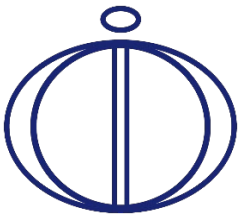
Diffusion Module (DICTRA) Example Macros

Thermo-Calc Version 2026a



Thermo-Calc Software

Thermo-Calc Software AB

Råsundavägen 18, SE-169 67 Solna, Sweden

+46 8 545 959 30

documentation@thermocalc.com

https://thermocalc.com/

exa1

One-phase problem. Homogenization of a binary Fe-Ni alloy. In this example it is assumed there is initially a linear Ni-concentration profile. ----------

exa2a

One-phase problem. Homogenization of a binary Fe-Ni alloy. A Ni rich and a Ni lean alloy are put together and initially there is a step profile. ----------

exa2b

One-phase problem. Homogenization of a binary Fe-Ni alloy. This example is identical to a2a but instead it uses implicit time integration instead of the trapezoidal method for solving the PDEs. ----------

exa3

One-phase problem. Uphill diffusion in an Fe-Si-C alloy This is an example to simulate uphill diffusion in a ternary single phase austenite matrix due to the classical Darken experiment published by L.S. Darken: Trans. Aime, v.180 (1949), pp. 430-438.

exa4

One-phase problem. Carburization of binary Fe-C alloy: Comparison to an analytical erf solution This is a simple binary simulation with a single phase region. The numerical simulation is compared with an analytical erf solution. For this reason a special database erf.tdb is created where the diffusion coefficient is set to a concentration independent value. ----------

exa5

One-phase problem. Carburization of a binary Fe-0.15 wt% C alloy. A mixture of 40% N2 and 60% cracked methanol is used as carrier gas. The carburizing "carbon potential" in the gas is 0.85 wt%. A surface reaction controls the flux of C at the surface. ----------

exa6

One-phase problem. Diffusion through a tube wall. A simple example about diffusion through a tube wall. The tube material is an Fe-0.6%Mn-0.7%Si-0.05%C alloy. On the inside wall a carbon activity of 0.9 is maintained whereas on the outside the C-activity is very low. This example demonstrates the use of the command SET-FIRST-INTERFACE as well as the MIXED boundary conditions. ----------

exa7

One phase example. Homogenization heat treatment The initial segregation profile is created from a Scheil calculation (see macro create_initial_profile.TCM). The command INPUT_SCHEIL_PROFILE in the DICTRA MONITOR performs most of the set up. Only time and temperature must be entered after the INPUT_SCHEIL_PROFILE command is executed. ----------

exb1a

Moving boundary problem. Austenite to ferrite transformation in a binary Fe-C alloy This example calculates a ferrite(BCC)/austenite(FCC)transformation in a binary Fe-C alloy. The initial state is an austenite of 2mm thickness. The composition of the austenite is Fe-0.15wt%C.

exb1b

Moving boundary problem. Austenite to ferrite transformation in a binary Fe-C alloy This is the same example as in exb1a but now the problem is with ferrite as an inactive phase adjacent to the initial austenite. ----------

exb1c

Moving boundary problem. Austenite to ferrite transformation in a binary Fe-C alloy This is the same example as in exb1a and exb1b but now the simulation starts at a higher temperature and assumes a gradual cooling down to 1050 K.

exb2

Description could not be found

exb3

Moving boundary example. Dissolution of 23-carbide in an austenitic matrix This example calculates the dissolution of an M23C6 particle in an austenite matrix. A film of ferrite is allowed to nucleate around the carbide during the precipitation. ----------

exb4a

Moving boundary problem. Solidification path of an Fe-18%Cr-8%Ni alloy: Eutectic reaction This example demonstrates the solidification path of an Fe-18%Cr-8%Ni alloy. A eutectic reaction is assumed, LIQUID -> BCC + FCC. Hence the BCC and FCC regions should be on separate sides of the liquid region. Comparison is made with both a Scheil-Gulliver simulation and equilibrium solidification conditions, both done in Thermo-Calc. ----------

exb4b

Moving boundary problem. Solidification path of an Fe-18%Cr-8%Ni alloy: Peritectic reaction This example is the same as exb4a but now a peritectic reaction is assumed: LIQUID + BCC -> FCC. Hence the FCC region should appear in between the LIQUID and the BCC. Comparison is made with both a Scheil-Gulliver simulation and equilibrium solidification conditions, both done in Thermo-Calc. ----------

exb4c

Moving boundary problem. Solidification path of an Fe-18%Cr-8%Ni alloy This example is the same as exb4b but now the diffusivity data is amended for the LIQUID and a high value for the diffusivity is used to simulate a case where it is assumed that the composition in the LIQUID is always homogeneous. This example is less realistic than exb4b. Comparison is made with both a Scheil-Gulliver simulation and equilibrium solidification conditions, both done in Thermo-Calc. ----------

exb4d

Moving boundary problem. Solidification path of an Fe-18%Cr-8%Ni alloy This example is the same as exb4b but instead of controlling the temperature the amount of heat extracted is given. Comparison is made with both a Scheil-Gulliver simulation and equilibrium solidification conditions, both done in Thermo-Calc. ----------

exb5

Moving boundary problem. Ternary diffusion couple of Fe-Ni-Cr alloys This example demonstrates the evaluation of a ternary Fe-Cr-Ni diffusion couple. A thin slice of alpha phase (38%Cr, 0%Ni) is clamped between two thicker slices of gamma phase (27%Cr, 20%Ni). The assembly is subsequently heat treated at 1373 K. This example corresponds to diffusion couple A in M. Kajihara, C.-B. Lim and M. Kikuchi: ISIJ International 33 (1993), pp. 498-507. See also M. Kajihara and M. Kikichi: Acta Metall.Mater. 41 (1993), pp.2045-2059. ----------

exb6

Moving boundary problem. Microsegregation of phosphorus This example illustrates the effect of microsegregation of phosphorus during peritectic solidification in steel. ----------

exb7

This example modifies the database interactively, which is not yet supported by GES6. Therefore, we enforce the use of GES5.

exc1

Cell calculation. Carbon cannon in ferrite/austenite: Fe-C system, 2-cell calculation This example simulates what happens to a ferrite plate that has inherited the carbon content of its parent austenite. The ferrite plate formed is embedded in an austenite matrix. This setup corresponds to a proposed mechanism for formation of WidmannstÃ¤tten ferrite or for the ferrite phase of the bainite structure. It is assumed that the phase boundary between ferrite and austenite is immobile, this is achieved in the simulation by putting the ferrite and the austenite in two different cells. See also M. Hillert, L. HÃ¶glund and J. Ã…gren: Acta Metall. Mater. 41 (1993), pp.1951-1957. ----------

exc2

Cell calculation. Cementite dissolution in an Fe-Cr-C alloy: Three particle sizes and three different cells This example calculates the dissolution of cementite particles in an austenite matrix. This example is the same as exc1 but instead there are three particle sizes. A total of six particles are considered using three different cells. This is to represent some size distribution among the cementite particles. See also Z.-K. Liu, L. HÃ¶glund, B. JÃ¶nsson and J. Ã…gren: Metall.Trans.A, v. 22A (1991), pp. 1745-1752. ----------

exd1a

Diffusion in dispersed systems. Carburization of Ni-25%Cr alloy: Dispersed system model This example is about carburization of a Ni-25Cr alloy. In this case the M3C2 and M7C3 carbides are entered as spheroid phases in a FCC matrix. This simulation can be run with either the DISPERSED SYSTEM MODEL or the HOMOGENIZATION MODEL. In this example the DISPERSED SYSTEM MODEL is used, which requires that the default HOMOGENIZATION MODEL is disabled. With the DISPERSED SYSTEM MODEL the command ENTER_LABYRINTH_FUNCTION is used to take into account the impeding effect of dispersed phases on long-range diffusion. For the HOMOGENIZATION MODEL the command ENTER_HOMOGENIZATION_FUNCTION should be used. This case is from A. EngstrÃ¶m, L. HÃ¶glund and J. Ã…gren: Metall.Trans.A v. 25A (1994), pp. 1127-1134. ----------

exd1b

Diffusion in dispersed systems. Carburization of Ni-25%Cr alloy: Homogenization model This example is about carburization of a Ni-25Cr alloy. In this case the M3C2 and M7C3 carbides are entered as spheroid phases in a FCC matrix. This case is from A. EngstrÃ¶m, L. HÃ¶glund and J. Ã…gren: Metall.Trans. A, v.25A (1994), pp. 1127-1134. This simulation can be run with the DISPERSED SYSTEM MODEL or HOMOGENIZATION MODEL. The default HOMOGENIZATION MODEL is used and then ENTER_HOMOGENIZATION_FUNCTION should be used instead of ENTER_LABYRINTH_FUNCTION. ----------

exd2a

Diffusion in dispersed systems. Diffusion couple of Fe-Cr-Ni alloys: Dispersed system model This example calculates the interdiffusion in a diffusion couple between a two-phase (FCC+BCC) and a single-phase (FCC) Fe-Ni-Cr alloy. This case is from A. EngstrÃ¶m: Scand. J. Met., v. 24, 1995, pp.12-20. This simulation can be run with either the DISPERSED SYSTEM MODEL or the HOMOGENIZATION MODEL. In this example the DISPERSED SYSTEM MODEL is used, which requires that the default HOMOGENIZATION MODEL is disabled. With the DISPERSED SYSTEM MODEL the command ENTER_LABYRINTH_FUNCTION is used to take into account the impeding effect of dispersed phases on long-range diffusion. For the HOMOGENIZATION MODEL the command ENTER_HOMOGENIZATION_FUNCTION should be used. ----------

exd2b

Diffusion in dispersed systems. Diffusion couple of Fe-Cr-Ni alloys: Homogenization model This example calculates the interdiffusion in a diffusion couple between a two-phase (FCC+BCC) and a single-phase (FCC) Fe-Ni-Cr alloy. This case is from A. EngstrÃ¶m: Scand. J. Met., v. 24, 1995, pp.12-20. This simulation can be run with either the DISPERSED SYSTEM MODEL or the HOMOGENIZATION MODEL. Here the default HOMOGENIZATION MODEL is used and then ENTER_HOMOGENIZATION_FUNCTION should be used instead of ENTER_LABYRINTH_FUNCTION. ----------

exd3

Diffusion in dispersed systems. Diffusion couple of Fe-Cr-Ni alloys: Homogenization model This example uses the homogenization model. It is taken from H. Larsson and A. EngstrÃ¶m, Acta. Mater. v.54 (2006), pp. 2431-2439. Experimental data from A. EngstrÃ¶m, Scand J Metall, v.243 (1995), p.12. The homogenization model can be used for multiphase simulations like the dispersed system model, but unlike the dispersed system model there is no need to have a single continuous matrix phase and, furthermore, there is no need to limit the size of time-steps. The set-up is performed in the same manner as for the dispersed system model, which means that a certain phase is entered as the matrix phase and the other phases are entered as spheroidal, but the choice of matrix phase will not affect the simulation. ----------

exe1

Cooperative growth. Growth of pearlite in an Fe-Mn-C alloy An example of pearlite growth in an Fe-0.50wt%C-0.91wt%Mn steel. ----------

exf1

Coarsening problem. Coarsening of M6C precipitate in an Fe-Mo-C alloy This example calculates the Ostwald-ripening of a spherical M6C carbide in an austenite matrix. ----------

exg1

Kinetic data example. Checking mobilities and diffusivities in an Fe-Ni alloy This is an example file to check the mobilities and diffusivities in an Fe-Ni alloy. ----------

exg2

Kinetic data example. Optimization of mobilities in Ni-Al fcc alloys A file for reading thermodynamic data and setting up the kinetic parameters that are needed for an optimization of the FCC phase in the binary Ni-Al system. See also A. EngstrÃ¶m and J. Ã…gren: ("Assessment of Diffusional Mobilities in Face-Centered Cubic Ni-Cr-Al Alloys" in Z. Metallkunde, Feb. 1996). ----------

exh1

Deviation from local equilibrium. Ferrite/austenite diffusion couple with interface mobility This example calculates the growth of ferrite into austenite with a limited interface mobility. this is done by adding a Gibbs-energy contribution to the ferrite using the SET-SURFACE-ENERGY command. ----------

exh2

Deviation from local equilibrium. Ferrite/austenite para-equilibrium in an Fe-Ni-C alloy This example calculates the growth of ferrite into austenite in an Fe-2.02%Ni-0.0885%C alloy using the para-equilibrium model. The results are compared with experimental information from Hutchinson, C. R., A. Fuchsmann, and Yves Brechet. "The diffusional formation of ferrite from austenite in Fe-C-Ni alloys." Metall. Mat. Trans. A 35.4 (2004): 1211-1221. ----------

exh3

Deviation from local equilibrium. Diffusion induced by a temperature gradient (thermomigration) This calculation shows how a temperature gradient induces diffusion. ----------

exi1

Diffusion in complex phases. Diffusion in a system with B2 ordering This example shows diffusion in a system with B2 ordering. The datafile AlFeNi-data.TDB contains both a thermodynamic and kinetic description for the ordered and disordered BCC. ----------

exi2

Diffusion in complex phases. Diffusion of carbon in cementite This example demonstrates the use of the model for calculation of diffusion through a stoichiometric phase. The flux of a component in the stoichiometric phase is assumed to be proportional to the difference in chemical potential at each side of the stoichiometric phase multiplied with the mobility for the component in the phase. The mobility is assessed from experimental information and is basically the tracer diffusivity for the component.

exi3a

Diffusion in complex phases. Diffusion in iron oxide (FeO) This example shows the oxidation of an iron sample and the consequent growth of an oxide layer. ----------

exi3b

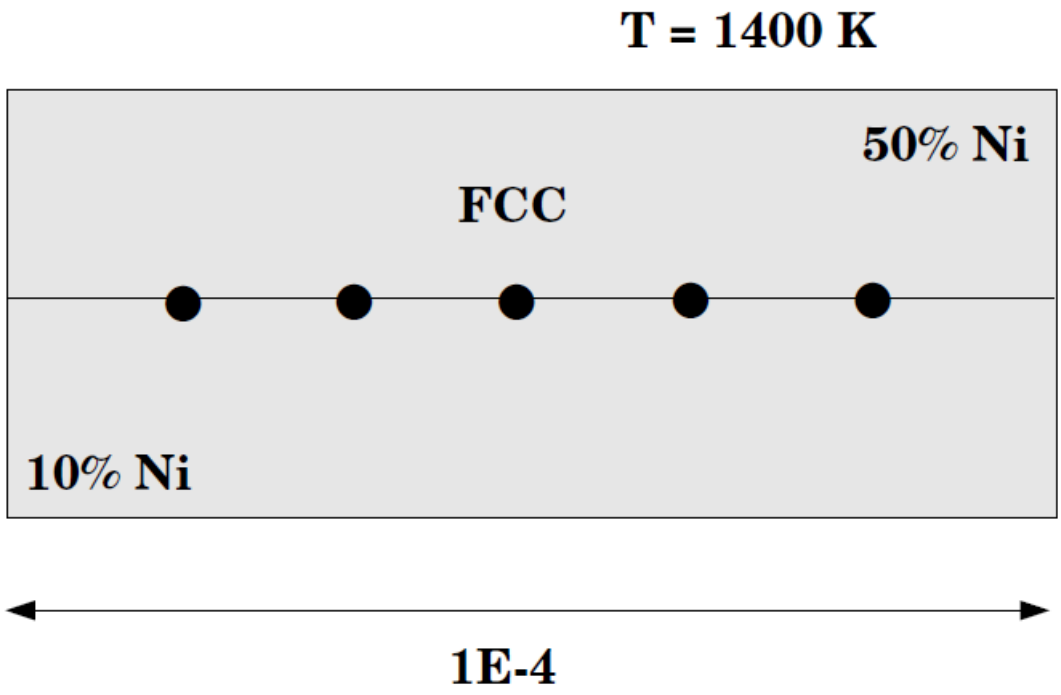
Diffusion in complex phases. Diffusion in iron oxide (FeO) with a grain boundary contribution This example shows the oxidation of an iron sample and consequent growth of an oxide layer using the grain boundary diffusion contribution model. ----------

One-Phase Problems

Example exa1

Homogenization of a binary Fe-Ni alloy: Linear Concentration Profile

Simple homogenization of a binary Fe-Ni alloy. It is assumed there is initially a linear Ni-concentration profile.



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```

Results

exa1-setup

```
SYS:About
 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exa1\setup.DCM.test"
SYS: @@
SYS: @@ One-phase problem.
SYS: @@ Homogenization of a binary Fe-Ni alloy.
SYS: @@ In this example it is assumed there is initially a linear
SYS: @@ Ni-concentration profile.
SYS: @@------------------------------------------------------------------
SYS:
SYS: @@
SYS: @@ START BY GOING TO THE DATABASE MODULE
SYS: @@
SYS: goto_module
MODULE NAME: data
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                        /-  DEFINED
DICTRA_FCC_A1  REJECTED
TDB_TCFE12:
TDB_TCFE12: @@
TDB_TCFE12: @@ USE THERMODYNAMIC DATABASE TO RETRIEVE DATA
TDB_TCFE12: @@
TDB_TCFE12: switch_database
 Use one of these databases

 TCFE12   =  Steels/Fe-Alloys  v12.0
 TCFE9    =  Steels/Fe-Alloys  v9.3
 SSUB6    =  SGTE Substances  v6.0
 FEDEMO   =  Iron Demo Database v6.0
 MOB2     =  Alloys Mobility  v2.7
 MOBFE7   =  Steels/Fe-Alloys Mobility  v7.1
 MOBFE4   =  Steels/Fe-Alloys Mobility  v4.0
 MOBFE2   =  Steels/Fe-Alloys Mobility  v2.0
 MFEDEMO  =  Fe-Alloys Mobility demo database v5.0
 USER     =  User defined Database

DATABASE NAME /TCFE12/: fedemo
 Current database: Iron Demo Database v6.0

 VA                        /-  DEFINED
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ DEFINE THE SYSTEM TO WORK WITH
TDB_FEDEMO: @@
TDB_FEDEMO: define_system
ELEMENTS: fe ni
 FE                        NI  DEFINED
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ EXCLUDE THE THERMODYNAMIC DATA FOR THE PHASES THAT ARE NOT NEEDED
TDB_FEDEMO: @@
TDB_FEDEMO: reject
ELEMENTS, SPECIES, PHASES, CONSTITUENT OR SYSTEM: /PHASES/: phase
PHASES: *


 GAS:G                     LIQUID:L                BCC_A2
 C14_LAVES                 CBCC_A12                CUB_A13
 FCC_A1                    HCP_A3  REJECTED
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ RESTORE THE THERMODYNAMIC DATA FOR THE FCC PHASE
TDB_FEDEMO: @@
TDB_FEDEMO: restore
ELEMENTS, SPECIES, PHASES OR CONSTITUENTS: /ELEMENTS/: phase
PHASES: fcc
 FCC_A1  RESTORED
TDB_FEDEMO:
TDB_FEDEMO: @@
```

```
TDB_FEDEMO: @@ RETRIEVE DATA FROM THE DATABASE FILE
TDB_FEDEMO: @@
TDB_FEDEMO: get_data
08:38:49,782 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ MOBILITY/DIFFUSIVITY DATA ARE STORED IN A SEPARATE DATABASE FILE.
TDB_FEDEMO: @@ SWITCH TO THE MOBILITY DATABASE TO RETRIEVE DATA
TDB_FEDEMO: @@
TDB_FEDEMO: append_database
 Use one of these databases

 TCFE12  =  Steels/Fe-Alloys  v12.0
 TCFE9   =  Steels/Fe-Alloys  v9.3
 SSUB6   =  SGTE Substances  v6.0
 FEDEMO  =  Iron Demo Database v6.0
 MOB2    =  Alloys Mobility  v2.7
 MOBFE7  =  Steels/Fe-Alloys Mobility  v7.1
 MOBFE4  =  Steels/Fe-Alloys Mobility  v4.0
 MOBFE2  =  Steels/Fe-Alloys Mobility  v2.0
 MFEDEMO =  Fe-Alloys Mobility demo database v5.0
 USER    =  User defined Database

DATABASE NAME /FEDEMO/: mfedemo
 Current database: Fe-Alloys Mobility demo database v5.0

 VA  DEFINED
APP: define_system
ELEMENTS: fe ni
 FE                     NI  DEFINED
APP: reject
ELEMENTS, SPECIES, PHASES, CONSTITUENT OR SYSTEM: /PHASES/: phase
PHASES: *
 BCC_A2                 FCC_A1                 LIQUID:L
   REJECTED
APP:
APP: restore
ELEMENTS, SPECIES, PHASES OR CONSTITUENTS: /ELEMENTS/: phase
PHASES: fcc
 FCC_A1  RESTORED
APP:
APP: get_data
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
APP:
APP: @@
APP: @@ ENTER THE DICTRA MONITOR WHERE THE SYSTEM IS SET UP
APP: @@
APP: goto_module
MODULE NAME: dictra_monitor
 NO TIME STEP DEFINED
DIC>
DIC> @@
DIC> @@ ENTER THE GLOBAL CONDITION T
DIC> @@
DIC> set_condition
GLOBAL OR BOUNDARY CONDITION /GLOBAL/: global
VARIABLE : T
LOW TIME LIMIT /0/: 0
T(TIME,X)= 1400;
HIGH TIME LIMIT /*/: *
ANY MORE RANGES /N/: N
DIC>
DIC> @@
DIC> @@ START BY ENTERING A REGION
DIC> @@
DIC> enter_region
REGION NAME : austenite
DIC>
DIC> @@
DIC> @@ ENTER A GRID INTO THE REGION
DIC> @@
DIC> @@ FOR SIMPLICITY, AN EQUIDISTANT GRID IS USED
DIC> @@
DIC> enter_grid_coordinates
REGION NAME : /AUSTENITE/: austenite
WIDTH OF REGION /1/: 1e-4
TYPE /AUTO/: AUTO
DIC>
DIC>
DIC> @@
DIC> @@ ENTER THE active PHASE INTO THE REGION
DIC> @@
DIC> enter_phase_in_region
ACTIVE OR INACTIVE PHASE /ACTIVE/: active
REGION NAME : /AUSTENITE/: austenite
PHASE TYPE /MATRIX/: matrix
PHASE NAME: /NONE/: fcc#1
DIC>
DIC> @@
DIC> @@ ENTER AN INITIAL Ni COMPOSITION INTO THE PHASE. A LINEAR
DIC> @@ VARIATION IN THE REGION IS ASSUMED.
DIC> @@
DIC> enter_compositions
REGION NAME : /AUSTENITE/: austenite
```

```
PHASE NAME: /FCC_A1/: fcc#1
DEPENDENT COMPONENT ? /NI/: fe
COMPOSITION TYPE /MOLE_FRACTION/: weight_percent
PROFILE FOR /NI/: ni
TYPE /LINEAR/: linear
VALUE OF FIRST POINT : 10
VALUE OF LAST POINT : /10/: 50
DIC>
DIC> @@
DIC> @@ THE BOUNDARY CONDITION IS A CLOSED SYSTEM AS WE DO NOT SPECIFY
DIC> @@ ANYTHING ELSE
DIC> @@
DIC>
DIC> @@
DIC> @@ SET THE SIMULATION TIME
DIC> @@
DIC> set_simulation_time
END TIME FOR INTEGRATION /.1/: 1E6
AUTOMATIC TIMESTEP CONTROL /YES/:
MAX TIMESTEP DURING INTEGRATION /100000/:
INITIAL TIMESTEP : /1E-07/:
SMALLEST ACCEPTABLE TIMESTEP : /1E-07/:
DIC>
DIC>
DIC> @@
DIC> @@ SAVE THE SET UP TO FILE AND EXIT
DIC> @@
DIC> save_workspaces exa1 Y
DIC>
DIC> set_interactive
 --OK---
DIC>
```

exa1-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exa1\run.DCM.test"
DIC>
DIC>
DIC> @@ exa1_run.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR RUNNING EXAMPLE a1
DIC> @@
DIC> goto_module
MODULE NAME: dictra_monitor
 TIME STEP AT TIME  0.00000E+00
DIC>
DIC> read_workspaces exa1
 OK
DIC>
DIC> @@
DIC> @@ Start the simulation
DIC> @@
DIC> simulate_reaction
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 Region: AUSTENITE
 linear    50 points
 DEGREE OF IMPLICITY SET TO TRAPEZOIDAL RULE
 U-FRACTION IN SYSTEM:  FE = .709679836161099  NI = .290320163838901
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
 U-FRACTION IN SYSTEM:  FE = .709679836161099  NI = .290320163838901
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
 TIME =  0.10000000E-06 DT =  0.10000000E-06 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .709679836161099  NI = .290320163838901
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.10010000E-03 DT =  0.10000000E-03 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .709679836161099  NI = .290320163838901
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.40010010     DT =  0.40000000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .709679836161099  NI = .290320163838901
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   1197.6953     DT =   1197.2952     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .709679836161099  NI = .290320163838901
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   3592.2856     DT =   2394.5903     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .7096798361611  NI = .290320163838901
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   8381.4662     DT =   4789.1806     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .7096798361611  NI = .290320163838901
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    1  seconds
 TIME =   17959.827     DT =   9578.3613     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .7096798361611  NI = .290320163838901
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   37116.550     DT =   19156.723     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .7096798361611  NI = .2903201638389
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   75429.995     DT =   38313.445     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .709679836161099  NI = .290320163838901
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   152056.89     DT =   76626.890     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .7096798361611  NI = .2903201638389
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   252056.89     DT =   100000.00     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .7096798361611  NI = .2903201638389
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   352056.89     DT =   100000.00     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .7096798361611  NI = .2903201638389
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   452056.89     DT =   100000.00     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .709679836161099  NI = .290320163838901
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   552056.89     DT =   100000.00     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .7096798361611  NI = .2903201638389
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   652056.89     DT =   100000.00     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .7096798361611  NI = .290320163838899
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   752056.89     DT =   100000.00     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .709679836161101  NI = .290320163838899
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   852056.89     DT =   100000.00     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .709679836161102  NI = .290320163838898
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   952056.89     DT =   100000.00     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .709679836161101  NI = .290320163838899
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   1000000.0     DT =   47943.115     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .709679836161101  NI = .290320163838899
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
 MUST SAVE WORKSPACE ON FILE
 WORKSPACE SAVED ON FILE
 RECLAIMING WORKSPACE
 DELETING TIME-RECORD FOR TIME    0.0000000
 DELETING TIME-RECORD FOR TIME   0.10000000E-06
 DELETING TIME-RECORD FOR TIME   0.10010000E-03
 DELETING TIME-RECORD FOR TIME   0.40010010
 DELETING TIME-RECORD FOR TIME    1197.6953
```

```
 DELETING TIME-RECORD FOR TIME    3592.2856
 DELETING TIME-RECORD FOR TIME    8381.4662
 DELETING TIME-RECORD FOR TIME    17959.827
 DELETING TIME-RECORD FOR TIME    37116.550
 DELETING TIME-RECORD FOR TIME    75429.995
 DELETING TIME-RECORD FOR TIME    152056.89
 DELETING TIME-RECORD FOR TIME    252056.89
 DELETING TIME-RECORD FOR TIME    352056.89
 DELETING TIME-RECORD FOR TIME    452056.89
 DELETING TIME-RECORD FOR TIME    552056.89
 DELETING TIME-RECORD FOR TIME    652056.89
 DELETING TIME-RECORD FOR TIME    752056.89
 DELETING TIME-RECORD FOR TIME    852056.89

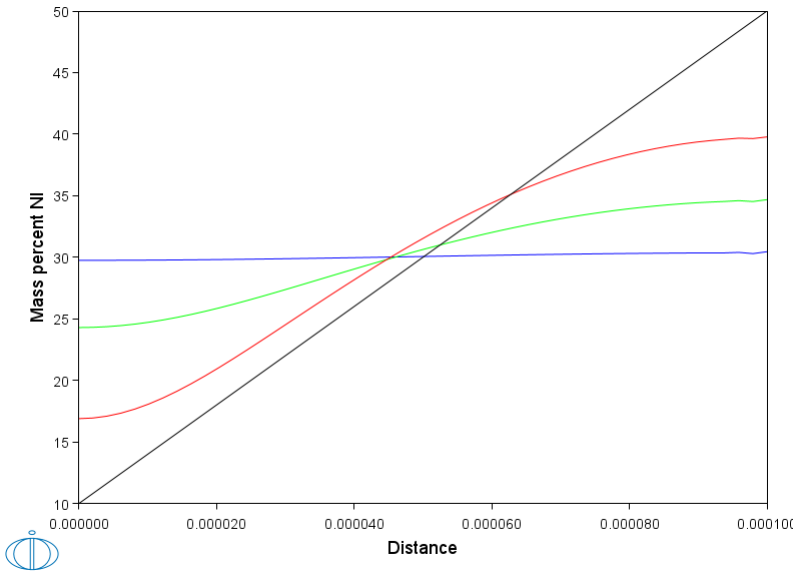
 KEEPING TIME-RECORD FOR TIME    952056.89
 AND FOR TIME                    1000000.0
 WORKSPACE RECLAIMED

 TIMESTEP AT     1000000.00     SELECTED

DIC>
DIC> @@
DIC> @@ THE SIMULATION IS FINISHED
DIC> @@
DIC>
DIC> set_interactive
 --OK---
DIC>
```

exa1-plot

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exa1\plot.DCM.test"
DIC>
DIC>
DIC> @@ exa1_plot.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR GENERATING GRAPHICAL OUTPUT FOR EXAMPLE a1
DIC> @@
DIC>
DIC> @@
DIC> @@ GO TO THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> goto_module
MODULE NAME: dictra_monitor
 TIME STEP AT TIME  1.00000E+06
DIC> read_workspaces exa1
 OK
DIC>
DIC> @@
DIC> @@ GO TO THE POST PROCESSOR
DIC> @@
DIC> post_processor
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1:
POST-1: @@
POST-1: @@ PLOT SOME CONCENTRATION PROFILES
POST-1: @@
POST-1: set_diagram_axis
AXIS (X, Y OR Z) : x
VARIABLE : distance
  INFO: Distance is set as independent variable
DISTANCE : /GLOBAL/: global
POST-1:
POST-1: set_diagram_axis
AXIS (X, Y OR Z) : y
VARIABLE : weight-percent
FOR COMPONENT : ni
POST-1:
POST-1: set_plot_condition
CONDITION /TIME/: time
VALUE(S) /LAST/: 0 1e5 3e5 1e6
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot_diagram
```

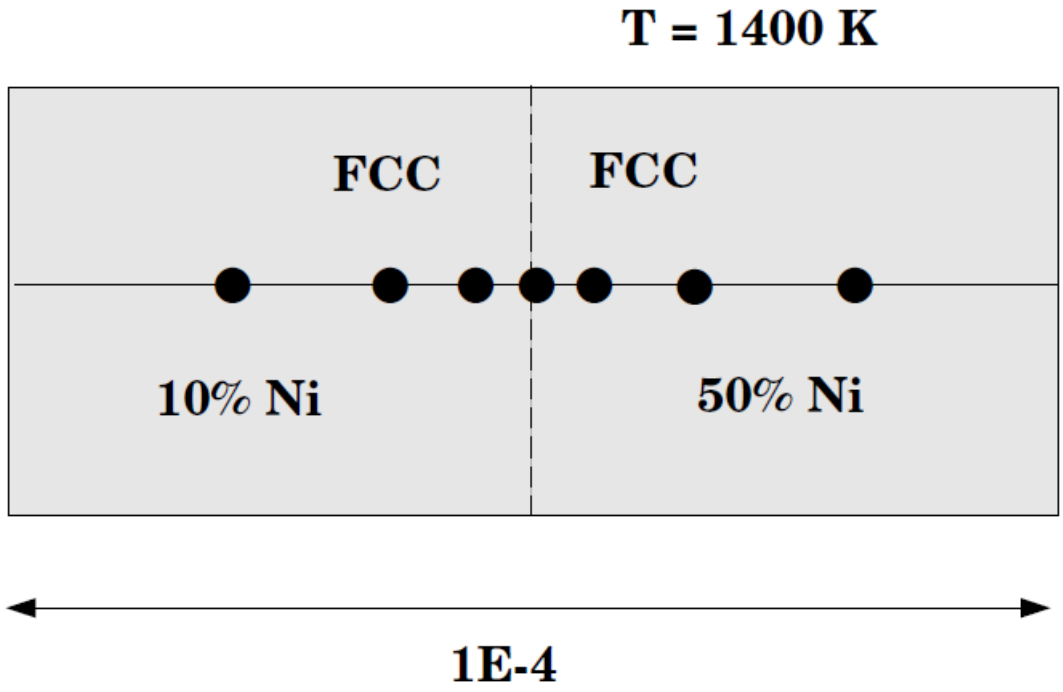



```
POST-1:
POST-1:
POST-1:
POST-1:@?<Hit_return_to_continue>
POST-1:
POST-1: set_interactive
 --OK---
POST-1:
```

Example exa2a

Homogenization of a binary Fe-Ni alloy: Step-profile

Simple homogenization of a binary Fe-Ni alloy. A Ni rich and a Ni lean alloy are put together and initially there is a step profile.



exa2a-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exa2a\setup.DCM.test"
SYS: @@
SYS: @@ One-phase problem.
SYS: @@ Homogenization of a binary Fe-Ni alloy.
SYS: @@ A Ni rich and a Ni lean alloy are put together and initially
SYS: @@ there is a step profile.
SYS: @@------------------------------------------------------------------
SYS:
SYS: @@ exa2a_setup.DCM
SYS:
SYS: @@
SYS: @@ IN exa1 ALL THE COMMANDS WERE WRITTEN IN FULL BUT NOW ABBREVIATED
SYS: @@ COMMANDS ARE USED
SYS: @@
SYS:
SYS: @@
SYS: @@ FIRST DEFINE A LOG-FILE FOR THIS EXAMPLE
SYS: @@
SYS: set_log_file setup
Heading:
SYS: @@
SYS: @@ NOW GO TO THE DATABASE MODULE
SYS: @@
SYS: go da
   ... the command in full is GOTO_MODULE
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                     /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12:
TDB_TCFE12: @@
TDB_TCFE12: @@ USE A THERMODYNAMIC DATABASE TO RETRIEVE DATA
TDB_TCFE12: @@
TDB_TCFE12: sw FEDEMO
   ... the command in full is SWITCH_DATABASE
 Current database: Iron Demo Database v6.0

 VA                     /-  DEFINED
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ DEFINE THE SYSTEM TO WORK WITH
TDB_FEDEMO: @@
TDB_FEDEMO: def-system fe ni
   ... the command in full is DEFINE_SYSTEM
 FE                     NI  DEFINED
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ EXCLUDE THE THERMODYNAMIC DATA FOR THE PHASES THAT ARE NOT NEEDED
TDB_FEDEMO: @@
TDB_FEDEMO: rej ph * all
   ... the command in full is REJECT
 GAS:G                  LIQUID:L               BCC_A2
 C14_LAVES              CBCC_A12               CUB_A13
 FCC_A1                 HCP_A3  REJECTED
TDB_FEDEMO: res ph fcc
   ... the command in full is RESTORE
 FCC_A1  RESTORED
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ RETRIEVE DATA FROM THE DATABASE FILE
TDB_FEDEMO: @@
TDB_FEDEMO: get
   ... the command in full is GET_DATA
08:41:48,180 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
   ... the command in full is AMEND_PHASE_DESCRIPTION
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ MOBILITY/DIFFUSIVITY DATA ARE STORED IN A SEPARATE DATABASE FILE.
TDB_FEDEMO: @@ SWITCH TO THE MOBILITY DATABASE TO RETRIEVE DATA
TDB_FEDEMO: @@
TDB_FEDEMO: app
   ... the command in full is APPEND_DATABASE
 Use one of these databases

 TCFE12  =  Steels/Fe-Alloys  v12.0
 TCFE9   =  Steels/Fe-Alloys  v9.3
 SSUB6   =  SGTE Substances  v6.0
 FEDEMO  =  Iron Demo Database v6.0
 MOB2    =  Alloys Mobility  v2.7
 MOBFE7  =  Steels/Fe-Alloys Mobility  v7.1
 MOBFE4  =  Steels/Fe-Alloys Mobility  v4.0
 MOBFE2  =  Steels/Fe-Alloys Mobility  v2.0
```

```
 MFEDEMO =  Fe-Alloys Mobility demo database v5.0
 USER    =  User defined Database

DATABASE NAME /FEDEMO/: mfedemo
 Current database: Fe-Alloys Mobility demo database v5.0

 VA  DEFINED
APP: def-sys fe ni
   ... the command in full is DEFINE_SYSTEM
 FE                      NI  DEFINED
APP: rej ph * all
   ... the command in full is REJECT
 BCC_A2                  FCC_A1                  LIQUID:L
   REJECTED
APP: res ph fcc
   ... the command in full is RESTORE
 FCC_A1  RESTORED
APP: get
   ... the command in full is GET_DATA
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
APP:
APP: @@
APP: @@ ENTER THE DICTRA MONITOR WHERE THE SYSTEM IS SET UP
APP: @@
APP: go d-m
   ... the command in full is GOTO_MODULE
 NO TIME STEP DEFINED
DIC>
DIC> @@
DIC> @@ ENTER THE GLOBAL CONDITION T
DIC> @@
DIC> set-cond
   ... the command in full is SET_CONDITION
GLOBAL OR BOUNDARY CONDITION /GLOBAL/: glob
VARIABLE : T
LOW TIME LIMIT /0/: 0
T(TIME,X)= 1400;
HIGH TIME LIMIT /*/: *
ANY MORE RANGES /N/: N
DIC>
DIC> @@
DIC> @@ ENTER A REGION
DIC> @@
DIC> enter-region
REGION NAME : austenite
DIC>
DIC> @@
DIC> @@ ENTER A GRID INTO THE REGION.
DIC> @@ IN THIS CASE WE WANT SEVERAL POINTS IN THE MIDDLE OF THE REGION,
DIC> @@ SO A DOUBLE GEOMETRIC GRID IS CONSTRUCTED.
DIC> @@
DIC> enter-grid
   ... the command in full is ENTER_GRID_COORDINATES
REGION NAME : /AUSTENITE/: austenite
WIDTH OF REGION /1/: 1e-4
TYPE /AUTO/: double
NUMBER OF POINTS /50/: 60
VALUE OF R IN THE GEOMETRICAL SERIE FOR LOWER PART OF REGION: 0.9
VALUE OF R IN THE GEOMETRICAL SERIE FOR UPPER PART OF REGION: 1.11
DIC>
DIC> @@
DIC> @@ ENTER THE active PHASES INTO THE REGIONS
DIC> @@
DIC> enter-phase
   ... the command in full is ENTER_PHASE_IN_REGION
ACTIVE OR INACTIVE PHASE /ACTIVE/: act
REGION NAME : /AUSTENITE/: austenite
PHASE TYPE /MATRIX/: matrix
PHASE NAME: /NONE/: fcc#1
DIC>
DIC> @@
DIC> @@ ENTER THE INITIAL Ni COMPOSITION INTO THE PHASE. READ DATA FROM
DIC> @@ THE FILE ni.dat WHICH CONTAINS THE Ni-PROFILE.
DIC> @@
DIC> enter-composition
   ... the command in full is ENTER_COMPOSITIONS
REGION NAME : /AUSTENITE/: austenite
PHASE NAME: /FCC_A1/: fcc#1
DEPENDENT COMPONENT ? /NI/: fe
COMPOSITION TYPE /MOLE_FRACTION/: w-p
PROFILE FOR /NI/: ni
TYPE /LINEAR/: read a2ani.dat
   ... the command in full is CREATE_NEW_EQUILIBRIUM
   ... the command in full is COMPUTE_EQUILIBRIUM
   ... the command in full is COMPUTE_EQUILIBRIUM
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    ... the command in full is COMPUTE_EQUILIBRIUM
DIC>
DIC> @@
DIC> @@ THE BOUNDARY CONDITION IS A CLOSED SYSTEM AS WE DO NOT SPECIFY
DIC> @@ ANYTHING ELSE
DIC> @@
DIC>
DIC> @@
DIC> @@ SET THE SIMULATION TIME
DIC> @@
DIC> set-simulation-time
END TIME FOR INTEGRATION /.1/: 1E6
AUTOMATIC TIMESTEP CONTROL /YES/:
MAX TIMESTEP DURING INTEGRATION /100000/:
INITIAL TIMESTEP : /1E-07/:
SMALLEST ACCEPTABLE TIMESTEP : /1E-07/:
DIC>
```

```
DIC>
DIC> @@
DIC> @@ SAVE THE SET UP TO FILE AND EXIT
DIC> @@
DIC> save exa2a Y
   ... the command in full is SAVE_WORKSPACES
DIC>
DIC> set-inter
   ... the command in full is SET_INTERACTIVE
 --OK---
DIC>
```

exa2a-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exa2a\run.DCM.test"
   ... the command in full is MACRO_FILE_OPEN
DIC>
DIC>
DIC> @@ exa2a_run.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR RUNNING EXAMPLE a2a
DIC> @@
DIC>
DIC> @@
DIC> @@ ENTER THE DICTRA MONITOR AN READ SETUP FROM FILE
DIC> @@
DIC> go d-m
   ... the command in full is GOTO_MODULE
 TIME STEP AT TIME  0.00000E+00
DIC>
DIC> read exa2a
   ... the command in full is READ_WORKSPACES
   ... the command in full is DEFINE_COMPONENTS
   ... the command in full is SELECT_EQUILIBRIUM
 OK
DIC>
DIC> @@
DIC> @@ START THE SIMULATION
DIC> @@
DIC> simulate
   ... the command in full is SIMULATE_REACTION
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 DEGREE OF IMPLICITY SET TO TRAPEZOIDAL RULE
   ... the command in full is SET_NUMERICAL_LIMITS
 U-FRACTION IN SYSTEM:  FE = .70888824540617  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
 U-FRACTION IN SYSTEM:  FE = .70888824540617  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  2  GRIDPOINT(S) ADDED   TO   CELL #1   REGION: AUSTENITE
 TIME =  0.10000000E-06 DT =  0.10000000E-06 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .708888245406169  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.10010000E-03 DT =  0.10000000E-03 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .708888245406169  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.40010010     DT =  0.40000000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .70888824540617  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   8.1787785     DT =   7.7786784     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .70888824540617  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   23.736135     DT =   15.557357     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .708888245406169  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    1  seconds
 TIME =   54.850849     DT =   31.114714     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .708888245406169  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   117.08028     DT =   62.229428     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .70888824540617  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   241.53913     DT =   124.45886     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .708888245406169  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   490.45684     DT =   248.91771     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .708888245406169  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   988.29226     DT =   497.83542     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .70888824540617  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   1983.9631     DT =   995.67084     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .70888824540617  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   3975.3048     DT =   1991.3417     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .708888245406169  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   7957.9881     DT =   3982.6834     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .70888824540617  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   15923.355     DT =   7965.3667     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .70888824540617  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   31854.088     DT =   15930.733     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .70888824540617  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   63715.555     DT =   31861.467     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .70888824540617  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   127438.49     DT =   63722.934     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .70888824540617  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   227438.49     DT =   100000.00     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .70888824540617  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   327438.49     DT =   100000.00     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .70888824540617  NI = .29111175459383
```

```
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   427438.49     DT =   100000.00     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .708888245406168  NI = .291111754593832
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   527438.49     DT =   100000.00     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .70888824540617  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   627438.49     DT =   100000.00     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .70888824540617  NI = .291111754593829
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    1  seconds
 TIME =   727438.49     DT =   100000.00     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .708888245406171  NI = .291111754593829
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   827438.49     DT =   100000.00     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .708888245406171  NI = .291111754593829
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   927438.49     DT =   100000.00     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .708888245406169  NI = .291111754593831
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   1000000.0     DT =   72561.511     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .708888245406171  NI = .291111754593828
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
 MUST SAVE WORKSPACE ON FILE
 WORKSPACE SAVED ON FILE
 RECLAIMING WORKSPACE
 DELETING TIME-RECORD FOR TIME    0.0000000
 DELETING TIME-RECORD FOR TIME   0.10000000E-06
 DELETING TIME-RECORD FOR TIME   0.10010000E-03
 DELETING TIME-RECORD FOR TIME   0.40010010
 DELETING TIME-RECORD FOR TIME    8.1787785
 DELETING TIME-RECORD FOR TIME    23.736135
 DELETING TIME-RECORD FOR TIME    54.850849
 DELETING TIME-RECORD FOR TIME    117.08028
 DELETING TIME-RECORD FOR TIME    241.53913
 DELETING TIME-RECORD FOR TIME    490.45684
 DELETING TIME-RECORD FOR TIME    988.29226
 DELETING TIME-RECORD FOR TIME    1983.9631
 DELETING TIME-RECORD FOR TIME    3975.3048
 DELETING TIME-RECORD FOR TIME    7957.9881
 DELETING TIME-RECORD FOR TIME    15923.355
 DELETING TIME-RECORD FOR TIME    31854.088
 DELETING TIME-RECORD FOR TIME    63715.555
 DELETING TIME-RECORD FOR TIME    127438.49
 DELETING TIME-RECORD FOR TIME    227438.49
 DELETING TIME-RECORD FOR TIME    327438.49
 DELETING TIME-RECORD FOR TIME    427438.49
 DELETING TIME-RECORD FOR TIME    527438.49
 DELETING TIME-RECORD FOR TIME    627438.49
 DELETING TIME-RECORD FOR TIME    727438.49
 DELETING TIME-RECORD FOR TIME    827438.49

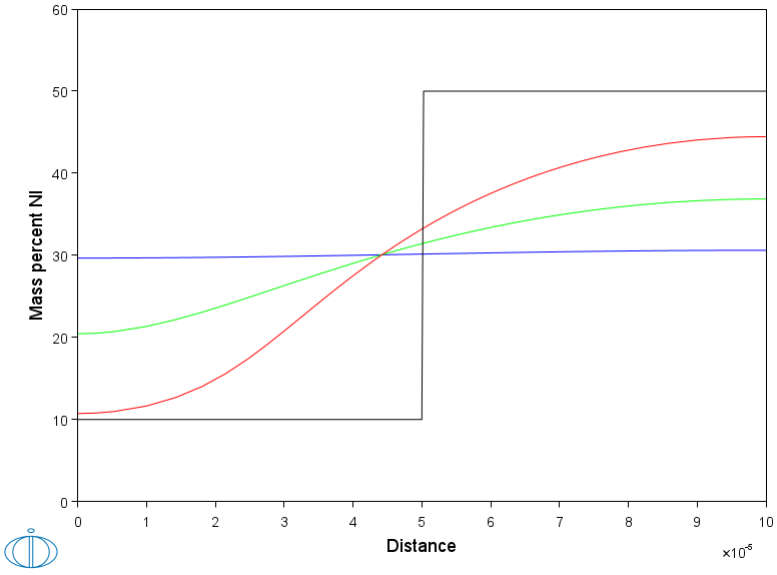
 KEEPING TIME-RECORD FOR TIME    927438.49
 AND FOR TIME                    1000000.0
 WORKSPACE RECLAIMED

 TIMESTEP AT     1000000.00     SELECTED

DIC>
DIC> @@
DIC> @@ THE SIMULATION IS FINISHED
DIC> @@
DIC>
DIC> set-inter
   ... the command in full is SET_INTERACTIVE
 --OK---
DIC>
```

exa2a-plot

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exa2a\plot.DCM.test"
   ... the command in full is MACRO_FILE_OPEN
DIC>
DIC>
DIC> @@ exa2a_plot.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR GENERATING GRAPHICAL OUTPUT FOR EXAMPLE a2a
DIC> @@
DIC>
DIC> @@
DIC> @@ GO TO THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
   ... the command in full is GOTO_MODULE
 TIME STEP AT TIME  1.00000E+06
DIC>
DIC> read exa2a
   ... the command in full is READ_WORKSPACES
   ... the command in full is DEFINE_COMPONENTS
   ... the command in full is SELECT_EQUILIBRIUM
 OK
DIC>
DIC> @@
DIC> @@ GO TO THE POST PROCESSOR
DIC> @@
DIC> post
   ... the command in full is POST_PROCESSOR
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1:
POST-1: @@
POST-1: @@ PLOT SOME NI-CONCENTRATION PROFILES
POST-1: @@
POST-1: s-d-a
   ... the command in full is SET_DIAGRAM_AXIS
AXIS (X, Y OR Z) : x
VARIABLE : dist
  INFO: Distance is set as independent variable
   ... the command in full is SET_INDEPENDENT_VARIABLE
DISTANCE : /GLOBAL/: glo
POST-1:
POST-1: s-d-a
   ... the command in full is SET_DIAGRAM_AXIS
AXIS (X, Y OR Z) : y
VARIABLE : weight-percent
FOR COMPONENT : ni
POST-1:
POST-1: s-p-c
   ... the command in full is SET_PLOT_CONDITION
CONDITION /TIME/: time
VALUE(S) /LAST/: 0 1e5 3e5 1e6
POST-1:
POST-1: @@
POST-1: @@ SET SCALING ON Y-AXIS BEFORE PLOTTING
POST-1: @@
POST-1: s-s-s
   ... the command in full is SET_SCALING_STATUS
AXIS (X, Y OR Z) : y
AUTOMATIC SCALING  (Y OR N) /N/: n
MIN VALUE : 0
MAX VALUE : 60
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
   ... the command in full is MAKE_EXPERIMENTAL_DATAFILE
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
   ... the command in full is PLOT_DIAGRAM
```



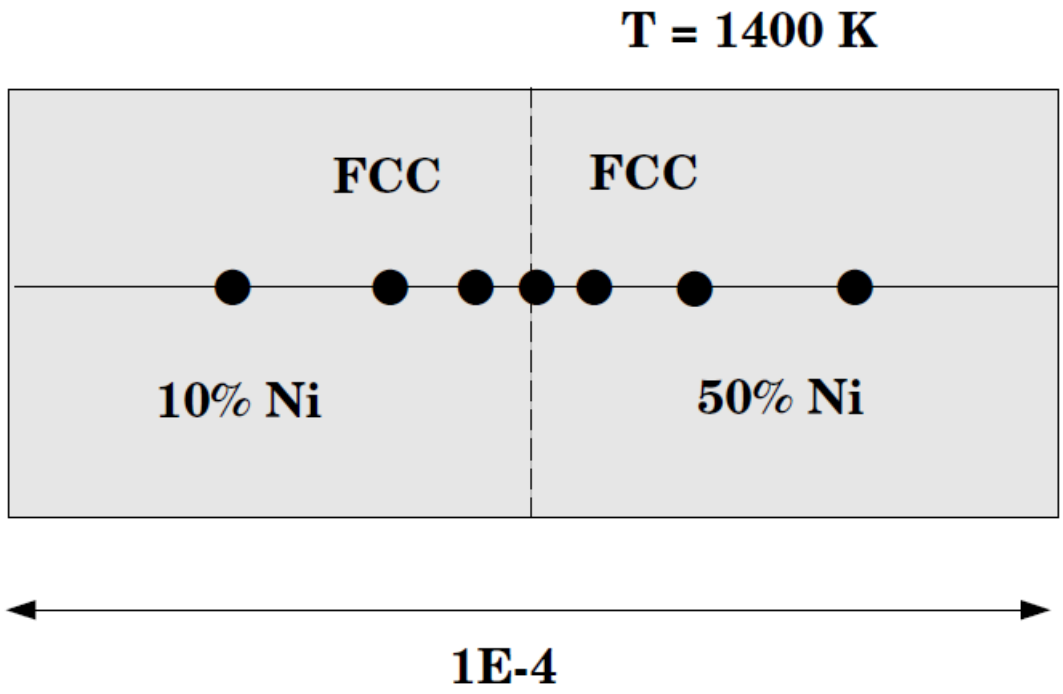

```
POST-1:
POST-1:
```

```
POST-1:
POST-1:@?<Hit_return_to_continue>
POST-1:
POST-1: set-inter
   ... the command in full is SET_INTERACTIVE_MODE
 --OK---
POST-1:
```

Example exa2b

Homogenization of a binary Fe-Ni alloy

Simple homogenization of a binary Fe-Ni alloy. We have put together a Ni rich and a Ni lean alloy. This example is identical to exa2a. However, in this example implicit time integration is used instead of the trapezoidal method for solving the PDEs.



exa2b-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exa2b\setup.DCM.test"
SYS: @@
SYS: @@ One-phase problem.
SYS: @@ Homogenization of a binary Fe-Ni alloy.
SYS: @@ This example is identical to a2a  but instead it uses implicit time
SYS: @@ integration instead of the trapezoidal method for solving the PDEs.
SYS: @@------------------------------------------------------------------
SYS:
SYS: @@ exa2b_setup.DCM
SYS:
SYS: @@
SYS: @@ FIRST DEFINE A LOG-FILE FOR THIS EXAMPLE
SYS: @@
SYS: set_log_file setup
Heading:
SYS: @@
SYS: @@ THEN GO TO THE DATABASE MODULE
SYS: @@
SYS: go da
   ... the command in full is GOTO_MODULE
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                     /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12:
TDB_TCFE12: @@
TDB_TCFE12: @@ USE THE TCFE DATABASE FOR THERMODYNAMIC DATA
TDB_TCFE12: @@
TDB_TCFE12: sw fedemo
   ... the command in full is SWITCH_DATABASE
 Current database: Iron Demo Database v6.0

 VA                     /-  DEFINED
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ DEFINE THE SYSTEM TO WORK WITH
TDB_FEDEMO: @@
TDB_FEDEMO: def-system fe ni
   ... the command in full is DEFINE_SYSTEM
 FE                     NI  DEFINED
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ EXCLUDE THE THERMODYNAMIC DATA FOR THE PHASES THAT ARE NOT NEEDED
TDB_FEDEMO: @@
TDB_FEDEMO: rej ph * all
   ... the command in full is REJECT
 GAS:G                  LIQUID:L               BCC_A2
 C14_LAVES              CBCC_A12               CUB_A13
 FCC_A1                 HCP_A3  REJECTED
TDB_FEDEMO: res ph fcc
   ... the command in full is RESTORE
 FCC_A1  RESTORED
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ RETRIEVE DATA FROM THE DATABASE FILE
TDB_FEDEMO: @@
TDB_FEDEMO: get
   ... the command in full is GET_DATA
08:44:45,594 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
   ... the command in full is AMEND_PHASE_DESCRIPTION
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ MOBILITY/DIFFUSIVITY DATA ARE STORED IN A SEPARATE DATABASE FILE.
TDB_FEDEMO: @@ SWITCH TO THE MOBILITY DATABASE TO RETRIEVE DATA.
TDB_FEDEMO: @@
TDB_FEDEMO: app
   ... the command in full is APPEND_DATABASE
 Use one of these databases

 TCFE12  =  Steels/Fe-Alloys  v12.0
 TCFE9   =  Steels/Fe-Alloys  v9.3
 SSUB6   =  SGTE Substances  v6.0
 FEDEMO  =  Iron Demo Database v6.0
 MOB2    =  Alloys Mobility  v2.7
 MOBFE7  =  Steels/Fe-Alloys Mobility  v7.1
 MOBFE4  =  Steels/Fe-Alloys Mobility  v4.0
 MOBFE2  =  Steels/Fe-Alloys Mobility  v2.0
 MFEDEMO =  Fe-Alloys Mobility demo database v5.0
 USER    =  User defined Database

DATABASE NAME /FEDEMO/: mfedemo
 Current database: Fe-Alloys Mobility demo database v5.0
```

```
 VA  DEFINED
APP: def-sys fe ni
   ... the command in full is DEFINE_SYSTEM
 FE                     NI  DEFINED
APP: rej ph * all
   ... the command in full is REJECT
 BCC_A2                 FCC_A1                  LIQUID:L
   REJECTED
APP: res ph fcc
   ... the command in full is RESTORE
 FCC_A1  RESTORED
APP: get
   ... the command in full is GET_DATA
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
APP:
APP: @@
APP: @@ ENTER THE DICTRA MONITOR WHERE THE SYSTEM IS SET UP
APP: @@
APP: go d-m
   ... the command in full is GOTO_MODULE
 NO TIME STEP DEFINED
DIC>
DIC> @@
DIC> @@ ENTER THE GLOBAL CONDITION T
DIC> @@
DIC> set-cond
   ... the command in full is SET_CONDITION
GLOBAL OR BOUNDARY CONDITION /GLOBAL/: glob
VARIABLE : T
LOW TIME LIMIT /0/: 0
T(TIME,X)= 1400;
HIGH TIME LIMIT /*/: *
ANY MORE RANGES /N/: N
DIC>
DIC> @@
DIC> @@ ENTER A REGION
DIC> @@
DIC> enter-region
REGION NAME : austenite
DIC>
DIC> @@
DIC> @@ ENTER A GRID INTO THE REGION.
DIC> @@ AS IN EXAMPLE a2a WE WANT SEVERAL POINTS IN THE MIDDLE OF THE REGION,
DIC> @@ SO A DOUBLE GEOMETRIC GRID IS ALSO CONSTRUCTED IN THIS EXAMPLE.
DIC> @@
DIC> enter-grid
   ... the command in full is ENTER_GRID_COORDINATES
REGION NAME : /AUSTENITE/: austenite
WIDTH OF REGION /1/: 1e-4
TYPE /AUTO/: double
NUMBER OF POINTS /50/: 60
VALUE OF R IN THE GEOMETRICAL SERIE FOR LOWER PART OF REGION: 0.9
VALUE OF R IN THE GEOMETRICAL SERIE FOR UPPER PART OF REGION: 1.11
DIC>
DIC> @@
DIC> @@ ENTER ACTIVE PHASES INTO THE REGIONS
DIC> @@
DIC> enter-phase
   ... the command in full is ENTER_PHASE_IN_REGION
ACTIVE OR INACTIVE PHASE /ACTIVE/: act
REGION NAME : /AUSTENITE/: austenite
PHASE TYPE /MATRIX/: matrix
PHASE NAME: /NONE/: fcc#1
DIC>
DIC> @@
DIC> @@ ENTER THE INITIAL Ni COMPOSITION INTO THE PHASE. READ DATA FROM
DIC> @@ THE FILE ni.dat WHICH CONTAINS THE Ni-PROFILE.
DIC> @@
DIC> enter-composition
   ... the command in full is ENTER_COMPOSITIONS
REGION NAME : /AUSTENITE/: austenite
PHASE NAME: /FCC_A1/: fcc#1
DEPENDENT COMPONENT ? /NI/: fe
COMPOSITION TYPE /MOLE_FRACTION/: w-p
PROFILE FOR /NI/: ni
TYPE /LINEAR/: read a2bni.dat
   ... the command in full is CREATE_NEW_EQUILIBRIUM
   ... the command in full is COMPUTE_EQUILIBRIUM
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DIC>
DIC> @@
DIC> @@ THE BOUNDARY CONDITION IS A CLOSED SYSTEM AS WE DO NOT SPECIFY
DIC> @@ ANYTHING ELSE
DIC> @@
DIC>
DIC> @@
DIC> @@ AFTER THE SIMULATION IN exa2a THE PROFILES HAVE SOME FLUCTUATIONS. WE
DIC> @@ NOW TRY TO GET RID OF THESE USING IMPLICIT (1) TIME INTEGRATION
DIC> @@ INSTEAD OF THE MORE ACCURATE (BUT LESS STABLE) TRAPETZOIDAL METHOD
DIC> @@ (THE DEFAULT).
DIC> @@
DIC> set-option DEGREE_OF_IMPLICITY 1.0
... the command in full is DEGREE_OF_IMPLICITY_WHEN_INTEGRATING_PDE
DIC>
DIC> @@
DIC> @@ SET THE SIMULATION TIME
DIC> @@
DIC> set-simulation-time
END TIME FOR INTEGRATION /.1/: 1E6
AUTOMATIC TIMESTEP CONTROL /YES/:
MAX TIMESTEP DURING INTEGRATION /100000/:
```

```
INITIAL TIMESTEP : /1E-07/:
SMALLEST ACCEPTABLE TIMESTEP : /1E-07/:
DIC>
DIC>
DIC> @@
DIC> @@ SAVE THE SET UP TO FILE AND EXIT
DIC> @@
DIC> save exa2b Y
   ... the command in full is SAVE_WORKSPACES
DIC>
DIC> set-inter
   ... the command in full is SET_INTERACTIVE
 --OK---
DIC>
```

exa2b-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exa2b\run.DCM.test"
   ... the command in full is MACRO_FILE_OPEN
DIC>
DIC>
DIC> @@ exa2b_run.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR RUNNING EXAMPLE a2b
DIC> @@
DIC>
DIC> @@
DIC> @@ ENTER THE DICTRA MONITOR AN READ SETUP FROM FILE
DIC> @@
DIC> go d-m
   ... the command in full is GOTO_MODULE
 TIME STEP AT TIME  0.00000E+00
DIC> read exa2b
   ... the command in full is READ_WORKSPACES
   ... the command in full is DEFINE_COMPONENTS
   ... the command in full is SELECT_EQUILIBRIUM
 OK
DIC>
DIC> @@
DIC> @@ Start the simulation
DIC> @@
DIC> simulate
   ... the command in full is SIMULATE_REACTION
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
   ... the command in full is SET_NUMERICAL_LIMITS
 U-FRACTION IN SYSTEM:  FE = .70888824540617  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
 U-FRACTION IN SYSTEM:  FE = .70888824540617  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  2  GRIDPOINT(S) ADDED   TO   CELL #1   REGION: AUSTENITE
 TIME =  0.10000000E-06 DT =  0.10000000E-06 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .708888245406169  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.10010000E-03 DT =  0.10000000E-03 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .708888245406169  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.40010010     DT =  0.40000000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .70888824540617  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   8.1725731     DT =   7.7724730     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .70888824540617  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   23.717519     DT =   15.544946     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .708888245406169  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   54.807411     DT =   31.089892     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .70888824540617  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   116.98720     DT =   62.179784     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .70888824540617  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   241.34676     DT =   124.35957     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .70888824540617  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   490.06590     DT =   248.71914     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .70888824540617  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   987.50417     DT =   497.43827     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .70888824540617  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   1982.3807     DT =   994.87654     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .708888245406169  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   3972.1338     DT =   1989.7531     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .70888824540617  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   7951.6400     DT =   3979.5062     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .70888824540617  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   15910.652     DT =   7959.0123     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .70888824540617  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   31828.677     DT =   15918.025     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .70888824540617  NI = .29111175459383
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   63664.726     DT =   31836.049     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .708888245406171  NI = .291111754593829
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   127336.83     DT =   63672.099     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .708888245406166  NI = .291111754593834
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   227336.83     DT =   100000.00     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .708888245406162  NI = .291111754593838
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   327336.83     DT =   100000.00     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .70888824540616  NI = .29111175459384
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    1  seconds
```

```
 TIME =   427336.83     DT =   100000.00     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .708888245406162  NI = .291111754593838
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   527336.83     DT =   100000.00     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .708888245406164  NI = .291111754593836
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   627336.83     DT =   100000.00     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .708888245406161  NI = .291111754593839
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   727336.83     DT =   100000.00     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .708888245406161  NI = .291111754593839
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   827336.83     DT =   100000.00     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .708888245406163  NI = .291111754593837
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   927336.83     DT =   100000.00     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .708888245406163  NI = .291111754593837
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   1000000.0     DT =   72663.175     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  FE = .708888245406167  NI = .291111754593833
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
 MUST SAVE WORKSPACE ON FILE
 WORKSPACE SAVED ON FILE
 RECLAIMING WORKSPACE
 DELETING TIME-RECORD FOR TIME    0.0000000
 DELETING TIME-RECORD FOR TIME    0.10000000E-06
 DELETING TIME-RECORD FOR TIME    0.10010000E-03
 DELETING TIME-RECORD FOR TIME    0.40010010
 DELETING TIME-RECORD FOR TIME    8.1725731
 DELETING TIME-RECORD FOR TIME    23.717519
 DELETING TIME-RECORD FOR TIME    54.807411
 DELETING TIME-RECORD FOR TIME    116.98720
 DELETING TIME-RECORD FOR TIME    241.34676
 DELETING TIME-RECORD FOR TIME    490.06590
 DELETING TIME-RECORD FOR TIME    987.50417
 DELETING TIME-RECORD FOR TIME    1982.3807
 DELETING TIME-RECORD FOR TIME    3972.1338
 DELETING TIME-RECORD FOR TIME    7951.6400
 DELETING TIME-RECORD FOR TIME    15910.652
 DELETING TIME-RECORD FOR TIME    31828.677
 DELETING TIME-RECORD FOR TIME    63664.726
 DELETING TIME-RECORD FOR TIME    127336.83
 DELETING TIME-RECORD FOR TIME    227336.83
 DELETING TIME-RECORD FOR TIME    327336.83
 DELETING TIME-RECORD FOR TIME    427336.83
 DELETING TIME-RECORD FOR TIME    527336.83
 DELETING TIME-RECORD FOR TIME    627336.83
 DELETING TIME-RECORD FOR TIME    727336.83
 DELETING TIME-RECORD FOR TIME    827336.83

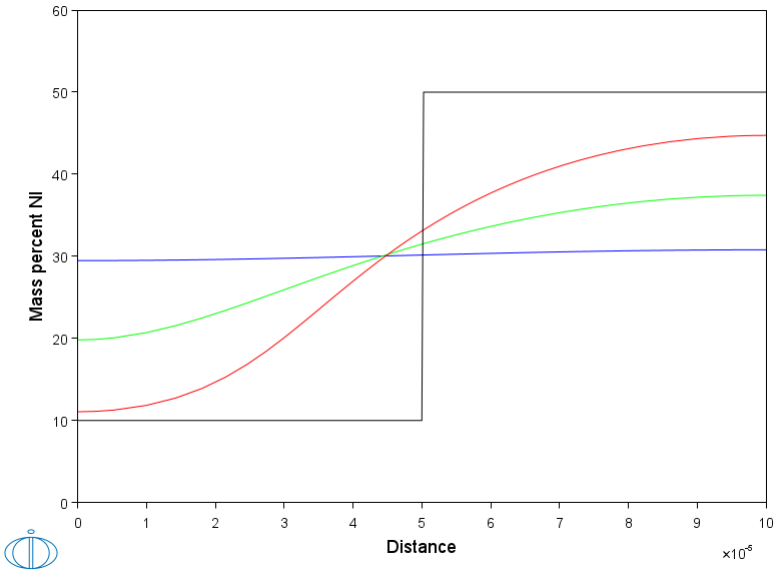
 KEEPING TIME-RECORD FOR TIME    927336.83
 AND FOR TIME                    1000000.0
 WORKSPACE RECLAIMED

 TIMESTEP AT     1000000.00     SELECTED

DIC>
DIC> @@
DIC> @@ THE SIMULATION IS FINISHED
DIC> @@
DIC>
DIC> set-inter
   ... the command in full is SET_INTERACTIVE
 --OK---
DIC>
```

exa2b-plot

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exa2b\plot.DCM.test"
   ... the command in full is MACRO_FILE_OPEN
DIC>
DIC>
DIC> @@ exa2b_plot.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR GENERATING GRAPHICAL OUTPUT FOR EXAMPLE a2b
DIC> @@
DIC>
DIC> @@
DIC> @@ GO TO THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
   ... the command in full is GOTO_MODULE
 TIME STEP AT TIME  1.00000E+06
DIC> read exa2b
   ... the command in full is READ_WORKSPACES
   ... the command in full is DEFINE_COMPONENTS
   ... the command in full is SELECT_EQUILIBRIUM
 OK
DIC>
DIC> @@
DIC> @@ GO TO THE POST PROCESSOR
DIC> @@
DIC> post
   ... the command in full is POST_PROCESSOR
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1:
POST-1: @@
POST-1: @@ PLOT SOME CONCENTRATION PROFILES
POST-1: @@
POST-1: s-d-a
   ... the command in full is SET_DIAGRAM_AXIS
AXIS (X, Y OR Z) : x
VARIABLE : dist
  INFO: Distance is set as independent variable
   ... the command in full is SET_INDEPENDENT_VARIABLE
DISTANCE : /GLOBAL/: glo
POST-1:
POST-1: s-d-a
   ... the command in full is SET_DIAGRAM_AXIS
AXIS (X, Y OR Z) : y
VARIABLE : w-p
FOR COMPONENT : ni
POST-1:
POST-1: s-p-c
   ... the command in full is SET_PLOT_CONDITION
CONDITION /TIME/: time
VALUE(S) /LAST/: 0 1e5 3e5 1e6
POST-1:
POST-1: @@
POST-1: @@ SET SCALING ON Y-AXIS BEFORE PLOTTING
POST-1: @@
POST-1: s-s-s
   ... the command in full is SET_SCALING_STATUS
AXIS (X, Y OR Z) : y
AUTOMATIC SCALING  (Y OR N) /N/: n
MIN VALUE : 0
MAX VALUE : 60
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
   ... the command in full is MAKE_EXPERIMENTAL_DATAFILE
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
   ... the command in full is PLOT_DIAGRAM
```




```
POST-1:
POST-1:
POST-1:
```

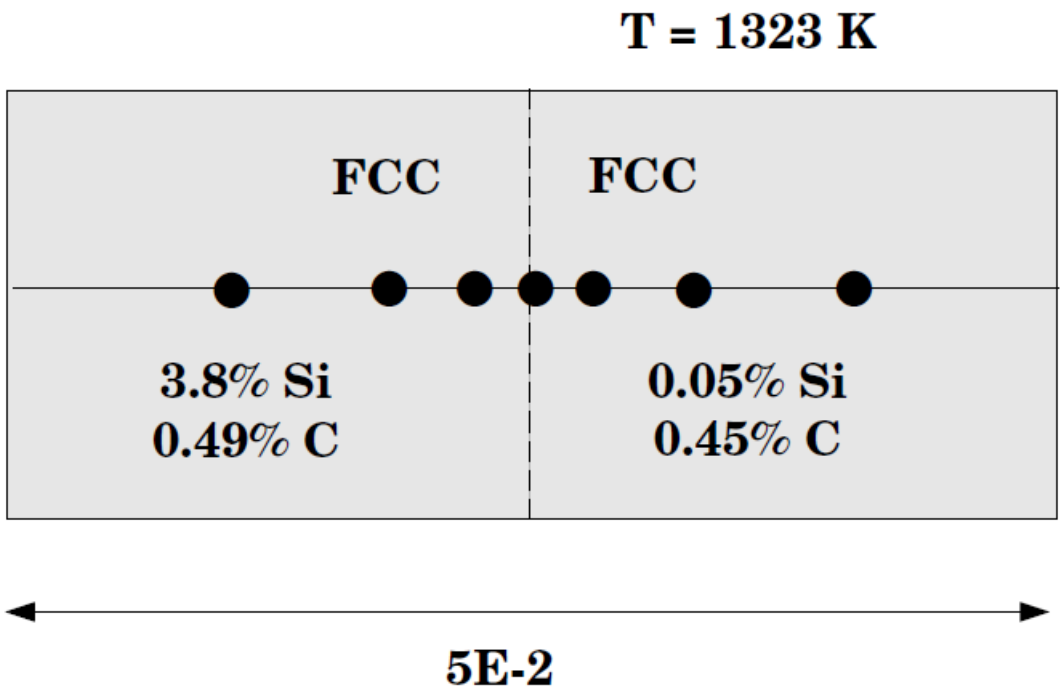
```
POST-1:@?<Hit_return_to_continue>
POST-1:
POST-1: set-inter
   ... the command in full is SET_INTERACTIVE_MODE
 --OK---
POST-1:
```

Example exa3

Uphill diffusion in an Fe-Si-C alloy

Simulation of uphill diffusion in a ternary single phase austenite matrix due to the classical darken experiment published by L.S. Darken (Trans. Aime, v.180 (1949), pp. 430-438).

In this example, two pieces of austenite (3.80 wt%Si, 0.49 wt%C) and (0.05 wt%Si, 0.45 wt%C) are put together and are subsequently annealed at 1050 C for 13 days. As both pieces are austenite they must be entered into the same region. This is done by giving the compositions of Si and C in each gridpoint individually. These data are then stored on file.



exa3-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exa3\setup.DCM.test"
SYS: @@
SYS: @@ One-phase problem.
SYS: @@ Uphill diffusion in an Fe-Si-C alloy
SYS: @@ This is an example to simulate uphill diffusion in a ternary single
SYS: @@ phase austenite matrix due to the classical Darken experiment published
SYS: @@ by L.S. Darken: Trans. Aime, v.180 (1949), pp. 430-438.
SYS: @@
SYS: @@ In this example two pieces of austenite (3.80 wt%Si, 0.49 wt%C) and
SYS: @@ (0.05 wt%Si, 0.45 wt%C) are put together and are subsequently annealed
SYS: @@ at 1050C for 13 days. As both pieces are austenite they must be entered
SYS: @@ into the same region. This is done by individually giving the compositions
SYS: @@ of Si and C in each grid point. These data are then stored to file.
SYS: @@----------------------------------------------------------------------
SYS:
SYS: @@ darken_setup.DCM
SYS:
SYS: @@
SYS: @@ Note that LOG-FILES used previously in examples a2a and a2b are
SYS: @@ no longer used.
SYS: @@
SYS:
SYS: @@
SYS: @@ RETRIEVE DATA FROM THE DATABASE
SYS: @@
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                     /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12:
TDB_TCFE12: @@
TDB_TCFE12: @@ USE A TCFE DATABASE FOR THE THERMODYNAMIC DATA
TDB_TCFE12: @@
TDB_TCFE12: sw tcfe9
 Current database: Steels/Fe-Alloys  v9.3

 VA                     /-  DEFINED
 L12_FCC                B2_BCC                 DICTRA_FCC_A1
   REJECTED
TDB_TCFE9: def-sys fe si c
 FE                     SI                     C
   DEFINED
TDB_TCFE9: rej ph * all
 GAS:G                  LIQUID:L               BCC_A2
 FCC_A1                 HCP_A3                 CBCC_A12
 CUB_A13                DIAMOND_FCC_A4         GRAPHITE
 CEMENTITE              M23C6                  M7C3
 M5C2                   KSI_CARBIDE            FE4N_LP1
 FECN_CHI               LAVES_PHASE_C14        M3SI
 CR3SI                  FE2SI                  FESI2_H
 FESI2_L                MSI                    M5SI3
 AL4C3                  FE8SI2C                SIC
 AL5FE4                 MP_B31                 M2P_C22
   REJECTED
TDB_TCFE9: res ph fcc
 FCC_A1  RESTORED
TDB_TCFE9: get
08:47:43,630 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_TCFE9:
TDB_TCFE9: @@
TDB_TCFE9: @@ SWITCH TO A MOBILITY DATABASE TO RETRIEVE MOBILITY DATA
TDB_TCFE9: @@
TDB_TCFE9: app mobfe4
 Current database: Steels/Fe-Alloys Mobility  v4.0

 VA  DEFINED
 B2_BCC  REJECTED
APP: def-sys  fe si c
 FE                     SI                     C
   DEFINED
APP: rej ph * all
 BCC_A2                 CEMENTITE              FCC_A1
 FE4N_LP1               HCP_A3                 LIQUID:L
   REJECTED
APP: res ph fcc
 FCC_A1  RESTORED
APP: get
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
```

```
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
APP:
APP: @@
APP: @@ ENTER THE DICTRA MONITOR
APP: @@
APP: go d-m
 NO TIME STEP DEFINED
DIC>
DIC> @@
DIC> @@  ENTER GLOBAL CONDITION T
DIC> @@
DIC> set-cond glob T 0 1323; * N
DIC>
DIC> @@
DIC> @@ ENTER THE REGION austenite
DIC> @@
DIC> enter-region
REGION NAME : austenite
DIC>
DIC> @@
DIC> @@ ENTER THE GRID
DIC> @@ NOTE THAT GRID POINT DISTANCES ARE SMALLEST AROUND THE MIDDLE
DIC> @@
DIC> enter-grid
REGION NAME : /AUSTENITE/: austenite
WIDTH OF REGION /1/: 50E-3
TYPE /AUTO/: AUTO
DIC>
DIC> @@
DIC> @@ ENTER THE PHASE INTO A REGION (BOTH PIECES ARE AUSTENITIC)
DIC> @@
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: active
REGION NAME : /AUSTENITE/: austenite
PHASE TYPE /MATRIX/: matrix
PHASE NAME: /NONE/: fcc#1
DIC>
DIC> @@
DIC> @@ ENTER COMPOSITIONS INTO THE PHASE
DIC> @@
DIC> enter-composition
REGION NAME : /AUSTENITE/: austenite
PHASE NAME: /FCC_A1/: fcc#1
DEPENDENT COMPONENT ? /SI/: FE
COMPOSITION TYPE /MOLE_FRACTION/: w-p
PROFILE FOR /C/: C  func 0.49-0.04*hs(x-25e-3);
PROFILE FOR /SI/: SI func 3.80-3.75*hs(x-25e-3);
DIC>
DIC> @@
DIC> @@ SET THE SIMULATION TIME AND OTHER SIMULATION PARAMETERS
DIC> @@
DIC> set-simulation-time
END TIME FOR INTEGRATION /.1/: 1e10
AUTOMATIC TIMESTEP CONTROL /YES/:
MAX TIMESTEP DURING INTEGRATION /1E+09/:
INITIAL TIMESTEP : /1E-07/:
SMALLEST ACCEPTABLE TIMESTEP : /1E-07/:
DIC>
DIC> save exa3 Y
DIC>
DIC> set-inter
 --OK---
DIC>
```

exa3-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exa3\run.DCM.test"
DIC>
DIC>
DIC> @@ darken_run.DCM
DIC>
DIC> @@
DIC> @@ ENTER THE DICTRA MONITOR
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  0.00000E+00
DIC>
DIC> @@
DIC> @@ READ SETUP FROM FILE AND START SIMULATION
DIC> @@
DIC> read exa3
 OK
DIC>
DIC> sim
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 Region: AUSTENITE
 geometric   0.833333     dense at   0.250000E-01   36 points
 geometric    1.20000     dense at   0.250000E-01   35 points
 DEGREE OF IMPLICITY SET TO TRAPEZOIDAL RULE
 U-FRACTION IN SYSTEM:  C = .0215351645464254  FE = .962915638654286
                        SI = .0370843613457148
 TOTAL SIZE OF SYSTEM:  .05 [m]
 U-FRACTION IN SYSTEM:  C = .0215351645464254  FE = .962915638654286
                        SI = .0370843613457148
 TOTAL SIZE OF SYSTEM:  .05 [m]
 TIME =  0.10000000E-06 DT =  0.10000000E-06 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0215351645464254  FE = .962915638654286
                        SI = .0370843613457148
 TOTAL SIZE OF SYSTEM:  .05 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.10010000E-03 DT =  0.10000000E-03 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0215351645464254  FE = .962915638654286
                        SI = .0370843613457148
 TOTAL SIZE OF SYSTEM:  .05 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.40010010     DT =  0.40000000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0215351645464253  FE = .962915638654286
                        SI = .0370843613457148
 TOTAL SIZE OF SYSTEM:  .05 [m]
  CPU time used in timestep                    0  seconds
 TIME =   39.307408     DT =   38.907308     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0215351645464254  FE = .962915638654286
                        SI = .0370843613457148
 TOTAL SIZE OF SYSTEM:  .05 [m]
  CPU time used in timestep                    0  seconds
 TIME =   117.12202     DT =   77.814615     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0215351645464254  FE = .962915638654286
                        SI = .0370843613457148
 TOTAL SIZE OF SYSTEM:  .05 [m]
  CPU time used in timestep                    0  seconds
 TIME =   272.75125     DT =   155.62923     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0215351645464254  FE = .962915638654286
                        SI = .0370843613457148
 TOTAL SIZE OF SYSTEM:  .05 [m]
  CPU time used in timestep                    0  seconds
 TIME =   584.00971     DT =   311.25846     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0215351645464257  FE = .962915638654286
                        SI = .0370843613457148
 TOTAL SIZE OF SYSTEM:  .05 [m]
  CPU time used in timestep                    0  seconds
 TIME =   1206.5266     DT =   622.51692     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0215351645464264  FE = .962915638654286
                        SI = .0370843613457148
 TOTAL SIZE OF SYSTEM:  .05 [m]
  CPU time used in timestep                    0  seconds
 TIME =   2451.5605     DT =   1245.0338     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0215351645464265  FE = .962915638654285
                        SI = .0370843613457148
 TOTAL SIZE OF SYSTEM:  .05 [m]
  CPU time used in timestep                    1  seconds
 TIME =   4941.6282     DT =   2490.0677     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0215351645464267  FE = .962915638654286
                        SI = .0370843613457148
 TOTAL SIZE OF SYSTEM:  .05 [m]
  CPU time used in timestep                    0  seconds
 TIME =   9921.7635     DT =   4980.1354     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0215351645464267  FE = .962915638654286
                        SI = .0370843613457148
 TOTAL SIZE OF SYSTEM:  .05 [m]
  CPU time used in timestep                    0  seconds
 TIME =   19882.034     DT =   9960.2708     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0215351645464261  FE = .962915638654286
                        SI = .0370843613457148
 TOTAL SIZE OF SYSTEM:  .05 [m]
  CPU time used in timestep                    0  seconds
 TIME =   39802.576     DT =   19920.542     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0215351645464252  FE = .962915638654286
                        SI = .0370843613457148
 TOTAL SIZE OF SYSTEM:  .05 [m]
  CPU time used in timestep                    0  seconds
 TIME =   79643.659     DT =   39841.083     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0215351645464261  FE = .962915638654286
                        SI = .0370843613457148
 TOTAL SIZE OF SYSTEM:  .05 [m]
  CPU time used in timestep                    1  seconds
 TIME =   159325.82     DT =   79682.166     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0215351645464378  FE = .962915638654285
                        SI = .0370843613457148
 TOTAL SIZE OF SYSTEM:  .05 [m]
  CPU time used in timestep                    0  seconds
 TIME =   318690.16     DT =   159364.33     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .021535164546488  FE = .962915638654285
                        SI = .0370843613457148
 TOTAL SIZE OF SYSTEM:  .05 [m]
  CPU time used in timestep                    0  seconds
 TIME =   637418.82     DT =   318728.66     SUM OF SQUARES =   0.0000000
```

```
U-FRACTION IN SYSTEM:  C = .0215351645466408  FE = .962915638654285
                       SI = .0370843613457148
TOTAL SIZE OF SYSTEM:  .05 [m]
 CPU time used in timestep                    0  seconds
TIME =   1274876.1     DT =   637457.33     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0215351645470029  FE = .962915638654285
                       SI = .0370843613457148
TOTAL SIZE OF SYSTEM:  .05 [m]
 CPU time used in timestep                    0  seconds
TIME =   2549790.8     DT =   1274914.7     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0215351645470028  FE = .962915638654285
                       SI = .0370843613457148
TOTAL SIZE OF SYSTEM:  .05 [m]
 CPU time used in timestep                    0  seconds
TIME =   5099620.1     DT =   2549829.3     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0215351645468634  FE = .962915638654285
                       SI = .0370843613457148
TOTAL SIZE OF SYSTEM:  .05 [m]
 CPU time used in timestep                    1  seconds
TIME =   10199279.     DT =   5099658.6     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .021535164546573  FE = .962915638654285
                       SI = .0370843613457148
TOTAL SIZE OF SYSTEM:  .05 [m]
 CPU time used in timestep                    0  seconds
TIME =   20398596.     DT =   10199317.     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0215351645463065  FE = .962915638654285
                       SI = .0370843613457148
TOTAL SIZE OF SYSTEM:  .05 [m]
 CPU time used in timestep                    0  seconds
TIME =   40797230.     DT =   20398634.     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .021535164546185  FE = .962915638654285
                       SI = .0370843613457148
TOTAL SIZE OF SYSTEM:  .05 [m]
 CPU time used in timestep                    0  seconds
TIME =   81594499.     DT =   40797269.     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0215351645461055  FE = .962915638654285
                       SI = .0370843613457148
TOTAL SIZE OF SYSTEM:  .05 [m]
 CPU time used in timestep                    0  seconds
TIME =  0.16318904E+09 DT =   81594538.     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0215351645460831  FE = .962915638654285
                       SI = .0370843613457148
TOTAL SIZE OF SYSTEM:  .05 [m]
 CPU time used in timestep                    0  seconds
TIME =  0.32637811E+09 DT =  0.16318908E+09 SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0215351645461223  FE = .962915638654285
                       SI = .0370843613457148
TOTAL SIZE OF SYSTEM:  .05 [m]
 CPU time used in timestep                    0  seconds
TIME =  0.65275627E+09 DT =  0.32637815E+09 SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0215351645462032  FE = .962915638654285
                       SI = .0370843613457148
TOTAL SIZE OF SYSTEM:  .05 [m]
 CPU time used in timestep                    0  seconds
TIME =  0.13055126E+10 DT =  0.65275630E+09 SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0215351645463127  FE = .962915638654285
                       SI = .0370843613457148
TOTAL SIZE OF SYSTEM:  .05 [m]
 CPU time used in timestep                    0  seconds
TIME =  0.23055126E+10 DT =  0.10000000E+10 SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0215351645465151  FE = .962915638654285
                       SI = .0370843613457148
TOTAL SIZE OF SYSTEM:  .05 [m]
 CPU time used in timestep                    0  seconds
TIME =  0.33055126E+10 DT =  0.10000000E+10 SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0215351645467281  FE = .962915638654285
                       SI = .0370843613457148
TOTAL SIZE OF SYSTEM:  .05 [m]
 CPU time used in timestep                    1  seconds
TIME =  0.43055126E+10 DT =  0.10000000E+10 SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0215351645471859  FE = .962915638654285
                       SI = .0370843613457148
TOTAL SIZE OF SYSTEM:  .05 [m]
 CPU time used in timestep                    0  seconds
TIME =  0.53055126E+10 DT =  0.10000000E+10 SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0215351645478041  FE = .962915638654285
                       SI = .0370843613457148
TOTAL SIZE OF SYSTEM:  .05 [m]
 CPU time used in timestep                    0  seconds
TIME =  0.63055126E+10 DT =  0.10000000E+10 SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .021535164548421  FE = .962915638654285
                       SI = .0370843613457148
TOTAL SIZE OF SYSTEM:  .05 [m]
 CPU time used in timestep                    0  seconds
TIME =  0.73055126E+10 DT =  0.10000000E+10 SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0215351645487861  FE = .962915638654285
                       SI = .0370843613457148
TOTAL SIZE OF SYSTEM:  .05 [m]
 CPU time used in timestep                    0  seconds
TIME =  0.83055126E+10 DT =  0.10000000E+10 SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .021535164548902  FE = .962915638654285
                       SI = .0370843613457149
TOTAL SIZE OF SYSTEM:  .05 [m]
 CPU time used in timestep                    0  seconds
TIME =  0.93055126E+10 DT =  0.10000000E+10 SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0215351645489791  FE = .962915638654285
                       SI = .0370843613457148
TOTAL SIZE OF SYSTEM:  .05 [m]
 CPU time used in timestep                    0  seconds
TIME =  0.10000000E+11 DT =  0.69448743E+09 SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0215351645490017  FE = .962915638654285
                       SI = .0370843613457148
TOTAL SIZE OF SYSTEM:  .05 [m]
MUST SAVE WORKSPACE ON FILE
WORKSPACE SAVED ON FILE
RECLAIMING WORKSPACE
DELETING TIME-RECORD FOR TIME    0.0000000
DELETING TIME-RECORD FOR TIME   0.10000000E-06
DELETING TIME-RECORD FOR TIME   0.10010000E-03
DELETING TIME-RECORD FOR TIME   0.40010010
DELETING TIME-RECORD FOR TIME    39.307408
DELETING TIME-RECORD FOR TIME    117.12202
DELETING TIME-RECORD FOR TIME    272.75125
DELETING TIME-RECORD FOR TIME    584.00971
DELETING TIME-RECORD FOR TIME    1206.5266
DELETING TIME-RECORD FOR TIME    2451.5605
```

```
 DELETING TIME-RECORD FOR TIME    4941.6282
 DELETING TIME-RECORD FOR TIME    9921.7635
 DELETING TIME-RECORD FOR TIME    19882.034
 DELETING TIME-RECORD FOR TIME    39802.576
 DELETING TIME-RECORD FOR TIME    79643.659
 DELETING TIME-RECORD FOR TIME    159325.82
 DELETING TIME-RECORD FOR TIME    318690.16
 DELETING TIME-RECORD FOR TIME    637418.82
 DELETING TIME-RECORD FOR TIME    1274876.1
 DELETING TIME-RECORD FOR TIME    2549790.8
 DELETING TIME-RECORD FOR TIME    5099620.1
 DELETING TIME-RECORD FOR TIME    10199279.
 DELETING TIME-RECORD FOR TIME    20398596.
 DELETING TIME-RECORD FOR TIME    40797230.
 DELETING TIME-RECORD FOR TIME    81594499.
 DELETING TIME-RECORD FOR TIME   0.16318904E+09
 DELETING TIME-RECORD FOR TIME   0.32637811E+09
 DELETING TIME-RECORD FOR TIME   0.65275627E+09
 DELETING TIME-RECORD FOR TIME   0.13055126E+10
 DELETING TIME-RECORD FOR TIME   0.23055126E+10
 DELETING TIME-RECORD FOR TIME   0.33055126E+10
 DELETING TIME-RECORD FOR TIME   0.43055126E+10
 DELETING TIME-RECORD FOR TIME   0.53055126E+10
 DELETING TIME-RECORD FOR TIME   0.63055126E+10
 DELETING TIME-RECORD FOR TIME   0.73055126E+10
 DELETING TIME-RECORD FOR TIME   0.83055126E+10

 KEEPING TIME-RECORD FOR TIME   0.93055126E+10
 AND FOR TIME                   0.10000000E+11
 WORKSPACE RECLAIMED

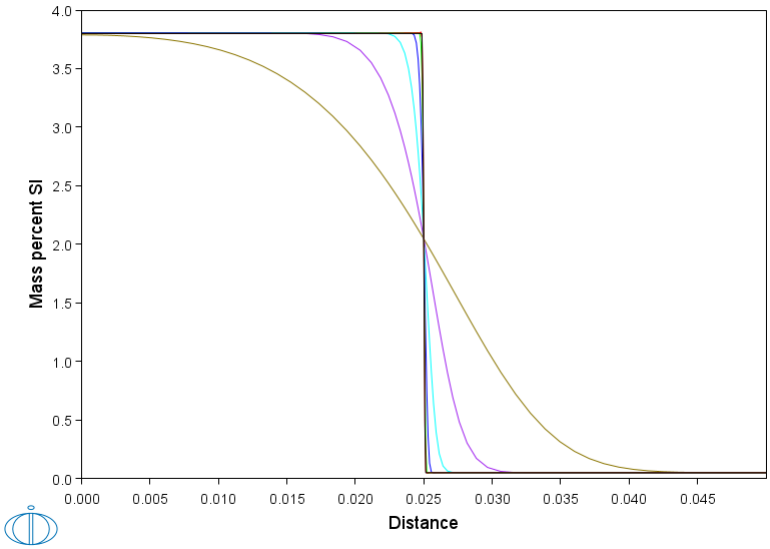
 TIMESTEP AT    0.100000000E+11 SELECTED

DIC>
DIC> set-inter
 --OK---
DIC>
```

exa3-plot

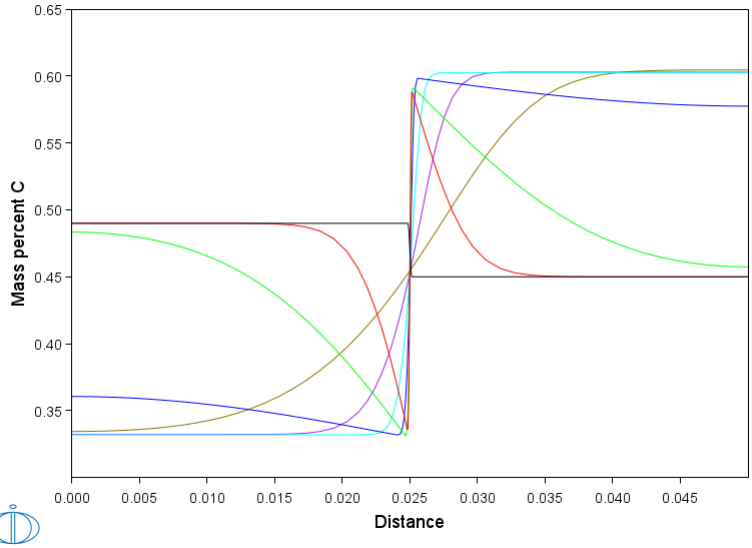
```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exa3\plot.DCM.test"
DIC>
DIC>
DIC> @@ darken_plot.DCM
DIC>
DIC> @@
DIC> @@ ENTER THE DICTRA MODULE AND SPECIFY THE STORE-RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  1.00000E+10
DIC> read exa3
 OK
DIC>
DIC> @@
DIC> @@ ENTER THE DICTRA POST PROCESSOR
DIC> @@
DIC> post
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1: @@
POST-1: @@ PLOT THE CONCENTRATION PROFILE FOR Si AT TIMES 0, 1E5, 1123200, 1E7,
POST-1: @@ 1E8, 1E9 AND 1E10 S
POST-1: @@
POST-1: @@ SET DISTANCE IN SYSTEM AS X-AXIS, WEIGHT-% SI ON Y-AXIS AND SPECIFY
POST-1: @@ FOR WHICH SIMULATION TIMES TO PLOT THE PROFILES.
POST-1: @@
POST-1: set-diagram-axis x distance global
  INFO: Distance is set as independent variable
POST-1: set-diagram-axis y weight-percent si
POST-1: set-plot-condition time 0 1E5 1123200 1e7 1E8 1E9 1E10
POST-1:
POST-1: @@
POST-1: @@ PLOT THE DIAGRAM
POST-1: @@
POST-1: set-title
TITLE : Figure a3.1
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

Figure a3.1



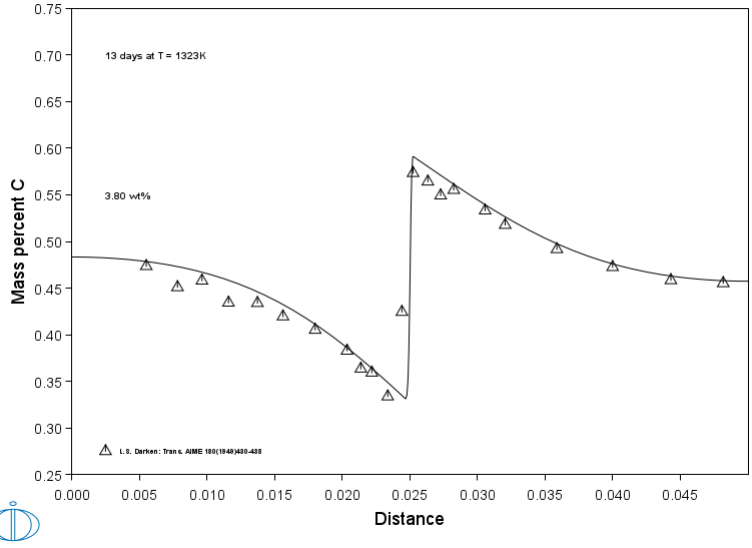

```
POST-1:
POST-1:
POST-1:
POST-1:Hit RETURN to continue
POST-1: @@
POST-1: @@ PLOT THE CONCENTRATION PROFILES FOR C
POST-1: @@
POST-1: @@ WE ONLY NEED TO CHANGE THE Y-AXIS
POST-1: @@
POST-1: set-diagram-axis y w-p c
POST-1: set-title Figure a3.2
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

Figure a3.2




```
POST-1:
POST-1:
POST-1:
POST-1:Hit RETURN to continue
POST-1: @@
POST-1: @@ COMPARE WITH DARKEN'S EXPERIMENTS
POST-1: @@
POST-1: append_experimental_data  yes exa3.exp 0; 1
POST-1:
POST-1: set-plot-condition time 1123200
POST-1:
POST-1: s-s-s
AXIS (X, Y OR Z) : y
AUTOMATIC SCALING  (Y OR N) /N/: n
MIN VALUE : 0.25
MAX VALUE : 0.75
POST-1:
POST-1: set-title Figure a3.3
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

Figure a3.3

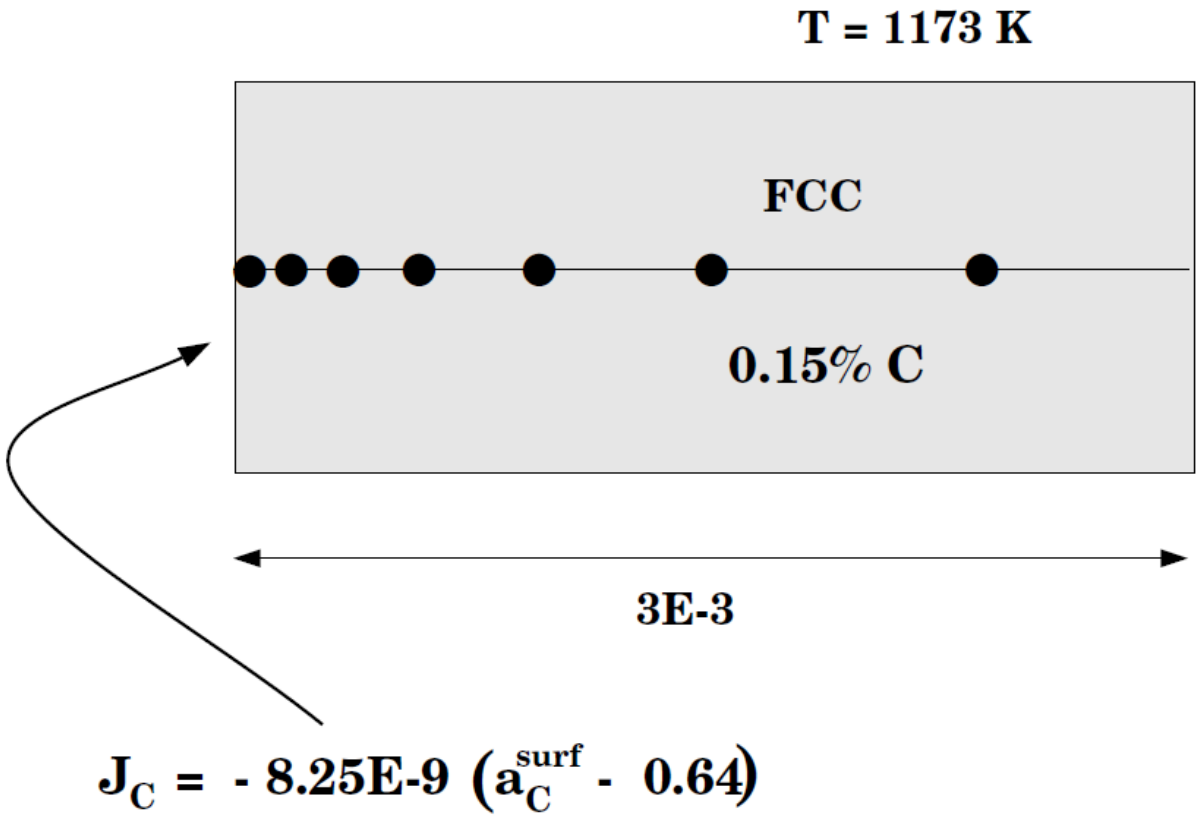



```
POST-1:
POST-1:
POST-1:
POST-1:Hit RETURN to continue
POST-1: set-inter
 --OK---
POST-1:
```

Example exa5

Carburization of a binary Fe-0.15 wt% C alloy: A surface reaction controls the flux of C at the surface

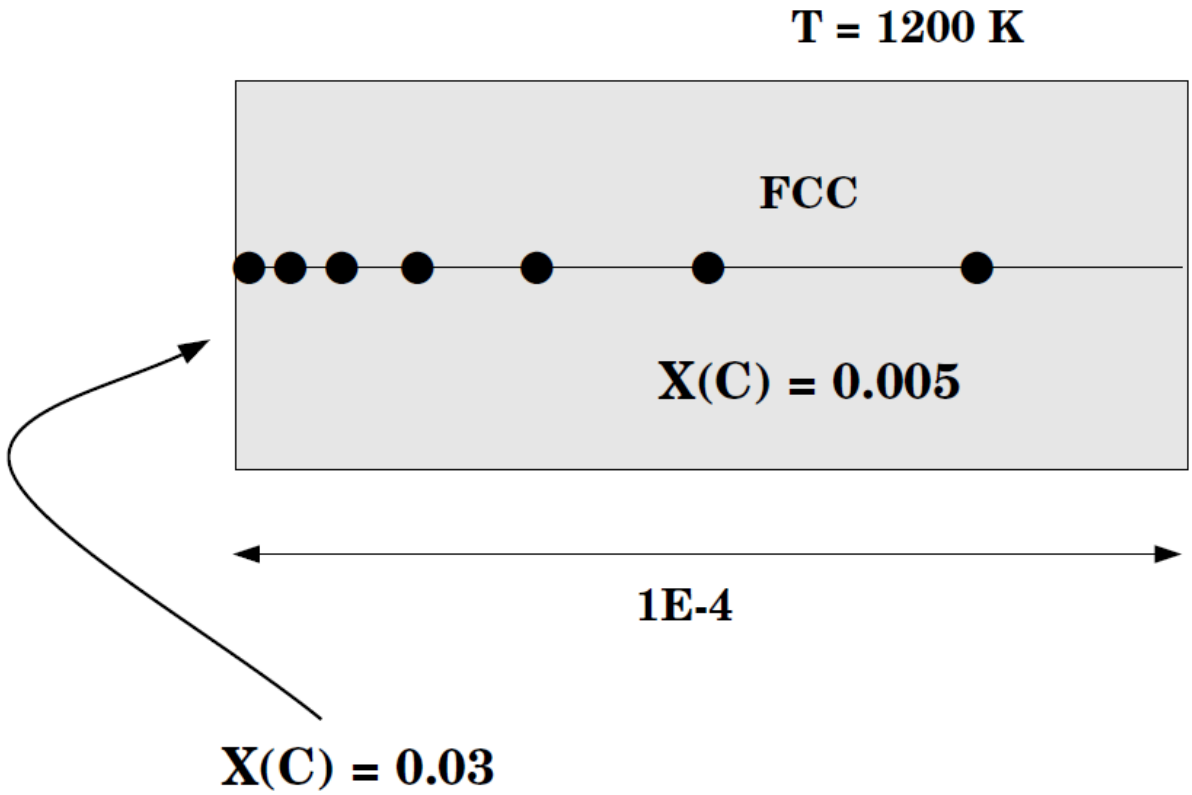
A mixture of 40% N2 and 60% cracked methanol is used as carrier gas. The carburizing "carbon potential" in the gas is 0.85 wt%.



Example exa4

Carburization of a binary Fe-C alloy: Comparison to analytical erf solution

This is a simple binary simulation with one single phase region. It compares a numerical simulation with an analytical erf-solution. For this reason a special database is created (*erf.tdb*) where the diffusion coefficient is set to a concentration independent value.



exa4-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exa4\setup.DCM.test"
SYS: @@
SYS: @@ One-phase problem.
SYS: @@ Carburization of binary Fe-C alloy: Comparison to an analytical erf solution
SYS: @@ This is a simple binary simulation with a single phase region.
SYS: @@ The numerical simulation is compared with an analytical erf solution.
SYS: @@ For this reason a special database erf.tdb is created where the
SYS: @@ diffusion coefficient is set to a concentration independent value.
SYS: @@----------------------------------------------------------------------
SYS:
SYS: @@ exa4_setup.DCM
SYS:
SYS:
SYS: @@
SYS: @@ READ THE DATA FROM THE DATABASES
SYS: @@
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                       /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12: sw FEDEMO
 Current database: Iron Demo Database v6.0

 VA                       /-  DEFINED
TDB_FEDEMO: def-system fe,c
 FE                       C  DEFINED
TDB_FEDEMO: rej-ph *
 GAS:G                    LIQUID:L                 BCC_A2
 C14_LAVES                CBCC_A12                 CEMENTITE_D011
 CUB_A13                  DIAMOND_A4               FCC_A1
 GRAPHITE_A9              HCP_A3                   KSI_CARBIDE
 M23C6_D84                M5C2                     M7C3_D101
   REJECTED
TDB_FEDEMO: rest-ph fcc
 FCC_A1  RESTORED
TDB_FEDEMO: get
08:50:51,494 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_FEDEMO:
TDB_FEDEMO: append user exa4.TDB
 Current database: User defined Database
This database does not support the DATABASE_INFORMATION command

 VA  DEFINED
08:50:52,366 [Thread-0] INFO  TDBFileParser: USER_1068030556_22, number of lines read: 29
08:50:52,425 [Thread-0] INFO  DatabaseUtils: Parsing of USER_1068030556_22 completed in 62 ms
TDB_APP: def-system fe,c
 FE                       C  DEFINED
TDB_APP: rej-ph *
 FCC_A1  REJECTED
TDB_APP: rest-ph fcc
 FCC_A1  RESTORED
TDB_APP: get
08:50:53,139 [Thread-0] INFO  Database: Preparing system for use: USER_1068030556_22
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....
 -OK-
TDB_APP:
TDB_APP: @@
TDB_APP: @@ GO TO THE DICTRA MODULE AND SET UP THE SYSTEM
TDB_APP: @@
TDB_APP: go d-m
 NO TIME STEP DEFINED
DIC>
DIC> @@
DIC> @@  ENTER GLOBAL CONDITION T
DIC> @@
DIC> set-cond glob T 0 1200; * N
DIC>
DIC> @@
DIC> @@ ENTER THE REGION steel
DIC> @@
DIC> enter-region
REGION NAME : steel
DIC>
DIC> @@
DIC> @@ ENTER THE GRID
DIC> @@ CARBON ENTERS THE SYSTEM FROM THE LOWER BOUNDARY AND CONSEQUENTLY
DIC> @@ MORE POINTS ARE REQUIRED AT THAT BOUNDARY. THIS IS WHY A GEOMETRIC
```

```
DIC> @@ GRID IS USED.
DIC> @@
DIC> enter-grid
REGION NAME : /STEEL/: steel
WIDTH OF REGION /1/: 1E-4
TYPE /AUTO/: AUTO
DIC>
DIC> @@
DIC> @@ ENTER THE PHASE INTO THE REGION
DIC> @@
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: act
REGION NAME : /STEEL/: steel
PHASE TYPE /MATRIX/: matrix
PHASE NAME: /NONE/: fcc#1
DIC>
DIC>
DIC> @@
DIC> @@ ENTER THE INITIAL COMPOSITION IN THE FCC PHASE
DIC> @@
DIC> enter-composition
REGION NAME : /STEEL/: steel
PHASE NAME: /FCC_A1/: fcc#1
COMPOSITION TYPE /MOLE_FRACTION/: mole-fraction
PROFILE FOR /C/: c
TYPE /LINEAR/: linear
VALUE OF FIRST POINT : 0.005
VALUE OF LAST POINT : /5E-3/: 0.005
08:50:54,699 [Thread-0] INFO  Phase: Preparing phase for use: FCC_A1
DIC>
DIC>
DIC> @@
DIC> @@ SET A FIXED COMPOSITION AS THE BOUNDARY VALUE
DIC> @@
DIC> set-condition
GLOBAL OR BOUNDARY CONDITION /GLOBAL/: boundary
BOUNDARY /LOWER/: lower
CONDITION TYPE /CLOSED_SYSTEM/: state-variable-value
State variable expression #1 : /N=1/: n=1
State variable expression #2 : x(c)=0.03
DIC>
DIC>
DIC> @@
DIC> @@ SET A SIMULATION TIME
DIC> @@
DIC> set-simulation-time
END TIME FOR INTEGRATION /.1/: 100
AUTOMATIC TIMESTEP CONTROL /YES/:
MAX TIMESTEP DURING INTEGRATION /10/:
INITIAL TIMESTEP : /1E-07/:
SMALLEST ACCEPTABLE TIMESTEP : /1E-07/:
DIC>
DIC>
DIC>
DIC> save exa4 Y
DIC>
DIC> set-inter
 --OK---
DIC>
```

exa4-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exa4\run.DCM.test"
DIC>
DIC>
DIC> @@ exa4_run.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR RUNNING EXAMPLE a4
DIC> @@
DIC>
DIC> @@
DIC> @@ ENTER THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  0.00000E+00
DIC> read exa4
 OK
DIC>
DIC> @@
DIC> @@ START THE SIMULATION
DIC> @@
DIC> sim
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 Region: STEEL
 geometric    1.20000     dense at    0.00000       57 points
 DEGREE OF IMPLICITY SET TO TRAPEZOIDAL RULE
 U-FRACTION IN SYSTEM:  C = .00502512562814071  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
 U-FRACTION IN SYSTEM:  C = .00502512562814071  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
 TIME =  0.10000000E-06 DT =  0.10000000E-06 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00505812483736605  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.10010000E-03 DT =  0.10000000E-03 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00505918131292522  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.39379161E-02 DT =  0.38378161E-02 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .005088438297452  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.11613548E-01 DT =  0.76756322E-02 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00512323510928179  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.26964813E-01 DT =  0.15351264E-01 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00516937716229967  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.57667341E-01 DT =  0.30702529E-01 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00523281439554546  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.11907240     DT =  0.61405057E-01 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00532134417798201  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.24188251     DT =  0.12281011     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00544573917126831  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.48750274     DT =  0.24562023     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00562110184346364  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.97874320     DT =  0.49124046     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00586871098233561  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   1.9612241     DT =  0.98248092     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00621860525716751  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   3.9261860     DT =   1.9649618     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00671317488999983  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   7.8561096     DT =   3.9299237     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00741220811437077  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   15.715957     DT =   7.8598473     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00840038142848028  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    1  seconds
 TIME =   25.715957     DT =   10.000000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00934017906507076  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   35.715957     DT =   10.000000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0101085679608066  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   45.715957     DT =   10.000000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0107752067656887  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   55.715957     DT =   10.000000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .011372261459059  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   65.715957     DT =   10.000000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .011917828517872  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   75.715957     DT =   10.000000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0124232979419724  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   85.715957     DT =   10.000000     SUM OF SQUARES =   0.0000000
```

```
 U-FRACTION IN SYSTEM:  C = .0128963915090011  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =    95.715957     DT =    10.000000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .013342629907881  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =    100.00000     DT =   4.2840430     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0135266153475069  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
 MUST SAVE WORKSPACE ON FILE
 WORKSPACE SAVED ON FILE
 RECLAIMING WORKSPACE
 DELETING TIME-RECORD FOR TIME    0.0000000
 DELETING TIME-RECORD FOR TIME   0.10000000E-06
 DELETING TIME-RECORD FOR TIME   0.10010000E-03
 DELETING TIME-RECORD FOR TIME   0.39379161E-02
 DELETING TIME-RECORD FOR TIME   0.11613548E-01
 DELETING TIME-RECORD FOR TIME   0.26964813E-01
 DELETING TIME-RECORD FOR TIME   0.57667341E-01
 DELETING TIME-RECORD FOR TIME   0.11907240
 DELETING TIME-RECORD FOR TIME   0.24188251
 DELETING TIME-RECORD FOR TIME   0.48750274
 DELETING TIME-RECORD FOR TIME   0.97874320
 DELETING TIME-RECORD FOR TIME    1.9612241
 DELETING TIME-RECORD FOR TIME    3.9261860
 DELETING TIME-RECORD FOR TIME    7.8561096
 DELETING TIME-RECORD FOR TIME    15.715957
 DELETING TIME-RECORD FOR TIME    25.715957
 DELETING TIME-RECORD FOR TIME    35.715957
 DELETING TIME-RECORD FOR TIME    45.715957
 DELETING TIME-RECORD FOR TIME    55.715957
 DELETING TIME-RECORD FOR TIME    65.715957
 DELETING TIME-RECORD FOR TIME    75.715957
 DELETING TIME-RECORD FOR TIME    85.715957

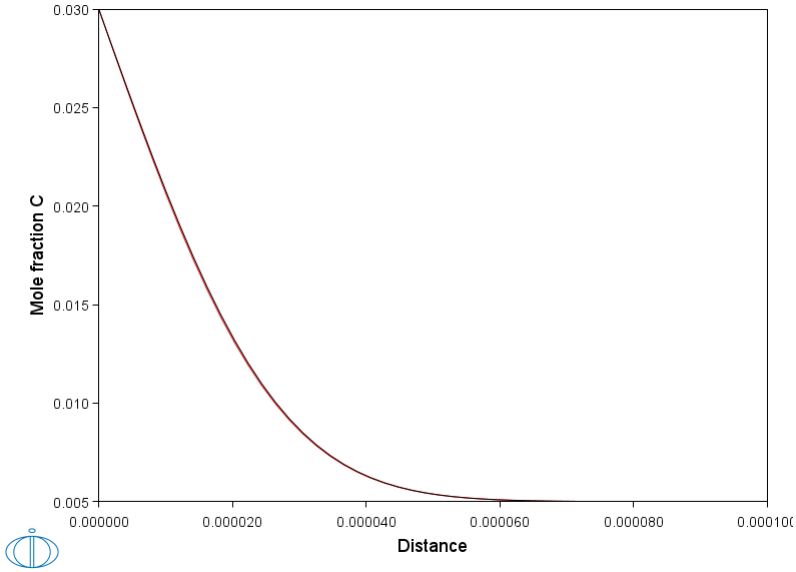
 KEEPING TIME-RECORD FOR TIME    95.715957
 AND FOR TIME                    100.00000
 WORKSPACE RECLAIMED

 TIMESTEP AT     100.000000     SELECTED

DIC>
DIC> @@
DIC> @@ THE SIMULATION IS FINISHED
DIC> @@
DIC>
DIC> set-inter
 --OK---
DIC>
```

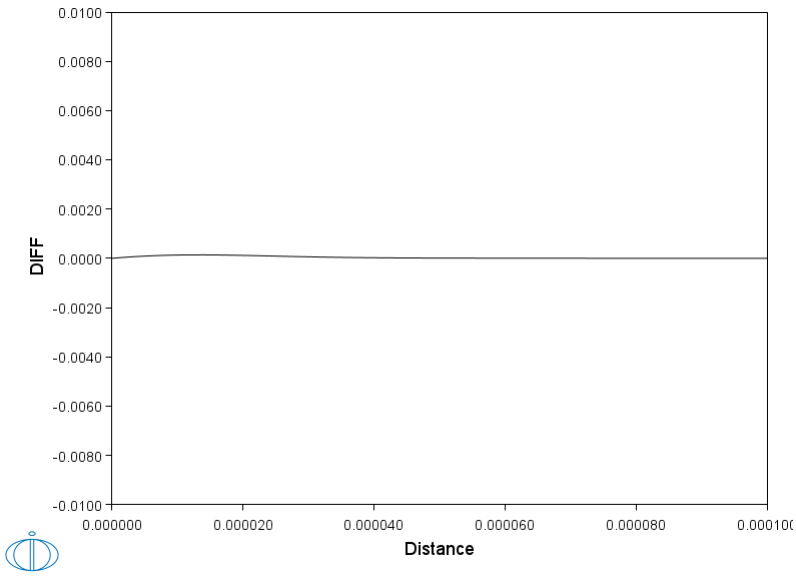
exa4-plot

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exa4\plot.DCM.test"
DIC>
DIC>
DIC> @@ exa4_plot.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR GENERATING GRAPHICAL OUTPUT FOR EXAMPLE exa4
DIC> @@
DIC>
DIC> @@
DIC> @@ GO TO THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  1.00000E+02
DIC> read exa4
 OK
DIC>
DIC> @@
DIC> @@ GO TO THE POST PROCESSOR
DIC> @@
DIC> post
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1: @@
POST-1: @@ PLOT A COMPOSITION PROFILE
POST-1: @@
POST-1: s-d-a x distance global
  INFO: Distance is set as independent variable
POST-1: s-d-a y x(c)
POST-1: s-p-c time 25
POST-1:
POST-1: @@
POST-1: @@ ENTER THE ANALYTICAL SOLUTION, CALLED ERFSOL
POST-1: @@
POST-1: enter-symbol
Function or table /FUNCTION/: function
NAME: erfsol
FUNCTION: 0.03-0.025*erf(gd/sqrt(4*dc(fcc,c,c,fe)*25));
POST-1:
POST-1: @@
POST-1: @@ COMPARE THE ANALYTICAL AND NUMERICAL SOLUTIONS
POST-1: @@
POST-1: enter-symbol
Function or table /FUNCTION/: table
NAME: aaa
Variable(s) x(c) erfsol
POST-1:
POST-1: s-d-a y aaa
COLUMN NUMBER /*/: 1 2
POST-1:
POST-1: set-axis-text
AXIS (X, Y OR Z) : y
AUTOMATIC AXIS TEXT  (Y OR N) /N/: n
AXIS TEXT : Mole fraction C
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```




```
POST-1:
POST-1:
POST-1:
POST-1:@?<Hit_return_to_continue>
POST-1:
POST-1: @@
POST-1: @@ PLOT THE DIFFERENCE
POST-1: @@
POST-1: enter func diff=x(c)-erfsol;
POST-1: s-d-a y diff
POST-1: s-s-s y n -1e-2 1e-2
POST-1:
```

```
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```




```
POST-1:
POST-1:
POST-1:
POST-1:@?<Hit_return_to_continue>
POST-1:
POST-1: set-interactive
 --OK---
POST-1:
```

exa5-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exa5\setup.DCM.test"
SYS: ï»¿@@
 NO SUCH COMMAND, USE HELP
SYS: @@ One-phase problem.
SYS: @@ Carburization of a binary Fe-0.15 wt% C alloy.
SYS: @@ A mixture of 40% N2 and 60% cracked methanol is used as carrier gas.
SYS: @@ The carburizing "carbon potential" in the gas is 0.85 wt%.
SYS: @@ A surface reaction controls the flux of C at the surface.
SYS: @@------------------------------------------------------------------
SYS:
SYS: @@ exa5_setup.DCM
SYS:
SYS: @@
SYS: @@ GO TO THE DATABASES AND READ THE THERMODYNAMIC AND KINETIC DATA
SYS: @@
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                     /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12: sw FEDEMO
 Current database: Iron Demo Database v6.0

 VA                     /-  DEFINED
TDB_FEDEMO: def-sys fe,c
 FE                     C  DEFINED
TDB_FEDEMO: rej-ph *
 GAS:G                  LIQUID:L               BCC_A2
 C14_LAVES              CBCC_A12               CEMENTITE_D011
 CUB_A13                DIAMOND_A4             FCC_A1
 GRAPHITE_A9            HCP_A3                 KSI_CARBIDE
 M23C6_D84              M5C2                   M7C3_D101
   REJECTED
TDB_FEDEMO: rest-ph fcc graphite
 FCC_A1                 GRAPHITE_A9  RESTORED
TDB_FEDEMO: get
08:53:51,323 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_FEDEMO:@?
TDB_FEDEMO: append
 Use one of these databases

 TCFE12  =  Steels/Fe-Alloys  v12.0
 TCFE9   =  Steels/Fe-Alloys  v9.3
 SSUB6   =  SGTE Substances  v6.0
 FEDEMO  =  Iron Demo Database v6.0
 MOB2    =  Alloys Mobility  v2.7
 MOBFE7  =  Steels/Fe-Alloys Mobility  v7.1
 MOBFE4  =  Steels/Fe-Alloys Mobility  v4.0
 MOBFE2  =  Steels/Fe-Alloys Mobility  v2.0
 MFEDEMO =  Fe-Alloys Mobility demo database v5.0
 USER    =  User defined Database

DATABASE NAME /FEDEMO/: mfedemo
 Current database: Fe-Alloys Mobility demo database v5.0

 VA  DEFINED
APP: def-sys fe,c
 FE                     C  DEFINED
APP: rej-ph *
 BCC_A2                 FCC_A1                 CEMENTITE_D011
 LIQUID:L  REJECTED
APP: rest-ph fcc
 FCC_A1  RESTORED
APP: get
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
APP:@?
APP: @@
APP: @@ GO TO THE DICTRA MONITOR TO SET UP THE INITIAL STATE OF THE SPECIMEN
APP: @@
APP: go d-m
 NO TIME STEP DEFINED
 *** ENTERING GRAPHITE_A9 AS A DIFFUSION NONE PHASE
DIC>
DIC> set-cond glob T 0 1173; * N
DIC>
```

```
DIC> @@
DIC> @@ SELECT A REFERENCE STATE FOR THE C ACTIVITY
DIC> @@
DIC> set-ref-state
Component: c
Reference state: graph
Temperature /*/: *
Pressure /100000/: 1e5
DIC>
DIC> @@
DIC> @@ ENTER A REGION, GRID, PHASE AND COMPOSITION
DIC> @@
DIC> enter-region
REGION NAME : steel
DIC>
DIC> enter-grid
REGION NAME : /STEEL/: steel
WIDTH OF REGION /1/: 3E-3
TYPE /AUTO/: AUTO
DIC>
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: act
REGION NAME : /STEEL/: steel
PHASE TYPE /MATRIX/: matrix
PHASE NAME: /NONE/: fcc#1
DIC>
DIC> enter-composition
REGION NAME : /STEEL/: steel
PHASE NAME: /FCC_A1/: fcc#1
COMPOSITION TYPE /MOLE_FRACTION/: w-p
PROFILE FOR /C/: c
TYPE /LINEAR/: lin
VALUE OF FIRST POINT : 0.15
VALUE OF LAST POINT : /0.15/: 0.15
DIC>
DIC> @@
DIC> @@ NOW SET THE BOUNDARY CONDITIONS. WE ARE ONLY INTERESTED IN THE
DIC> @@ SURFACE REGION, FOR EXAMPLE IT IS SUFFICIENT TO SET CONDITIONS AT THE
DIC> @@ LOWER BOUNDARY.
DIC> @@
DIC>
DIC> @@
DIC> @@ Specify the activity flux function which controls the uptake of C.
DIC> @@
DIC> @@ The functions f  and g  and the parameter N has to be specified.
DIC> @@                k      k
DIC> @@
DIC> @@                                  N
DIC> @@  J  V = f (variables)*(ACTIVITY -g (variables))    (1)
DIC> @@   k  m   k                      k  k
DIC> @@
DIC> @@ f   and g   in equation 1 is the mass-transfer coefficient and
DIC> @@  k       k
DIC> @@ the activity of k in the gas, respectively. ACTIVITY in eq. 1 means
DIC> @@ the actual activity of species k at the surface.
DIC> @@
DIC>
DIC> @@
DIC> @@ The main carburizing reaction for our atmosphere is:
DIC> @@
DIC> @@   CO  +  H    ->   C  +    H O       (I)
DIC> @@           2   <-   -        2
DIC> @@
DIC> @@ Following Sproge and Ã…gren (J. Heat Treating, v6, no 1, 1988 pp. 9-19)
DIC> @@ we calculate the mass-transfer coefficient for carbon, f in
DIC> @@ eq. 1 above by means of eq. 3, 4 and 12 in Sproge and Ã…gren's paper.
DIC> @@
DIC> @@
DIC> @@          A *  K *  P  *  sqrt( P   )
DIC> @@               I    CO          H
DIC> @@                                2
DIC> @@   f  =  ----------------------------  / gamma        (2)
DIC> @@          a  +  B * K * P  * sqrt( P  )
DIC> @@           C         I   CO         H
DIC> @@                                   2
DIC> @@
DIC> @@ K  is the equilibrium constant for reaction (I)
DIC> @@  I
DIC> @@
DIC> @@ A and B are constants defined in Sproge and Ã…gren's paper. gamma
DIC> @@ is the activity coefficient for carbon in the steel.
DIC> @@
DIC> @@ Assume a constant value for  P  *  sqrt( P   ) = 0.14
DIC> @@                                          CO          H
DIC> @@                                                     2
DIC> @@ The carbon activity in the gas is controlled by the partial
DIC> @@ pressure of water as can be understood from reaction (I).
DIC> @@
DIC> @@ Assume that the carbon activity, a of the gas is 0.64
DIC> @@                                   C
DIC> @@ which corresponds to a carburizing "carbon potential" of 0.85 wt%.
DIC> @@
DIC> @@ In this way we may calculate f to 8.25E-9 mol/s.
DIC> @@
DIC>
DIC> set-cond
GLOBAL OR BOUNDARY CONDITION /GLOBAL/: bound
BOUNDARY /LOWER/: lower
CONDITION TYPE /CLOSED_SYSTEM/: activity_flux_function
 ENTER THE EXPRESSION AS:
                                N
   J  V = f (variables)*(ACTIVITY -g (variables))
    k  m   k                    k  k
 FLUX OF FCC_A1,C
LOW TIME LIMIT /0/: 0
f(T,P,TIME)= -8.25E-9;
HIGH TIME LIMIT /*/: *
ANY MORE RANGES /N/: N
N /1/: 1
LOW TIME LIMIT /0/: 0
```

```
g(T,P,TIME)= 0.64;
HIGH TIME LIMIT /*/: *
ANY MORE RANGES /N/: N
DIC>
DIC> @@
DIC> @@ SPECIFY A SIMULATION TIME
DIC> @@
DIC> set-simulation-time
END TIME FOR INTEGRATION /.1/: 18000
AUTOMATIC TIMESTEP CONTROL /YES/:
MAX TIMESTEP DURING INTEGRATION /1800/:
INITIAL TIMESTEP : /1E-07/:
SMALLEST ACCEPTABLE TIMESTEP : /1E-07/:
DIC>
DIC> @@
DIC> @@ SAVE THE SET UP TO FILE
DIC> @@
DIC> Save exa5 Y
DIC>
DIC> set-inter
 --OK---
DIC>
```

exa5-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exa5\run.DCM.test"
DIC>
DIC>
DIC> @@ exa5_run.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR RUNNING EXAMPLE a5
DIC> @@
DIC>
DIC> @@
DIC> @@ ENTER THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  0.00000E+00
 *** ENTERING GRAPHITE_A9 AS A DIFFUSION NONE PHASE
DIC> read exa5
 OK
DIC>
DIC> @@
DIC> @@ Start the simulation
DIC> @@
DIC> sim
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 Region: STEEL
 geometric    1.20000     dense at    0.00000       57 points
 DEGREE OF IMPLICITY SET TO TRAPEZOIDAL RULE
 U-FRACTION IN SYSTEM:  C = .00698495916383108  FE = 1
 TOTAL SIZE OF SYSTEM:  .003 [m]
 U-FRACTION IN SYSTEM:  C = .00698495916383108  FE = 1
 TOTAL SIZE OF SYSTEM:  .003 [m]
 TIME =  0.10000000E-06 DT =  0.10000000E-06 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00698495916398348  FE = 1
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.10010000E-03 DT =  0.10000000E-03 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00698495931638295  FE = 1
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.40010010     DT =  0.40000000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00698556362936311  FE = 1
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    1  seconds
 TIME =   4.3766840     DT =   3.9765839     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00699127311193793  FE = 1
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    0  seconds
 TIME =   12.329852     DT =   7.9531678     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00700200719387827  FE = 1
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    1  seconds
 TIME =   28.236188     DT =   15.906336     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00702208623823577  FE = 1
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    0  seconds
 TIME =   60.048859     DT =   31.812671     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00705900594239566  FE = 1
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    1  seconds
 TIME =   123.67420     DT =   63.625343     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00712525459781422  FE = 1
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    0  seconds
 TIME =   250.92489     DT =   127.25069     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0072405156803945  FE = 1
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    1  seconds
 TIME =   505.42626     DT =   254.50137     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00743394621983935  FE = 1
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    0  seconds
 TIME =   1014.4290     DT =   509.00274     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00774626834606196  FE = 1
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    1  seconds
 TIME =   2032.4345     DT =   1018.0055     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00823209852005916  FE = 1
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    0  seconds
 TIME =   3832.4345     DT =   1800.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00888873155588146  FE = 1
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    1  seconds
 TIME =   5632.4345     DT =   1800.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00941704184821519  FE = 1
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    1  seconds
 TIME =   7432.4345     DT =   1800.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00987244241587805  FE = 1
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    1  seconds
 TIME =   9232.4345     DT =   1800.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0102788675108747  FE = 1
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    0  seconds
 TIME =   11032.434     DT =   1800.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0106494229829431  FE = 1
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    1  seconds
 TIME =   12832.434     DT =   1800.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0109922280612705  FE = 1
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    0  seconds
 TIME =   14632.434     DT =   1800.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0113127299083723  FE = 1
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    1  seconds
 TIME =   16432.434     DT =   1800.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0116147948085907  FE = 1
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    0  seconds
```

```
 TIME =   18000.000     DT =   1567.5655     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0118650755663949  FE = 1
 TOTAL SIZE OF SYSTEM:  .003 [m]
 MUST SAVE WORKSPACE ON FILE
 WORKSPACE SAVED ON FILE
 RECLAIMING WORKSPACE
 DELETING TIME-RECORD FOR TIME    0.0000000
 DELETING TIME-RECORD FOR TIME   0.10000000E-06
 DELETING TIME-RECORD FOR TIME   0.10010000E-03
 DELETING TIME-RECORD FOR TIME   0.40010010
 DELETING TIME-RECORD FOR TIME    4.3766840
 DELETING TIME-RECORD FOR TIME    12.329852
 DELETING TIME-RECORD FOR TIME    28.236188
 DELETING TIME-RECORD FOR TIME    60.048859
 DELETING TIME-RECORD FOR TIME    123.67420
 DELETING TIME-RECORD FOR TIME    250.92489
 DELETING TIME-RECORD FOR TIME    505.42626
 DELETING TIME-RECORD FOR TIME    1014.4290
 DELETING TIME-RECORD FOR TIME    2032.4345
 DELETING TIME-RECORD FOR TIME    3832.4345
 DELETING TIME-RECORD FOR TIME    5632.4345
 DELETING TIME-RECORD FOR TIME    7432.4345
 DELETING TIME-RECORD FOR TIME    9232.4345
 DELETING TIME-RECORD FOR TIME    11032.434
 DELETING TIME-RECORD FOR TIME    12832.434
 DELETING TIME-RECORD FOR TIME    14632.434

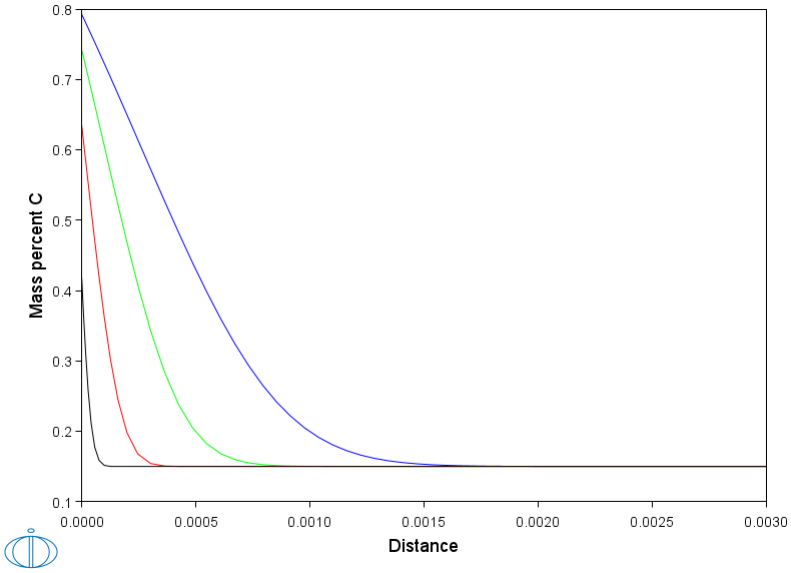
 KEEPING TIME-RECORD FOR TIME    16432.434
 AND FOR TIME                    18000.000
 WORKSPACE RECLAIMED

 TIMESTEP AT     18000.0000     SELECTED

DIC>
DIC> set-inter
 --OK---
DIC>
```

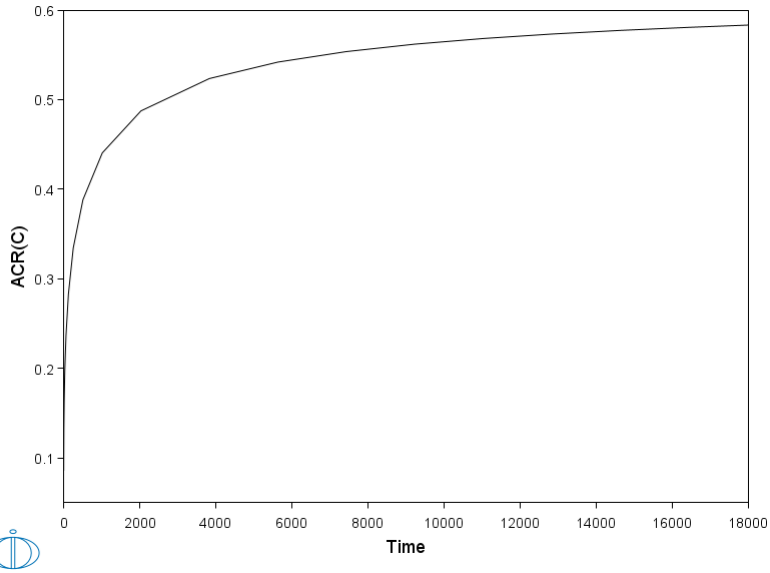
exa5-plot

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exa5\plot.DCM.test"
DIC>
DIC>
DIC> @@ exa5_plot.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR GENERATING GRAPHICAL OUTPUT FOR EXAMPLE a5
DIC> @@
DIC>
DIC> @@
DIC> @@ GO TO THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  1.80000E+04
 *** ENTERING GRAPHITE_A9 AS A DIFFUSION NONE PHASE
DIC> read exa5
 OK
DIC>
DIC> @@
DIC> @@ ENTER THE POST PROCESSOR
DIC> @@
DIC> post
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1: @@
POST-1: @@ PLOT SOME DIFFERENT CONCENTRATION PROFILES
POST-1: @@
POST-1: s-d-a x dist glo
  INFO: Distance is set as independent variable
POST-1: s-d-a y w-p c
POST-1: s-p-c time 100 1000 5000 18000
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

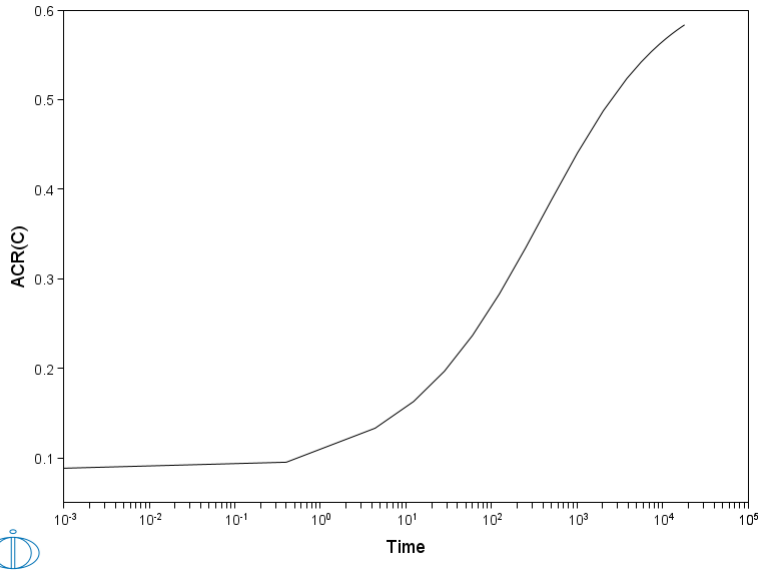



```
POST-1:
POST-1:
POST-1:
POST-1:@?<Hit_return_to_continue>
POST-1:
POST-1: @@
POST-1: @@ PLOT THE VARIATION OF THE C ACTIVITY AT THE SURFACE
POST-1: @@
POST-1: s-d-a y acr(c)
POST-1:
POST-1: s-d-a x time
  INFO: Time is set as independent variable
POST-1:
POST-1: s-p-c
CONDITION /TIME/: interface
INTERFACE : first
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y

          OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

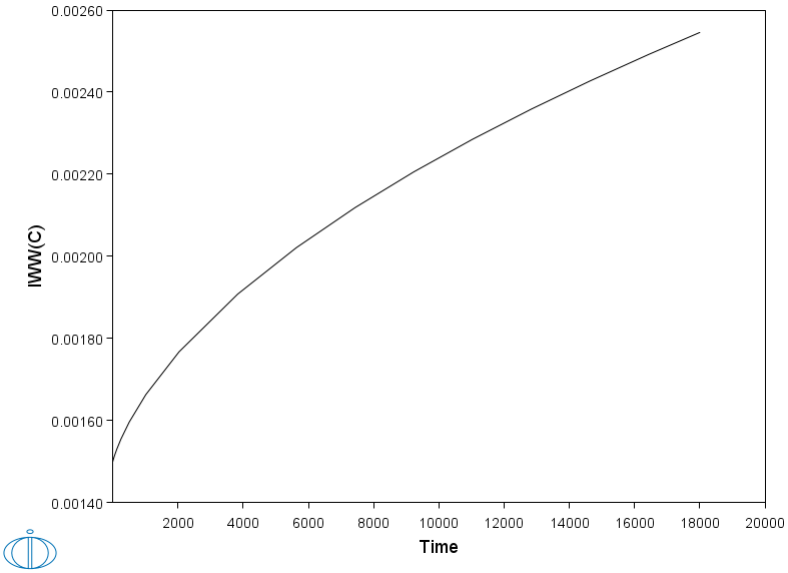



```
POST-1:
POST-1:
POST-1:
POST-1:@?<Hit_return_to_continue>
POST-1:
POST-1: @@
POST-1: @@ USE A LOGARITHMIC SCALE ON THE X-AXIS
POST-1: @@
POST-1: set-axis-type
AXIS (X, Y OR Z) : x
AXIS TYPE /LINEAR/: logarithmic
POST-1:
POST-1: s-s-s x n 0.001 2e4
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```



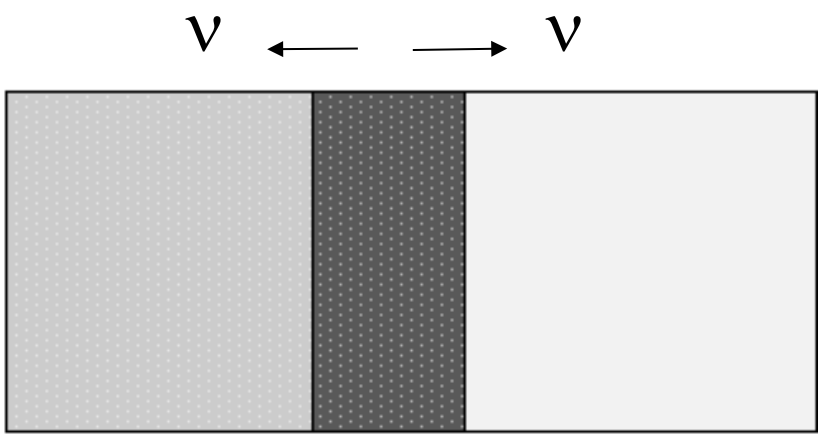

```
POST-1:
POST-1:
POST-1:
POST-1:@?<Hit_return_to_continue>
POST-1:
POST-1: @@
POST-1: @@ PLOT THE AVERAGE WEIGHT FRACTION OF C IN THE SPECIMEN
POST-1: @@
POST-1: s-d-a y iww(c)
POST-1:
POST-1: set-ax-ty
AXIS (X, Y OR Z) : x
AXIS TYPE /LINEAR/: linear
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y

          OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```




```
POST-1:
POST-1:
POST-1:
POST-1:@?<Hit_return_to_continue>
POST-1:
POST-1:
POST-1: set-inter
 --OK---
POST-1:
```

Moving Boundary Problems

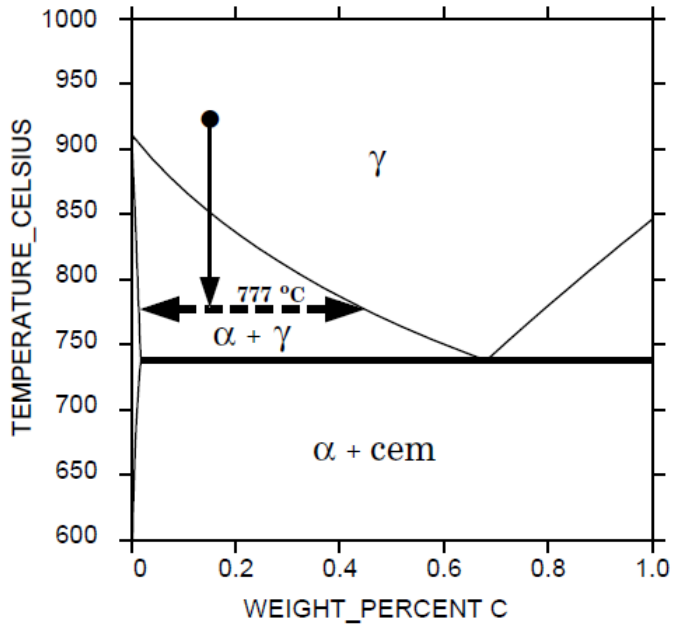


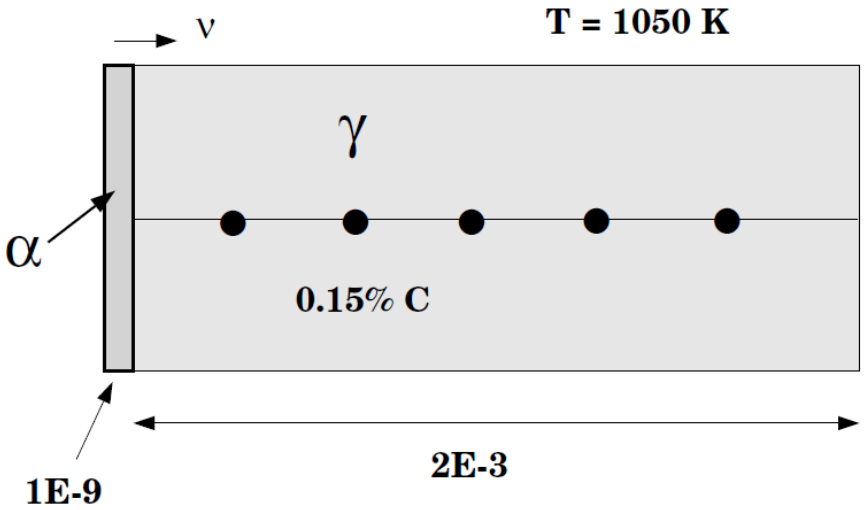
Example exb1a

γ to α transformation in a binary Fe-C alloy

This example calculates a ferrite (BCC)/austenite (FCC) transformation in a binary Fe-C alloy. The initial state is an austenite of 2 mm thickness. The composition of the austenite is Fe-0.15wt%C. After austenitization the specimen has been quenched down to 1050K. The system is assumed closed, no boundary conditions are set (a closed system is the default). Ferrite is expected to grow into the austenite. For this reason you start with a thin region with ferrite adjacent to the austenite.

Fe - C Phase diagram



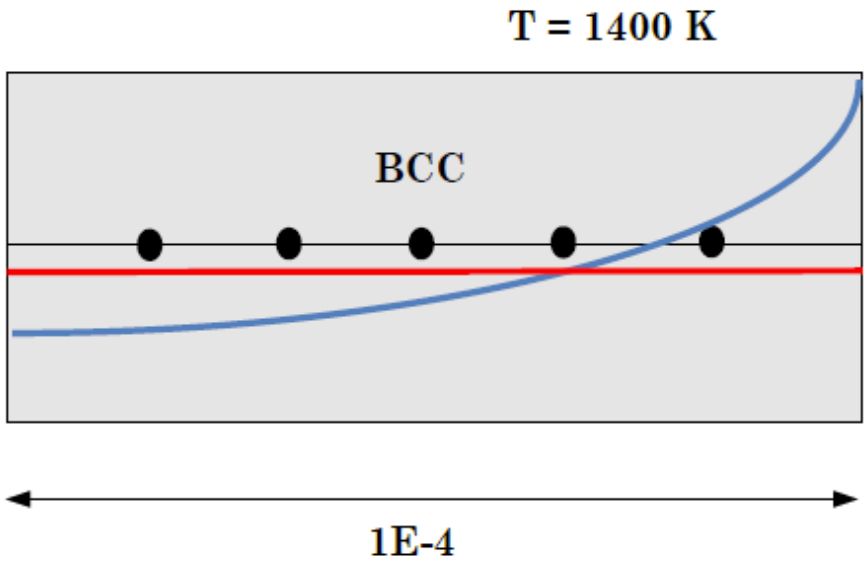


Example exa7

Homogenization heat-treatment

(Initial profile imported from Scheil simulation)

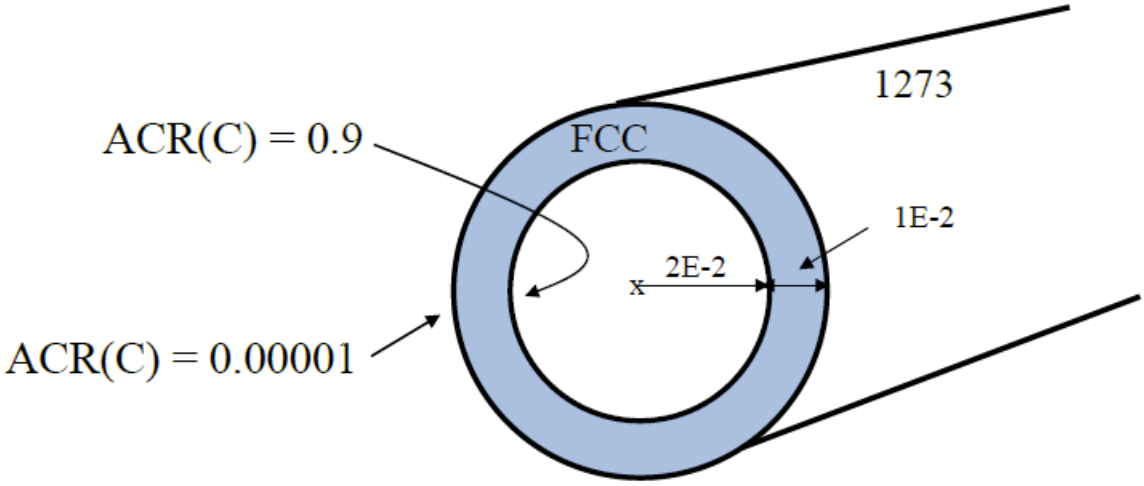
The initial segregation profile is created from a Scheil calculation (see macro `create_initial_profile.TCM`). The command INPUT_SCHEIL_PROFILE in the DICTRA monitor performs most of the setup. Only time and temperature must be entered after the INPUT_SCHEIL_PROFILE command is executed.



Example exa6

Diffusion through a tube wall: Boundary conditions result in a gradient in C-activity

A simple example of diffusion through a tube wall. The tube-material is an Fe-0.6%Mn-0.7%Si-0.05%C alloy. On the inside wall a carbon activity of 0.9 is maintained whereas on the outside the C-activity is very low. This example demonstrates the use of the command SET-FIRST-INTERFACE as well as the use of MIXED boundary conditions.



exa6-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exa6\setup.DCM.test"
SYS: @@
SYS: @@ One-phase problem.
SYS: @@ Diffusion through a tube wall.
SYS: @@ A simple example about diffusion through a tube wall.
SYS: @@ The tube material is an Fe-0.6%Mn-0.7%Si-0.05%C alloy. On
SYS: @@ the inside wall a carbon activity of 0.9 is maintained whereas on
SYS: @@ the outside the C-activity is very low. This example demonstrates
SYS: @@ the use of the command SET-FIRST-INTERFACE as well as the MIXED
SYS: @@ boundary conditions.
SYS: @@----------------------------------------------------------------------
SYS:
SYS: @@ setup.DCM
SYS:
SYS:
SYS: @@
SYS: @@ GO TO THE DATABASE MODULE
SYS: @@
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                        /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12:
TDB_TCFE12: @@
TDB_TCFE12: @@ USE THE TCFE DATABASE FOR THERMODYNAMIC DATA
TDB_TCFE12: @@
TDB_TCFE12: sw tcfe9
 Current database: Steels/Fe-Alloys  v9.3

 VA                        /-  DEFINED
 L12_FCC                   B2_BCC                    DICTRA_FCC_A1
   REJECTED
TDB_TCFE9: def-sys fe si mn c
 FE                        SI                        MN
 C  DEFINED
TDB_TCFE9: rej ph * all
 GAS:G                     LIQUID:L                  BCC_A2
 FCC_A1                    HCP_A3                    CBCC_A12
 CUB_A13                   DIAMOND_FCC_A4            GRAPHITE
 CEMENTITE                 M23C6                     M7C3
 M5C2                      KSI_CARBIDE               FE4N_LP1
 FECN_CHI                  LAVES_PHASE_C14           M3SI
 MN9SI2                    MN11SI19                  MN6SI
 G_PHASE                   CR3SI                     FE2SI
 FESI2_H                   FESI2_L                   MSI
 M5SI3                     AL4C3                     FE8SI2C
 SIC                       MN5SIC                    CUZN_EPSILON
 AL5FE4                    MP_B31                    M2P_C22
   REJECTED
TDB_TCFE9: res ph fcc,grap
 FCC_A1                    GRAPHITE  RESTORED
TDB_TCFE9: get
08:57:00,442 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_TCFE9:
TDB_TCFE9: @@
TDB_TCFE9: @@ SWITCH TO A MOBILITY DATABASE TO RETRIVE KINETIC DATA
TDB_TCFE9: @@
TDB_TCFE9: app
 Use one of these databases

 TCFE12  =  Steels/Fe-Alloys  v12.0
 TCFE9   =  Steels/Fe-Alloys  v9.3
 SSUB6   =  SGTE Substances  v6.0
 FEDEMO  =  Iron Demo Database v6.0
 MOB2    =  Alloys Mobility  v2.7
 MOBFE7  =  Steels/Fe-Alloys Mobility  v7.1
 MOBFE4  =  Steels/Fe-Alloys Mobility  v4.0
 MOBFE2  =  Steels/Fe-Alloys Mobility  v2.0
 MFEDEMO =  Fe-Alloys Mobility demo database v5.0
 USER    =  User defined Database

DATABASE NAME /TCFE9/: mobfe4
 Current database: Steels/Fe-Alloys Mobility  v4.0

 VA  DEFINED
 B2_BCC  REJECTED
APP: def-sys fe si mn c
 FE                        SI                        MN
 C  DEFINED
APP: rej ph * all
 BCC_A2                    CEMENTITE                 FCC_A1
 FE4N_LP1                  HCP_A3                    LIQUID:L
```

```
   REJECTED
APP: res ph fcc
 FCC_A1  RESTORED
APP: get
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
APP:
APP: @@
APP: @@ ENTER THE DICTRA MONITOR WHERE THE PROBLEM IS SET UP
APP: @@
APP: go d-m
 NO TIME STEP DEFINED
 *** ENTERING GRAPHITE AS A DIFFUSION NONE PHASE
DIC>
DIC> @@
DIC> @@ ENTER GLOBAL CONDITION T
DIC> @@
DIC> set-cond glob T 0 1273; * N
DIC>
DIC> @@
DIC> @@ SET THE REFERENCE STATE FOR CARBON
DIC> @@
DIC> set-ref C grap * 101325
DIC>
DIC> @@
DIC> @@ ENTER A REGION
DIC> @@
DIC> enter-region aus
DIC>
DIC> @@
DIC> @@ ENTER A DOUBLE GEOMETRIC GRID INTO THE REGION
DIC> @@
DIC> enter-grid
REGION NAME : /AUS/: aus
WIDTH OF REGION /1/: 1e-2
TYPE /AUTO/: AUTO
DIC>
DIC> @@
DIC> @@ SET THE GEOMETRY (1 = CYLINDER)
DIC> @@
DIC> enter-geo
GEOMETRICAL EXPONENT /0/: 1
DIC>
DIC> @@
DIC> @@ SET THE FIRST INTERFACE => TUBE
DIC> @@
DIC> set-first-interface
COORDINATE FOR FIRST INTERFACE /0/: 2e-2
DIC>
DIC> @@
DIC> @@ ENTER AN active PHASE IN THE REGION
DIC> @@
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: act
REGION NAME : /AUS/: aus
PHASE TYPE /MATRIX/: matrix
PHASE NAME: /NONE/: fcc_a1#1
DIC>
DIC> @@
DIC> @@ ENTER INITIAL COMPOSITIONS INTO THE PHASE
DIC> @@
DIC> enter-composition
REGION NAME : /AUS/: aus
PHASE NAME: /FCC_A1/: fcc#1
DEPENDENT COMPONENT ? /SI/: fe
COMPOSITION TYPE /MOLE_FRACTION/: w-p
PROFILE FOR /C/: si lin 0.7 0.7
PROFILE FOR /MN/: mn lin 0.6 0.6
PROFILE FOR /SI/: c lin 5e-2 5e-2
DIC>
DIC> @@
DIC> @@ SET THE BOUNDARY CONDITIONS ON BOTH THE LOWER AND UPPER PART OF THE REGION
DIC> @@
DIC> @@ USE MIXED CONDITIONS: AN ACTIVITY CONDITION FOR C AND CLOSED
DIC> @@ SYSTEMS FOR MN AND SI.
DIC> @@
DIC> set-cond
GLOBAL OR BOUNDARY CONDITION /GLOBAL/: boundary
BOUNDARY /LOWER/: lower
CONDITION TYPE /CLOSED_SYSTEM/: mixed
Dependent substitutional element:FE
Dependent interstitial element:VA
TYPE OF CONDITION FOR COMPONENT C /ZERO_FLUX/: activity
LOW TIME LIMIT /0/: 0
ACR(C)(TIME)= 0.9;
HIGH TIME LIMIT /*/: *
ANY MORE RANGES /N/: N
TYPE OF CONDITION FOR COMPONENT MN /ZERO_FLUX/: zero_flux
TYPE OF CONDITION FOR COMPONENT SI /ZERO_FLUX/: zero_flux
DIC>
DIC> set-cond
GLOBAL OR BOUNDARY CONDITION /GLOBAL/: boundary
BOUNDARY /UPPER/: upper
CONDITION TYPE /CLOSED_SYSTEM/: mixed
Dependent substitutional element:FE
Dependent interstitial element:VA
TYPE OF CONDITION FOR COMPONENT C /ZERO_FLUX/: activity
LOW TIME LIMIT /0/: 0
ACR(C)(TIME)= 1e-5;
HIGH TIME LIMIT /*/: *
ANY MORE RANGES /N/: N
TYPE OF CONDITION FOR COMPONENT MN /ZERO_FLUX/: zero_flux
TYPE OF CONDITION FOR COMPONENT SI /ZERO_FLUX/: zero_flux
DIC>
```

```
DIC> @@
DIC> @@ SET THE SIMULATION TIME
DIC> @@
DIC> set-simulation-time
END TIME FOR INTEGRATION /.1/: 1e9
AUTOMATIC TIMESTEP CONTROL /YES/:
MAX TIMESTEP DURING INTEGRATION /100000000/:
INITIAL TIMESTEP : /1E-07/:
SMALLEST ACCEPTABLE TIMESTEP : /1E-07/:
DIC>
DIC>
DIC> @@
DIC> @@ SAVE TO FILE
DIC> @@
DIC> save exa6 y
DIC>
DIC> set-inter
 --OK---
DIC>
```

exa6-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exa6\run.DCM.test"
DIC>
DIC>
DIC> @@ run.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR RUNNING exa6
DIC> @@
DIC>
DIC> @@
DIC> @@ ENTER THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  0.00000E+00
 *** ENTERING GRAPHITE AS A DIFFUSION NONE PHASE
DIC> read exa6
 OK
DIC>
DIC> @@
DIC> @@ Start the simulation
DIC> @@
DIC> simulate
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 Region: AUS
 geometric    1.20000     dense at    0.00000       35 points
 geometric   0.833333     dense at   0.100000E-01   36 points
 DEGREE OF IMPLICITY SET TO TRAPEZOIDAL RULE
 U-FRACTION IN SYSTEM:  C = .00115488575879621  FE = .490055682684517
                        MN = .00302988813183617  SI = .00691442924890043
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
 U-FRACTION IN SYSTEM:  C = .00115488575879621  FE = .490055682684517
                        MN = .00302988813183617  SI = .00691442924890043
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
 TIME =  0.10000000E-06 DT =  0.10000000E-06 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00116918857196932  FE = .490055682684517
                        MN = .00302988813183617  SI = .00691442924890043
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    0  seconds
 TIME =  0.10010000E-03 DT =  0.10000000E-03 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00116925677511611  FE = .490055682684517
                        MN = .00302988813183617  SI = .00691442924890043
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    1  seconds
 TIME =   3.7171296     DT =   3.7170295     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00119293284978174  FE = .490055682684522
                        MN = .00302988813183677  SI = .00691442924889472
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    0  seconds
 TIME =   11.151189     DT =   7.4340590     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00121675295851969  FE = .490055682684526
                        MN = .00302988813183727  SI = .00691442924889021
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    0  seconds
 TIME =   26.019307     DT =   14.868118     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00124742195297911  FE = .490055682684531
                        MN = .00302988813183786  SI = .00691442924888482
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    1  seconds
 TIME =   55.755543     DT =   29.736236     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00128911390005542  FE = .490055682684537
                        MN = .0030298881318386  SI = .00691442924887818
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    0  seconds
 TIME =   115.22801     DT =   59.472472     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00134703651660225  FE = .490055682684544
                        MN = .0030298881318395  SI = .00691442924887014
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    1  seconds
 TIME =   234.17296     DT =   118.94494     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00142832106681786  FE = .490055682684552
                        MN = .00302988813184054  SI = .00691442924886107
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    0  seconds
 TIME =   472.06285     DT =   237.88989     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00154296869660367  FE = .490055682684559
                        MN = .00302988813184158  SI = .00691442924885257
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    0  seconds
 TIME =   947.84262     DT =   475.77978     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00170514012818242  FE = .490055682684562
                        MN = .00302988813184217  SI = .00691442924884914
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    0  seconds
 TIME =   1899.4022     DT =   951.55955     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00193499994805703  FE = .490055682684551
                        MN = .00302988813184128  SI = .00691442924886167
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    1  seconds
 TIME =   3802.5213     DT =   1903.1191     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00226140370551408  FE = .490055682684509
                        MN = .00302988813183727  SI = .00691442924890687
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    0  seconds
 TIME =   7608.7595     DT =   3806.2382     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00272584528526073  FE = .490055682684477
                        MN = .00302988813183441  SI = .00691442924894202
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    0  seconds
 TIME =   15221.236     DT =   7612.4764     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00338827312489028  FE = .490055682684529
                        MN = .00302988813184169  SI = .00691442924888304
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    0  seconds
 TIME =   30446.189     DT =   15224.953     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00433631630407219  FE = .490055682684635
                        MN = .00302988813185701  SI = .00691442924876118
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    1  seconds
 TIME =   60896.094     DT =   30449.906     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00570002964090365  FE = .490055682684757
```

```
                        MN = .00302988813187498  SI = .0069144292486217
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    0  seconds
 TIME =   121795.91     DT =   60899.811     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00767412084728369  FE = .490055682684913
                        MN = .00302988813189467  SI = .00691442924844635
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    0  seconds
 TIME =   243595.53     DT =   121799.62     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0105195649513181  FE = .490055682685137
                        MN = .00302988813192002  SI = .00691442924819631
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    1  seconds
 TIME =   487194.77     DT =   243599.25     SUM OF SQUARES =   0.0000000


output ignored...



... output resumed

 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    0  seconds
 TIME =   974393.26     DT =   487198.49     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0161959223170427  FE = .4900556826862
                        MN = .0030298881320517  SI = .00691442924700152
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    0  seconds
 TIME =   1948790.2     DT =   974396.98     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0165255441524092  FE = .490055682687089
                        MN = .00302988813216816  SI = .00691442924599685
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    1  seconds
 TIME =   3659176.8     DT =   1710386.6     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0165253603333896  FE = .490055682688707
                        MN = .00302988813236503  SI = .00691442924418116
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    0  seconds
 TIME =   6504445.9     DT =   2845269.0     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0165252156043225  FE = .4900556826919
                        MN = .00302988813272575  SI = .00691442924062761
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    0  seconds
 TIME =   11499948.     DT =   4995502.6     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0165250199480401  FE = .490055682698835
                        MN = .0030298881334676  SI = .00691442923295053
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    1  seconds
 TIME =   21490954.     DT =   9991005.2     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0165246370574857  FE = .490055682716788
                        MN = .00302988813528998  SI = .00691442921317571
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    0  seconds
 TIME =   41472964.     DT =   19982010.     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0165242743764126  FE = .490055682765089
                        MN = .00302988814001775  SI = .00691442916014728
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    0  seconds
 TIME =   81436985.     DT =   39964021.     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0165240798225428  FE = .490055682897507
                        MN = .00302988815269011  SI = .00691442901505678
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    1  seconds
 TIME =  0.16136503E+09 DT =   79928042.     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0165243841670119  FE = .490055683239964
                        MN = .00302988818594653  SI = .00691442863934314
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    0  seconds
 TIME =  0.26136503E+09 DT =  0.10000000E+09 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0165274380561969  FE = .490055683710213
                        MN = .00302988823461859  SI = .00691442812042194
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    0  seconds
 TIME =  0.36136503E+09 DT =  0.10000000E+09 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0165311427149333  FE = .490055684172888
                        MN = .00302988828599814  SI = .00691442760636751
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    1  seconds
 TIME =  0.46136503E+09 DT =  0.10000000E+09 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0165343499685237  FE = .49005568461407
                        MN = .00302988833774673  SI = .00691442711343715
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    0  seconds
 TIME =  0.56136503E+09 DT =  0.10000000E+09 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0165372920835742  FE = .49005568503205
                        MN = .00302988838885054  SI = .00691442664435305
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    0  seconds
 TIME =  0.66136503E+09 DT =  0.10000000E+09 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0165400639747419  FE = .490055685428352
                        MN = .00302988843888551  SI = .00691442619801563
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    1  seconds
 TIME =  0.76136503E+09 DT =  0.10000000E+09 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0165427132192147  FE = .49005568580507
                        MN = .00302988848767346  SI = .00691442577251001
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    0  seconds
 TIME =  0.86136503E+09 DT =  0.10000000E+09 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0165452672694828  FE = .49005568616428
                        MN = .00302988853516225  SI = .00691442536581158
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    0  seconds
 TIME =  0.96136503E+09 DT =  0.10000000E+09 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0165477435591337  FE = .490055686507851
                        MN = .00302988858136234  SI = .00691442497603956
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
  CPU time used in timestep                    1  seconds
 TIME =  0.10000000E+10 DT =   38634974.     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .016550560658945  FE = .49005568663674
                        MN = .00302988859887261  SI = .00691442482964091
 TOTAL SIZE OF SYSTEM:  .00314159265359 [m^2]
 MUST SAVE WORKSPACE ON FILE
 WORKSPACE SAVED ON FILE
 RECLAIMING WORKSPACE
```

```
 DELETING TIME-RECORD FOR TIME     0.0000000
 DELETING TIME-RECORD FOR TIME    0.10000000E-06
 DELETING TIME-RECORD FOR TIME    0.10010000E-03
 DELETING TIME-RECORD FOR TIME     3.7171296
 DELETING TIME-RECORD FOR TIME     11.151189
 DELETING TIME-RECORD FOR TIME     26.019307
 DELETING TIME-RECORD FOR TIME     55.755543
 DELETING TIME-RECORD FOR TIME     115.22801
 DELETING TIME-RECORD FOR TIME     234.17296
 DELETING TIME-RECORD FOR TIME     472.06285
 DELETING TIME-RECORD FOR TIME     947.84262
 DELETING TIME-RECORD FOR TIME     1899.4022
 DELETING TIME-RECORD FOR TIME     3802.5213
 DELETING TIME-RECORD FOR TIME     7608.7595
 DELETING TIME-RECORD FOR TIME     15221.236
 DELETING TIME-RECORD FOR TIME     30446.189
 DELETING TIME-RECORD FOR TIME     60896.094
 DELETING TIME-RECORD FOR TIME     121795.91
 DELETING TIME-RECORD FOR TIME     243595.53
 DELETING TIME-RECORD FOR TIME     487194.77
 DELETING TIME-RECORD FOR TIME     974393.26
 DELETING TIME-RECORD FOR TIME     1948790.2
 DELETING TIME-RECORD FOR TIME     3659176.8
 DELETING TIME-RECORD FOR TIME     6504445.9
 DELETING TIME-RECORD FOR TIME     11499948.
 DELETING TIME-RECORD FOR TIME     21490954.
 DELETING TIME-RECORD FOR TIME     41472964.
 DELETING TIME-RECORD FOR TIME     81436985.
 DELETING TIME-RECORD FOR TIME    0.16136503E+09
 DELETING TIME-RECORD FOR TIME    0.26136503E+09
 DELETING TIME-RECORD FOR TIME    0.36136503E+09
 DELETING TIME-RECORD FOR TIME    0.46136503E+09
 DELETING TIME-RECORD FOR TIME    0.56136503E+09
 DELETING TIME-RECORD FOR TIME    0.66136503E+09
 DELETING TIME-RECORD FOR TIME    0.76136503E+09
 DELETING TIME-RECORD FOR TIME    0.86136503E+09

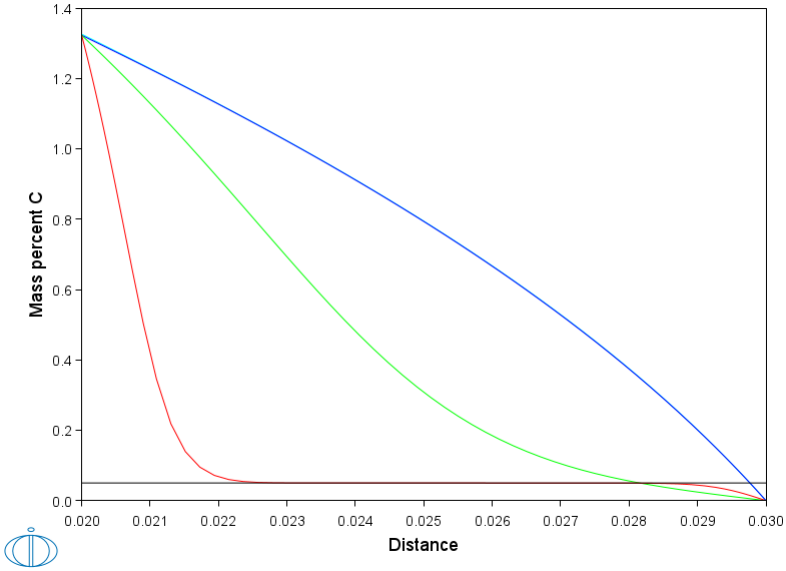
 KEEPING TIME-RECORD FOR TIME    0.96136503E+09
 AND FOR TIME                    0.10000000E+10
 WORKSPACE RECLAIMED

 TIMESTEP AT    0.100000000E+10 SELECTED

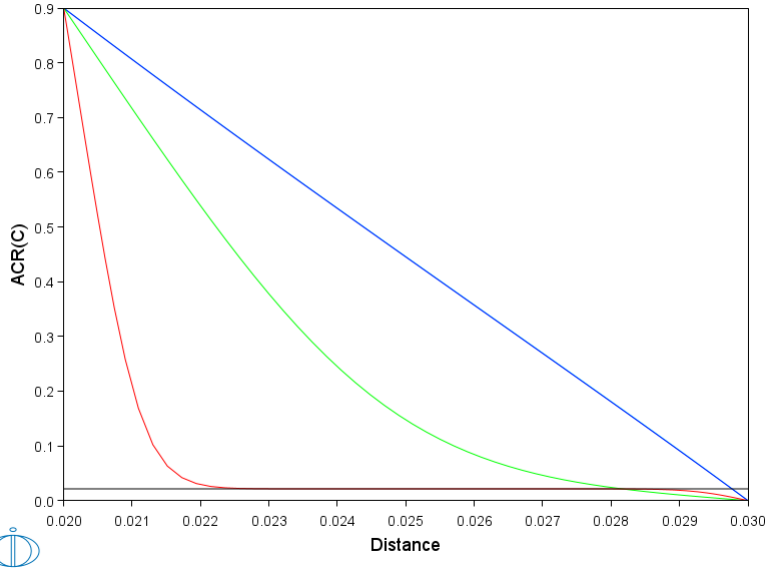
DIC>
DIC> @@
DIC> @@ THE SIMULATION IS FINISHED
DIC> @@
DIC>
DIC> set-inter
 --OK---
DIC>
```

exa6-plot

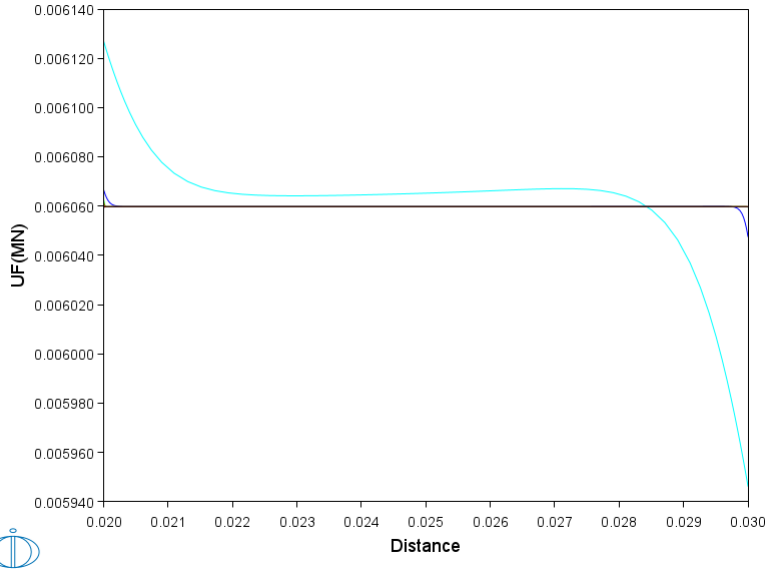
```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exa6\plot.DCM.test"
DIC>
DIC>
DIC> @@ exa6_plot.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR GENERATING GRAPHICAL OUTPUT FOR EXAMPLE exa6
DIC> @@
DIC>
DIC> @@
DIC> @@ GO TO THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  1.00000E+09
 *** ENTERING GRAPHITE AS A DIFFUSION NONE PHASE
DIC> read exa6
 OK
DIC>
DIC> @@
DIC> @@ GO TO THE POST PROCESSOR
DIC> @@
DIC> post
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1:
POST-1: @@
POST-1: @@ PLOT THE CONCENTRATION OF C AT DIFFERENT TIMES
POST-1: @@
POST-1: s-d-a x distance global
  INFO: Distance is set as independent variable
POST-1: s-d-a y w-p c
POST-1: s-p-c time 0,1e4,2e5,1e7,1e9
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```



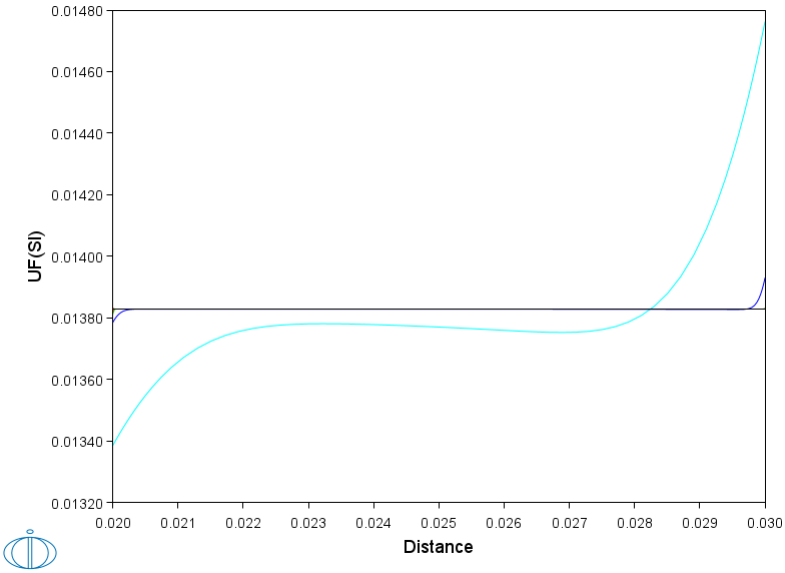

```
POST-1:
POST-1:
POST-1:
POST-1:Hit RETURN to continue
POST-1:
POST-1: @@
POST-1: @@ PLOT THE ACTIVITY OF C
POST-1: @@
POST-1:
POST-1: s-d-a y acr(c)
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```



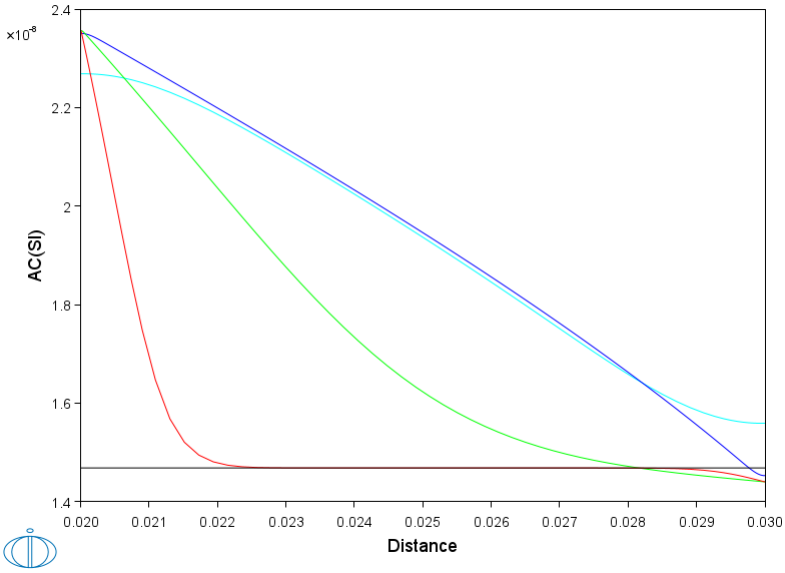

```
POST-1:
POST-1:
POST-1:
POST-1:Hit RETURN to continue
POST-1:
POST-1: @@
POST-1: @@ LET US LOOK AT THE MN AND SI PROFILES
POST-1: @@
POST-1: @@ WE PLOT THE U-FRACTION OF MN AND SI WHICH WILL BE INDEPENDENT
POST-1: @@ OF THE C-CONCENTRATION.
POST-1: @@
POST-1: s-d-a y u-f mn
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```




```
POST-1:
POST-1:
POST-1:
POST-1:
POST-1:Hit RETURN to continue
POST-1:
POST-1: s-d-a y u-f si
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```




```
POST-1:
POST-1:
POST-1:
POST-1:
POST-1:Hit RETURN to continue
POST-1:
POST-1: @@
POST-1: @@ FINALLY, LOOK AT THE ACTIVITY PROFILES OF SI
POST-1: @@
POST-1: s-d-a y ac(si)
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```




```
POST-1:
POST-1:
POST-1:
POST-1:
POST-1:Hit RETURN to continue
POST-1:
POST-1: set-inter
 --OK---
POST-1:
```

exa7-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exa7\setup.DCM.test"
SYS: @@ One phase example.
SYS: @@ Homogenization heat treatment
SYS: @@ The initial segregation profile is created from a Scheil
SYS: @@ calculation (see macro create_initial_profile.TCM). The command
SYS: @@ INPUT_SCHEIL_PROFILE in the DICTRA MONITOR performs most of the
SYS: @@ set up. Only time and temperature must  be entered after the
SYS: @@ INPUT_SCHEIL_PROFILE command is executed.
SYS: @@----------------------------------------------------------------------
SYS:
SYS: @@ In this example only a single phase, ferrite, is entered in the simulation
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                     /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12: sw FEDEMO
 Current database: Iron Demo Database v6.0

 VA                     /-  DEFINED
TDB_FEDEMO: def-sys fe cr ni mn
 FE                     CR                     NI
 MN  DEFINED
TDB_FEDEMO: rej ph *
 GAS:G                  LIQUID:L               BCC_A2
 C14_LAVES              CBCC_A12               CHI_A12
 CUB_A13                DIAMOND_A4             FCC_A1
 HCP_A3                 SIGMA_D8B  REJECTED
TDB_FEDEMO: rest ph bcc
 BCC_A2  RESTORED
TDB_FEDEMO: get
09:00:58,282 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_FEDEMO:
TDB_FEDEMO: app MFEDEMO
 Current database: Fe-Alloys Mobility demo database v5.0

 VA  DEFINED
APP: def-sys fe cr ni mn
 FE                     CR                     NI
 MN  DEFINED
APP: rej ph *
 BCC_A2                 FCC_A1                 LIQUID:L
   REJECTED
APP: rest ph bcc
 BCC_A2  RESTORED
APP: get
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
APP:
APP: go dict-mon
 NO TIME STEP DEFINED
DIC>
DIC>
DIC> @@ THE INPUT_SCHEIL_PROFILE COMMAND PERFORMS MOST OF THE SET UP
DIC> input_scheil_profile
 INFO: SCHEIL_REGION CREATED
FILE NAME /XF.TXT/: segregation_profile.TXT
ENTER WIDTH OF REGION /1/: 100e-6
 INFO: LINEAR GRID IN SCHEIL_REGION ENTERED WITH 100 GRID POINTS
 ENTER MAIN SOLID SOLUTION PHASE
PHASE NAME: bcc#1
 INFO: CHANGING DEPENDENT COMPONENT FROM NI TO FE
 INFO: COMPOSITION PROFILE ENTERED IN REGION
SHOULD MORE PHASES BE ENTERED IN THE REGION /NO/: n
 INFO: TO COMPLETE SETUP, ENTER TEMPERATURE AND
 SIMULATION TIME
DIC>
DIC>
DIC> @@ ENTER THE HEAT TREATMENT TEMPERATURE
DIC> s-cond
GLOBAL OR BOUNDARY CONDITION /GLOBAL/: glob
VARIABLE : t
LOW TIME LIMIT /0/: 0 1473; * n
DIC>
DIC>
```

```
DIC> @@ ENTER A SIMULATION TIME
DIC> se-si-ti
END TIME FOR INTEGRATION /.1/: 3600
AUTOMATIC TIMESTEP CONTROL /YES/: y
MAX TIMESTEP DURING INTEGRATION /360/: 360
INITIAL TIMESTEP : /1E-07/: 1e-7
SMALLEST ACCEPTABLE TIMESTEP : /1E-07/: 1e-9
DIC>
DIC>
DIC> save exa7 y
DIC>
DIC> set-inter
 --OK---
DIC>
```

exa7-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exa7\run.DCM.test"
DIC> go dict-mon
 TIME STEP AT TIME  0.00000E+00
DIC>
DIC> read exa7
 OK
DIC>
DIC> sim
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 DEGREE OF IMPLICITY SET TO TRAPEZOIDAL RULE
 U-FRACTION IN SYSTEM:  CR = .180420497424242  FE = .796498787878788
                        MN = .00999016878282828  NI = .0130905459141414
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
 U-FRACTION IN SYSTEM:  CR = .180420497424242  FE = .796498787878788
                        MN = .00999016878282828  NI = .0130905459141414
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
 TIME =  0.10000000E-06 DT =  0.10000000E-06 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .180420497424242  FE = .796498787878788
                        MN = .00999016878282829  NI = .0130905459141414
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    1  seconds
 TIME =  0.10010000E-03 DT =  0.10000000E-03 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .180420497424242  FE = .796498787878788
                        MN = .00999016878282829  NI = .0130905459141414
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.43088419     DT =  0.43078409     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .180420497424243  FE = .796498787878788
                        MN = .00999016878282829  NI = .0130905459141414
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    1  seconds
 TIME =   1.2924524     DT =  0.86156818     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .180420497424243  FE = .796498787878788
                        MN = .0099901687828283  NI = .0130905459141414
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   3.0155887     DT =   1.7231364     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .180420497424242  FE = .796498787878787
                        MN = .00999016878282903  NI = .0130905459141414
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    1  seconds
 TIME =   6.4618615     DT =   3.4462727     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .180420497424241  FE = .796498787878781
                        MN = .00999016878283682  NI = .0130905459141414
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   13.354407     DT =   6.8925455     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .180420497424229  FE = .796498787878749
                        MN = .00999016878287914  NI = .0130905459141424
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   27.139498     DT =   13.785091     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .180420497424222  FE = .796498787878759
                        MN = .00999016878287931  NI = .0130905459141401
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   54.709680     DT =   27.570182     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .180420497424197  FE = .79649878787879
                        MN = .00999016878287965  NI = .0130905459141337
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    1  seconds
 TIME =   109.85004     DT =   55.140364     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .180420497424141  FE = .796498787878856
                        MN = .00999016878288083  NI = .0130905459141224
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   220.13077     DT =   110.28073     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .180420497424055  FE = .79649878787895
                        MN = .00999016878288576  NI = .0130905459141088
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   440.69223     DT =   220.56145     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .180420497423961  FE = .79649878787904
                        MN = .00999016878289935  NI = .013090545914099
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   800.69223     DT =   360.00000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .180420497423905  FE = .796498787879083
                        MN = .00999016878291508  NI = .0130905459140971
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   1160.6922     DT =   360.00000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .180420497423885  FE = .796498787879095
                        MN = .00999016878292113  NI = .0130905459140983
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    1  seconds
 TIME =   1520.6922     DT =   360.00000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .180420497423872  FE = .796498787879106
                        MN = .00999016878292266  NI = .0130905459140985
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   1880.6922     DT =   360.00000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .180420497423861  FE = .796498787879119
                        MN = .00999016878292224  NI = .0130905459140979
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   2240.6922     DT =   360.00000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .180420497424024  FE = .79649878787892
                        MN = .00999016878295051  NI = .0130905459141057
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   2600.6922     DT =   360.00000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .180420497424179  FE = .796498787878731
                        MN = .00999016878297196  NI = .0130905459141176
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   2960.6922     DT =   360.00000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .180420497424306  FE = .796498787878574
                        MN = .00999016878299062  NI = .0130905459141293
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
```

```
 CPU time used in timestep                    0  seconds
TIME =   3320.6922     DT =   360.00000     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  CR = .180420497424408  FE = .796498787878447
                       MN = .00999016878300579  NI = .0130905459141394
TOTAL SIZE OF SYSTEM:  1E-04 [m]
 CPU time used in timestep                    1  seconds
TIME =   3600.0000     DT =   279.30777     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  CR = .180420497424463  FE = .796498787878379
                       MN = .00999016878301374  NI = .0130905459141449
TOTAL SIZE OF SYSTEM:  1E-04 [m]
MUST SAVE WORKSPACE ON FILE
WORKSPACE SAVED ON FILE
RECLAIMING WORKSPACE
DELETING TIME-RECORD FOR TIME    0.0000000
DELETING TIME-RECORD FOR TIME   0.10000000E-06
DELETING TIME-RECORD FOR TIME   0.10010000E-03
DELETING TIME-RECORD FOR TIME   0.43088419
DELETING TIME-RECORD FOR TIME    1.2924524
DELETING TIME-RECORD FOR TIME    3.0155887
DELETING TIME-RECORD FOR TIME    6.4618615
DELETING TIME-RECORD FOR TIME    13.354407
DELETING TIME-RECORD FOR TIME    27.139498
DELETING TIME-RECORD FOR TIME    54.709680
DELETING TIME-RECORD FOR TIME    109.85004
DELETING TIME-RECORD FOR TIME    220.13077
DELETING TIME-RECORD FOR TIME    440.69223
DELETING TIME-RECORD FOR TIME    800.69223
DELETING TIME-RECORD FOR TIME    1160.6922
DELETING TIME-RECORD FOR TIME    1520.6922
DELETING TIME-RECORD FOR TIME    1880.6922
DELETING TIME-RECORD FOR TIME    2240.6922
DELETING TIME-RECORD FOR TIME    2600.6922
DELETING TIME-RECORD FOR TIME    2960.6922

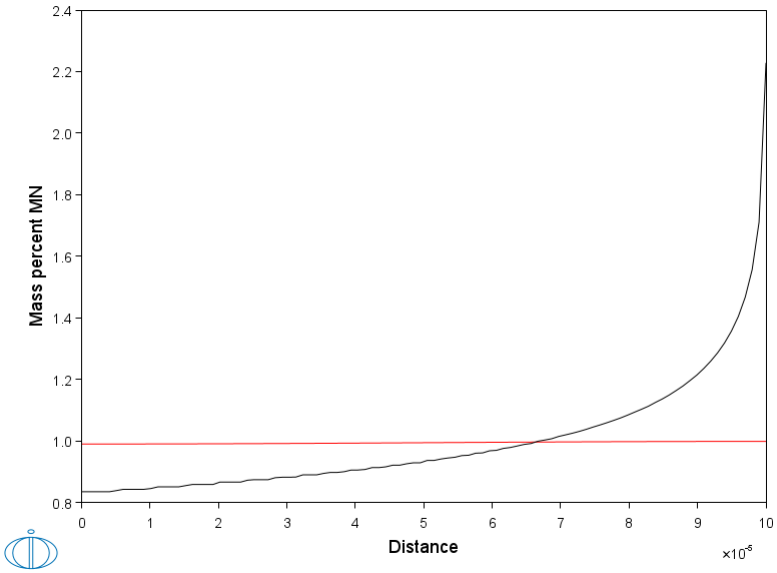
KEEPING TIME-RECORD FOR TIME    3320.6922
AND FOR TIME                    3600.0000
WORKSPACE RECLAIMED

TIMESTEP AT     3600.00000     SELECTED

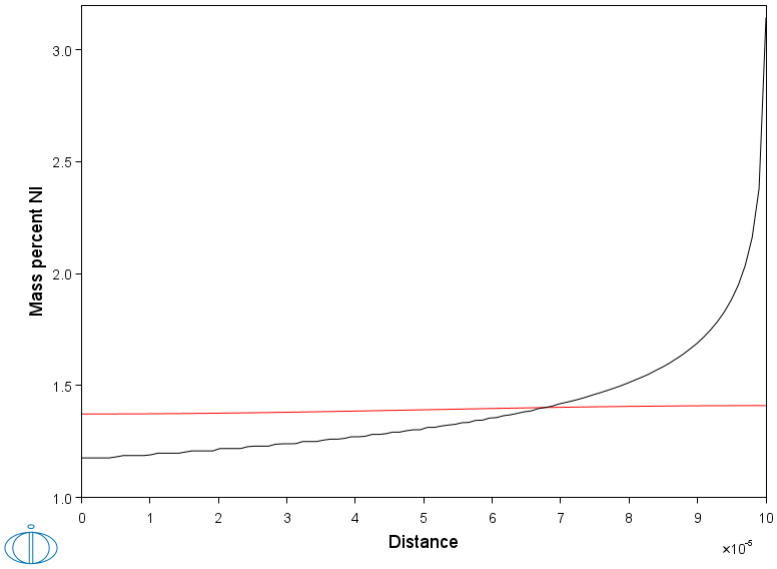
DIC>
DIC> set-inter
 --OK---
DIC>
```

exa7-plot

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exa7\plot.DCM.test"
DIC> go dict-mon
 TIME STEP AT TIME  3.60000E+03
DIC>
DIC> read exa7
 OK
DIC>
DIC> post
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1: s-p-c time 0,3600
POST-1: s-d-a x d g
  INFO: Distance is set as independent variable
POST-1: s-d-a y w-p mn
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```




```
POST-1:
POST-1: @@ Hit enter for the next plot
POST-1:@?
POST-1:
POST-1: s-d-a y w-p ni
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```




```
POST-1:
POST-1: set-inter
 --OK---
POST-1:
```

exb1a-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb1a\setup.DCM.test"
SYS: @@
SYS: @@ Moving boundary problem.
SYS: @@  Austenite to ferrite transformation in a binary Fe-C alloy
SYS: @@ This example calculates a ferrite(BCC)/austenite(FCC)transformation
SYS: @@ in a binary Fe-C alloy.  The initial state is an austenite of 2mm
SYS: @@ thickness. The composition of the austenite is Fe-0.15wt%C.
SYS: @@
SYS: @@ After austenitization the specimen is quenched down to 1050K.
SYS: @@ The system is assumed closed, so no boundary conditions are set
SYS: @@ (a closed system is the default). Ferrite is expected to grow
SYS: @@ into the austenite, which is why we start with a thin
SYS: @@ region with ferrite adjacent to the austenite.
SYS: @@----------------------------------------------------------------------
SYS:
SYS: @@ exb1a_setup.DCM
SYS:
SYS:
SYS: @@
SYS: @@ START BY GOING TO THE DATABASE MODULE
SYS: @@
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                       /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12:
TDB_TCFE12: @@
TDB_TCFE12: @@ USE A THERMODYNAMIC DATABASE TO RETRIEVE THE DATA
TDB_TCFE12: @@
TDB_TCFE12: sw FEDEMO
 Current database: Iron Demo Database v6.0

 VA                       /-  DEFINED
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ DEFINE THE SYSTEM TO WORK WITH
TDB_FEDEMO: @@
TDB_FEDEMO: def-sys fe c
 FE                       C  DEFINED
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ EXCLUDE THE THERMODYNAMIC DATA FOR THE PHASES THAT ARE NOT NEEDED
TDB_FEDEMO: @@
TDB_FEDEMO: rej ph * all
 GAS:G                    LIQUID:L                 BCC_A2
 C14_LAVES                CBCC_A12                 CEMENTITE_D011
 CUB_A13                  DIAMOND_A4               FCC_A1
 GRAPHITE_A9              HCP_A3                   KSI_CARBIDE
 M23C6_D84                M5C2                     M7C3_D101
   REJECTED
TDB_FEDEMO: res ph fcc bcc
 FCC_A1                   BCC_A2  RESTORED
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ RETRIEVE DATA FROM THE DATABASE FILE
TDB_FEDEMO: @@
TDB_FEDEMO: get
09:03:58,960 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ MOBILITY/DIFFUSIVITY DATA ARE STORED IN A SEPARATE DATABASE FILE.
TDB_FEDEMO: @@ SWITCH TO A MOBILITY DATABASE TO RETRIEVE DATA
TDB_FEDEMO: @@
TDB_FEDEMO: append
 Use one of these databases

 TCFE12  =  Steels/Fe-Alloys  v12.0
 TCFE9   =  Steels/Fe-Alloys  v9.3
 SSUB6   =  SGTE Substances  v6.0
 FEDEMO  =  Iron Demo Database v6.0
 MOB2    =  Alloys Mobility  v2.7
 MOBFE7  =  Steels/Fe-Alloys Mobility  v7.1
 MOBFE4  =  Steels/Fe-Alloys Mobility  v4.0
 MOBFE2  =  Steels/Fe-Alloys Mobility  v2.0
 MFEDEMO =  Fe-Alloys Mobility demo database v5.0
 USER    =  User defined Database

DATABASE NAME /FEDEMO/: MFEDEMO
 Current database: Fe-Alloys Mobility demo database v5.0

 VA  DEFINED
```

```
APP: def-sys fe c
 FE                     C  DEFINED
APP: rej ph * all
 BCC_A2                 FCC_A1                 CEMENTITE_D011
 LIQUID:L  REJECTED
APP: res ph fcc bcc
 FCC_A1                 BCC_A2  RESTORED
APP: get
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
APP:
APP: @@
APP: @@ ENTER THE DICTRA MONITOR WHERE THE SYSTEM IS SET UP
APP: @@
APP: go d-m
 NO TIME STEP DEFINED
DIC>
DIC> @@
DIC> @@ ENTER GLOBAL CONDITION T
DIC> @@
DIC> set-condition global T 0 1050; * N
DIC>
DIC> @@
DIC> @@ START BY ENTERING THE REGIONS ferrite AND austenite WHERE WE
DIC> @@ PUT THE BCC AND FCC PHASE, RESPECTIVELY. THE FERRITE REGION IS
DIC> @@ ASSUMED INITIALLY TO BE VERY THIN, 1E-9 METERS.
DIC> @@
DIC> enter-region
REGION NAME : ferrite
DIC>
DIC> enter-region
REGION NAME : austenite
ATTACH TO REGION NAMED /FERRITE/:
ATTACHED TO THE RIGHT OF FERRITE /YES/:
DIC>
DIC> @@
DIC> @@ ENTER GRIDS INTO THE REGIONS
DIC> @@
DIC> enter-grid
REGION NAME : /FERRITE/: ferrite
WIDTH OF REGION /1/: 1e-9
TYPE /AUTO/: linear
NUMBER OF POINTS /50/: 10
DIC>
DIC> enter-grid austenite
WIDTH OF REGION /1/: 20e-4
TYPE /AUTO/: geo
NUMBER OF POINTS /50/: 100
VALUE OF R IN THE GEOMETRICAL SERIE : 1.05
DIC>
DIC>
DIC>
DIC> @@
DIC> @@ ENTER active PHASES INTO THE REGIONS
DIC> @@
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: active
REGION NAME : /FERRITE/: ferrite
PHASE TYPE /MATRIX/: matrix
PHASE NAME: /NONE/: bcc
DIC>
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: active
REGION NAME : /AUSTENITE/: austenite
PHASE TYPE /MATRIX/: matrix
PHASE NAME: /NONE/: fcc#1
DIC>
DIC>
DIC>
DIC> @@
DIC> @@ ENTER AN INITIAL COMPOSITION INTO BCC
DIC> @@
DIC> enter-composition
REGION NAME : /FERRITE/: ferrite
PHASE NAME: /BCC_A2/: bcc
COMPOSITION TYPE /MOLE_FRACTION/: w-p
PROFILE FOR /C/: C
TYPE /LINEAR/: linear
VALUE OF FIRST POINT : 0.01
VALUE OF LAST POINT : /1E-2/: 0.01
DIC>
DIC> @@
DIC> @@ ENTER AN INITIAL COMPOSITION INTO FCC
DIC> @@
DIC> enter-composition
REGION NAME : /AUSTENITE/: austenite
PHASE NAME: /FCC_A1/: fcc#1
COMPOSITION TYPE /MOLE_FRACTION/: w-p
PROFILE FOR /C/: C
TYPE /LINEAR/: linear
VALUE OF FIRST POINT : 0.15
VALUE OF LAST POINT : /0.15/: 0.15
DIC>
DIC>
DIC> @@
DIC> @@ THE BOUNDARY CONDITION IS A CLOSED SYSTEM AS WE DO NOT SPECIFY
DIC> @@ ANYTHING ELSE
DIC> @@
DIC>
DIC> @@
DIC> @@ SET THE SIMULATION TIME
DIC> @@
DIC> set-simulation-time
```

```
END TIME FOR INTEGRATION /.1/: 1e9
AUTOMATIC TIMESTEP CONTROL /YES/: YES
MAX TIMESTEP DURING INTEGRATION /100000000/: 1e8
INITIAL TIMESTEP : /1E-07/: 1E-7
SMALLEST ACCEPTABLE TIMESTEP : /1E-07/: 1E-7
DIC>
DIC>
DIC> @@
DIC> @@ IMPLICIT (1) TIME INTEGRATION IS USED INSTEAD OF THE MORE ACCURATE
DIC> @@ (BUT LESS STABLE) TRAPETZOIDAL METHOD WHICH IS THE DEFAULT.
DIC> @@
DIC> set-option DEGREE_OF_IMPLICITY 1.0
DIC>
DIC> @@
DIC> @@ SAVE THE SET UP TO A NEW STORE FILE AND EXIT
DIC> @@
DIC> save exb1a Y
DIC>
DIC> set-inter
 --OK---
DIC>
```

exb1a-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb1a\run.DCM.test"
DIC>
DIC>
DIC> @@ exb1a_run.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR RUNNING EXAMPLE b1a
DIC> @@
DIC>
DIC> @@
DIC> @@ ENTER THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  0.00000E+00
DIC> read exb1a
 OK
DIC>
DIC> @@
DIC> @@ START THE SIMULATION
DIC> @@
DIC> simulate
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
  Trying old scheme                    3
 U-FRACTION IN SYSTEM:  C = .00698495590385911  FE = 1
 TOTAL SIZE OF SYSTEM:  .002000001 [m]
 U-FRACTION IN SYSTEM:  C = .00698495590385911  FE = 1
 TOTAL SIZE OF SYSTEM:  .002000001 [m]
  4  GRIDPOINT(S) ADDED   TO   CELL #1   REGION: FERRITE
  1  GRIDPOINT(S) ADDED   TO   CELL #1   REGION: AUSTENITE
 0.115717401092532        0.115717856446369         111.048227048957        0.112984276791639        0.104050479021637        9.078830416795058
002        7.040904723184642E-002        3.472489916122559E-002        1.786881247439455E-003        9.193858915072814E-
006        1.857932633733402E-009        6.961181207827499E-020       TIME =  0.10000000E-06 DT =  0.10000000E-
06 SUM OF SQUARES =  0.69611812E-19
 CELL # 1 VELOCITY AT INTERFACE # 2 IS    9.7160434     AND    9.7160434
 POSITION OF INTERFACE FERRITE / AUSTENITE IS   0.97260434E-06
 U-FRACTION IN SYSTEM:  C = .00698493868666348  FE = 1
 TOTAL SIZE OF SYSTEM:  .002000001 [m]
  11  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: FERRITE
  18  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: AUSTENITE

  CPU time used in timestep                    0  seconds
 3.9248677972346911E-003        3.925632782452177E-003        2.584529651866910E-005        1.486336496202991E-005        1.819317395067808E-
006        2.382916455095352E-009        8.205700881550707E-010        1.188241281818198E-010        3.399651142650408E-
021       TIME =  0.30000000E-06 DT =  0.20000000E-06 SUM OF SQUARES =  0.33996511E-20
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.39752367E-05 AND   0.39752367E-05
 POSITION OF INTERFACE FERRITE / AUSTENITE IS   0.97260514E-06
 U-FRACTION IN SYSTEM:  C = .00698493868666082  FE = 1
 TOTAL SIZE OF SYSTEM:  .002000001 [m]
  CPU time used in timestep                    0  seconds
 3.401999976038911E-009        3.365290685772431E-009        4.093695838798279E-014        1.545477732805252E-018       TIME =  0.70000000E-
06 DT =  0.40000000E-06 SUM OF SQUARES =  0.15454777E-17
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.39679940E-05 AND   0.39679940E-05
 POSITION OF INTERFACE FERRITE / AUSTENITE IS   0.97260672E-06
 U-FRACTION IN SYSTEM:  C = .00698493868665902  FE = 1
 TOTAL SIZE OF SYSTEM:  .002000001 [m]
  CPU time used in timestep                    0  seconds
 4.098253737021600E-009        4.058109820116081E-009        8.006954446087587E-015        1.502870138493581E-018       TIME =  0.15000000E-
05 DT =  0.80000000E-06 SUM OF SQUARES =  0.15028701E-17
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.39679475E-05 AND   0.39679475E-05
 POSITION OF INTERFACE FERRITE / AUSTENITE IS   0.97260990E-06
 U-FRACTION IN SYSTEM:  C = .00698493868665542  FE = 1
 TOTAL SIZE OF SYSTEM:  .002000001 [m]
  1  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: FERRITE

  CPU time used in timestep                    0  seconds
 4.093819624242715E-009        4.053733166299584E-009        1.044582208539704E-015        4.719935580229088E-019       TIME =  0.31000000E-
05 DT =  0.16000000E-05 SUM OF SQUARES =  0.47199356E-18
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.39678579E-05 AND   0.39678579E-05
 POSITION OF INTERFACE FERRITE / AUSTENITE IS   0.97261625E-06
 U-FRACTION IN SYSTEM:  C = .00698493868664821  FE = 1
 TOTAL SIZE OF SYSTEM:  .002000001 [m]
  1  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: FERRITE

  CPU time used in timestep                    0  seconds
 4.084485200528954E-009        4.044439967759275E-009        1.480555155016377E-015        4.155720032801227E-023       TIME =  0.63000000E-
05 DT =  0.32000000E-05 SUM OF SQUARES =  0.41557200E-22
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.39676764E-05 AND   0.39676764E-05
 POSITION OF INTERFACE FERRITE / AUSTENITE IS   0.97262894E-06
 U-FRACTION IN SYSTEM:  C = .00698493868663385  FE = 1
 TOTAL SIZE OF SYSTEM:  .002000001 [m]
  1  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: FERRITE

  CPU time used in timestep                    0  seconds


output ignored...


... output resumed

  32  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: FERRITE

  CPU time used in timestep                    0  seconds
 2.611831128559994E-005        2.612247732488457E-005        1.163693146018181E-
018       TIME =  0.61258999E+09 DT =  0.10000000E+09 SUM OF SQUARES =  0.11636931E-17
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.50743205E-16 AND  -0.50743205E-16
 POSITION OF INTERFACE FERRITE / AUSTENITE IS   0.13801335E-02
 U-FRACTION IN SYSTEM:  C = .00697896446883887  FE = 1
 TOTAL SIZE OF SYSTEM:  .002000001 [m]
  1  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: AUSTENITE

  CPU time used in timestep                    0  seconds
 5.667696996320780E-006        5.667214108148784E-006        4.934237366947947E-
021       TIME =  0.71258999E+09 DT =  0.10000000E+09 SUM OF SQUARES =  0.49342374E-20
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.16645896E-15 AND  -0.16645896E-15
 POSITION OF INTERFACE FERRITE / AUSTENITE IS   0.13801169E-02
 U-FRACTION IN SYSTEM:  C = .00697913421325872  FE = 1
 TOTAL SIZE OF SYSTEM:  .002000001 [m]
  1  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: AUSTENITE
```

```
  CPU time used in timestep                    0  seconds
 1.759335210588360E-004        1.759423470102133E-004        8.020718929993898E-
021       TIME =  0.81258999E+09 DT =  0.10000000E+09 SUM OF SQUARES =  0.80207189E-20
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.48723311E-15 AND   0.48723311E-15
 POSITION OF INTERFACE FERRITE / AUSTENITE IS   0.13801656E-02
 U-FRACTION IN SYSTEM:  C = .006978637363447  FE = 1
 TOTAL SIZE OF SYSTEM:  .002000001 [m]
  32  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: FERRITE

  CPU time used in timestep                    0  seconds
 1.489740793056276E-004        1.489978523102500E-004        2.905911973058217E-
019       TIME =  0.91258999E+09 DT =  0.10000000E+09 SUM OF SQUARES =  0.29059120E-18
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.12097389E-15 AND  -0.12097389E-15
 POSITION OF INTERFACE FERRITE / AUSTENITE IS   0.13801535E-02
 U-FRACTION IN SYSTEM:  C = .00697876072504328  FE = 1
 TOTAL SIZE OF SYSTEM:  .002000001 [m]
  1  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: AUSTENITE

  CPU time used in timestep                    0  seconds
 1.028394579648291E-005        1.028549662054664E-005        5.156398795723296E-
022       TIME =  0.10000000E+10 DT =   87410009.     SUM OF SQUARES =  0.51563988E-21
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.38684973E-16 AND   0.38684973E-16
 POSITION OF INTERFACE FERRITE / AUSTENITE IS   0.13801569E-02
 U-FRACTION IN SYSTEM:  C = .0069787262430949  FE = 1
 TOTAL SIZE OF SYSTEM:  .002000001 [m]
 MUST SAVE WORKSPACE ON FILE
 WORKSPACE SAVED ON FILE
 RECLAIMING WORKSPACE
 DELETING TIME-RECORD FOR TIME    0.0000000
 DELETING TIME-RECORD FOR TIME   0.10000000E-06
 DELETING TIME-RECORD FOR TIME   0.30000000E-06
 DELETING TIME-RECORD FOR TIME   0.70000000E-06
 DELETING TIME-RECORD FOR TIME   0.15000000E-05
 DELETING TIME-RECORD FOR TIME   0.31000000E-05
 DELETING TIME-RECORD FOR TIME   0.63000000E-05
 DELETING TIME-RECORD FOR TIME   0.12700000E-04
 DELETING TIME-RECORD FOR TIME   0.25500000E-04
 DELETING TIME-RECORD FOR TIME   0.51100000E-04
 DELETING TIME-RECORD FOR TIME   0.10230000E-03
 DELETING TIME-RECORD FOR TIME   0.20470000E-03
 DELETING TIME-RECORD FOR TIME   0.40950000E-03
 DELETING TIME-RECORD FOR TIME   0.81910000E-03
 DELETING TIME-RECORD FOR TIME   0.16383000E-02
 DELETING TIME-RECORD FOR TIME   0.32767000E-02
 DELETING TIME-RECORD FOR TIME   0.65535000E-02
 DELETING TIME-RECORD FOR TIME   0.13107100E-01
 DELETING TIME-RECORD FOR TIME   0.26214300E-01
 DELETING TIME-RECORD FOR TIME   0.52428700E-01
 DELETING TIME-RECORD FOR TIME   0.10485750
 DELETING TIME-RECORD FOR TIME   0.20971510
 DELETING TIME-RECORD FOR TIME   0.41943030
 DELETING TIME-RECORD FOR TIME   0.83886070
 DELETING TIME-RECORD FOR TIME    1.6777215
 DELETING TIME-RECORD FOR TIME    3.3554431
 DELETING TIME-RECORD FOR TIME    6.7108863
 DELETING TIME-RECORD FOR TIME    13.421773
 DELETING TIME-RECORD FOR TIME    26.843545
 DELETING TIME-RECORD FOR TIME    53.687091
 DELETING TIME-RECORD FOR TIME    107.37418
 DELETING TIME-RECORD FOR TIME    214.74836
 DELETING TIME-RECORD FOR TIME    429.49673
 DELETING TIME-RECORD FOR TIME    858.99346
 DELETING TIME-RECORD FOR TIME    1717.9869
 DELETING TIME-RECORD FOR TIME    3435.9738
 DELETING TIME-RECORD FOR TIME    6871.9477
 DELETING TIME-RECORD FOR TIME    13743.895
 DELETING TIME-RECORD FOR TIME    27487.791
 DELETING TIME-RECORD FOR TIME    54975.581
 DELETING TIME-RECORD FOR TIME    109951.16
 DELETING TIME-RECORD FOR TIME    219902.33
 DELETING TIME-RECORD FOR TIME    439804.65
 DELETING TIME-RECORD FOR TIME    879609.30
 DELETING TIME-RECORD FOR TIME    1759218.6
 DELETING TIME-RECORD FOR TIME    3518437.2
 DELETING TIME-RECORD FOR TIME    7036874.4
 DELETING TIME-RECORD FOR TIME    14073749.
 DELETING TIME-RECORD FOR TIME    28147498.
 DELETING TIME-RECORD FOR TIME    56294995.
 DELETING TIME-RECORD FOR TIME   0.11258999E+09
 DELETING TIME-RECORD FOR TIME   0.21258999E+09
 DELETING TIME-RECORD FOR TIME   0.31258999E+09
 DELETING TIME-RECORD FOR TIME   0.41258999E+09
 DELETING TIME-RECORD FOR TIME   0.51258999E+09
 DELETING TIME-RECORD FOR TIME   0.61258999E+09
 DELETING TIME-RECORD FOR TIME   0.71258999E+09
 DELETING TIME-RECORD FOR TIME   0.81258999E+09

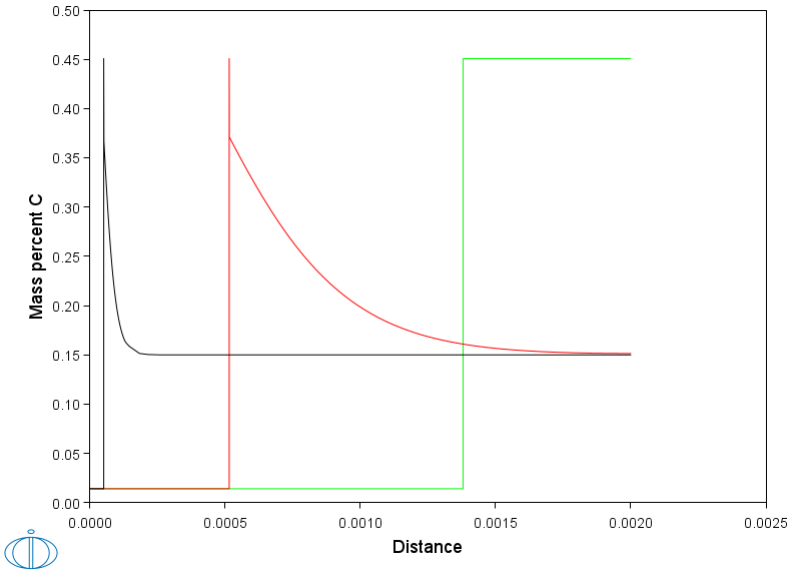
 KEEPING TIME-RECORD FOR TIME   0.91258999E+09
 AND FOR TIME                   0.10000000E+10
 WORKSPACE RECLAIMED

 TIMESTEP AT    0.100000000E+10 SELECTED

DIC>
DIC>
DIC>
DIC> @@
DIC> @@ THE SIMULATION IS FINISHED
DIC> @@
DIC>
DIC> set-inter
 --OK---
DIC>
```

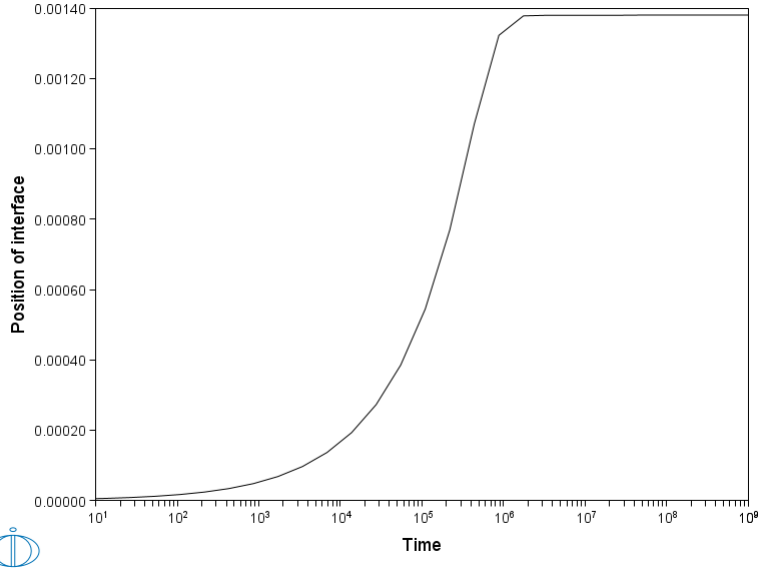
exb1a-plot

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb1a\plot.DCM.test"
DIC>
DIC>
DIC> @@ exb1a_plot.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR GENERATING GRAPHICAL OUTPUT FOR EXAMPLE b1a
DIC> @@
DIC>
DIC> @@
DIC> @@ GO TO THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  1.00000E+09
DIC> read exb1a
 OK
DIC>
DIC> @@
DIC> @@ GO TO THE POST PROCESSOR
DIC> @@
DIC> post
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1:
POST-1: @@
POST-1: @@ PLOT THE CARBON CONCENTRATIONS AT DIFFERENT TIMES
POST-1: @@
POST-1: s-d-a x distance global
  INFO: Distance is set as independent variable
POST-1: s-d-a y w-p c
POST-1: s-p-c time 1e3,1e5,1e9
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```



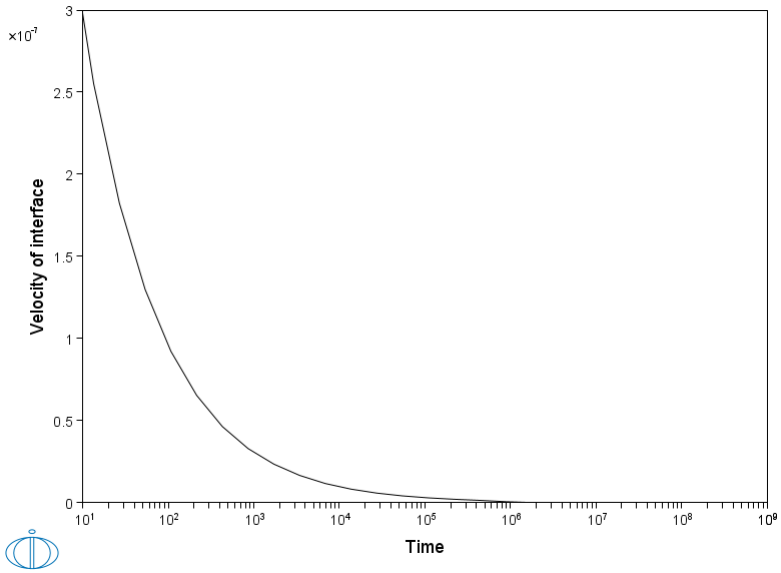

```
POST-1:
POST-1:
POST-1:@?
POST-1:
POST-1: sel-plot new
POST-1:
POST-1:
POST-1: @@
POST-1: @@ PLOT THE POSITION OF THE BCC/FCC INTERPHASE
POST-1: @@
POST-1: s-d-a x time
  INFO: Time is set as independent variable
POST-1: s-d-a y
VARIABLE : pos
INTERFACE : aus
UPPER OR LOWER INTERFACE OF REGION AUSTENITE#1 /LOWER/: lower
POST-1:
POST-1: set_axis_type
AXIS (X, Y OR Z) : x
AXIS TYPE /LINEAR/: log
POST-1:
POST-1: s-s-s
AXIS (X, Y OR Z) : x
AUTOMATIC SCALING  (Y OR N) /N/: n
MIN VALUE : 10
MAX VALUE : 1e9
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y

           OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```




```
POST-1:
POST-1:@?
POST-1:
POST-1: sel-plot new
POST-1:
POST-1:
POST-1: @@
POST-1: @@ PLOT THE VELOCITY OF THE BCC/FCC INTERPHASE
POST-1: @@
POST-1: s-d-a
AXIS (X, Y OR Z) : y
VARIABLE : velocity
INTERFACE : aus
UPPER OR LOWER INTERFACE OF REGION AUSTENITE#1 /LOWER/: lower
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y

         OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

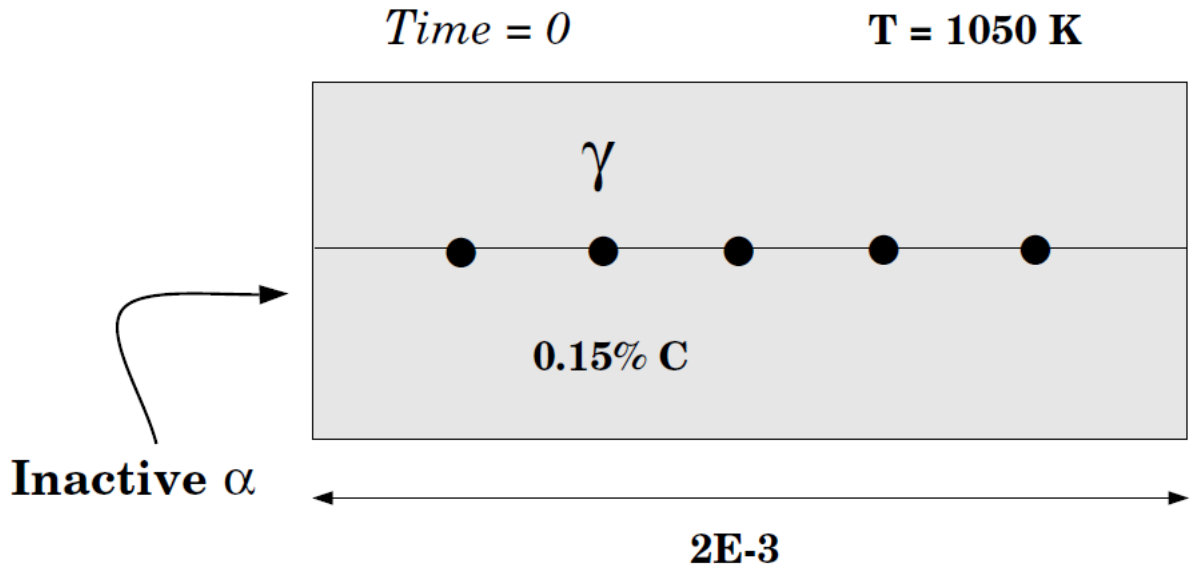


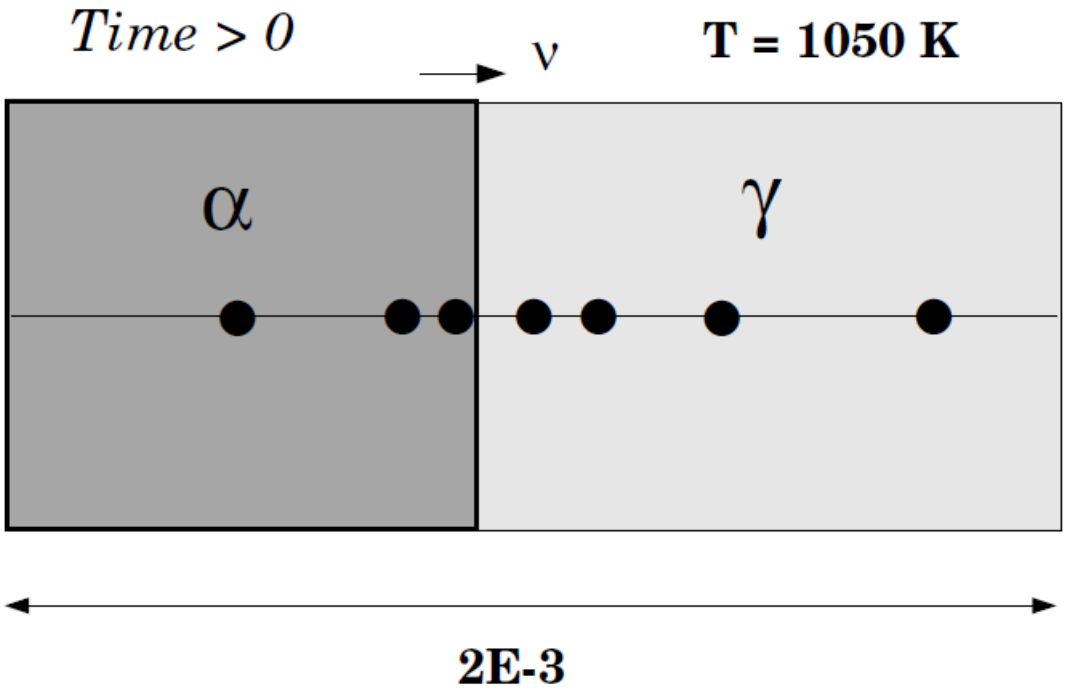

```
POST-1:
POST-1:
POST-1:
POST-1:
POST-1: set-inter
 --OK---
POST-1:
```

Example exb1b

γ to α transformation in a binary Fe-C alloy: Inactive α

This is the same example as in exb1a but now the problem is with ferrite as an inactive phase adjacent to the initial austenite.





exb1b-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb1b\setup.DCM.test"
SYS: @@
SYS: @@ Moving boundary problem.
SYS: @@ Austenite to ferrite transformation in a binary Fe-C alloy
SYS: @@ This is the same example as in exb1a but now the problem is with
SYS: @@ ferrite as an inactive phase adjacent to the initial austenite.
SYS: @@------------------------------------------------------------------
SYS:
SYS: @@ exb1b_setup.DCM
SYS:
SYS: @@
SYS: @@ START BY GOING TO THE DATABASE MODULE
SYS: @@
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                        /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12:
TDB_TCFE12: @@
TDB_TCFE12: @@ USE A THERMODYNAMIC DATABASE TO RETRIEVE DATA
TDB_TCFE12: @@
TDB_TCFE12: sw FEDEMO
 Current database: Iron Demo Database v6.0

 VA                        /-  DEFINED
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ DEFINE THE SYSTEM TO WORK WITH
TDB_FEDEMO: @@
TDB_FEDEMO: def-sys fe c
 FE                        C  DEFINED
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ EXCLUDE THE THERMODYNAMIC DATA FOR THE PHASES THAT ARE NOT NEEDED
TDB_FEDEMO: @@
TDB_FEDEMO: rej ph * all
 GAS:G                     LIQUID:L                  BCC_A2
 C14_LAVES                 CBCC_A12                  CEMENTITE_D011
 CUB_A13                   DIAMOND_A4                FCC_A1
 GRAPHITE_A9               HCP_A3                    KSI_CARBIDE
 M23C6_D84                 M5C2                      M7C3_D101
   REJECTED
TDB_FEDEMO: res ph fcc bcc
 FCC_A1                    BCC_A2  RESTORED
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ RETRIEVE DATA FROM THE DATABASE FILE
TDB_FEDEMO: @@
TDB_FEDEMO: get
09:06:59,984 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ MOBILITY/DIFFUSIVITY DATA ARE STORED IN A SEPARATE DATABASE FILE.
TDB_FEDEMO: @@ SWITCH TO A MOBILITY DATABASE TO RETRIEVE THE DATA.
TDB_FEDEMO: @@
TDB_FEDEMO: app
 Use one of these databases

 TCFE12  =  Steels/Fe-Alloys  v12.0
 TCFE9   =  Steels/Fe-Alloys  v9.3
 SSUB6   =  SGTE Substances  v6.0
 FEDEMO  =  Iron Demo Database v6.0
 MOB2    =  Alloys Mobility  v2.7
 MOBFE7  =  Steels/Fe-Alloys Mobility  v7.1
 MOBFE4  =  Steels/Fe-Alloys Mobility  v4.0
 MOBFE2  =  Steels/Fe-Alloys Mobility  v2.0
 MFEDEMO =  Fe-Alloys Mobility demo database v5.0
 USER    =  User defined Database

DATABASE NAME /FEDEMO/: MFEDEMO
 Current database: Fe-Alloys Mobility demo database v5.0

 VA  DEFINED
APP: def-sys fe c
 FE                        C  DEFINED
APP: rej ph * all
 BCC_A2                    FCC_A1                    CEMENTITE_D011
 LIQUID:L  REJECTED
APP: res ph fcc bcc
 FCC_A1                    BCC_A2  RESTORED
APP: get
```

```
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
APP:
APP: @@
APP: @@ ENTER THE DICTRA MONITOR WHERE THE SYSTEM IS SET UP
APP: @@
APP: go d-m
 NO TIME STEP DEFINED
DIC>
DIC> @@
DIC> @@ ENTER THE GLOBAL CONDITION T
DIC> @@
DIC> set-cond glob T 0 1050; * N
DIC>
DIC> @@
DIC> @@ START BY ENTERING THE REGION austenite WHERE WE PUT THE fcc PHASE
DIC> @@
DIC> enter-region
REGION NAME : austenite
DIC>
DIC> @@
DIC> @@ ENTER THE GRID INTO THE REGION
DIC> @@
DIC> enter-grid
REGION NAME : /AUSTENITE/: austenite
WIDTH OF REGION /1/: 20e-4
TYPE /AUTO/: GEO
NUMBER OF POINTS /50/: 100
VALUE OF R IN THE GEOMETRICAL SERIE : 1.05
DIC>
DIC>
DIC> @@
DIC> @@ ENTER THE active PHASES INTO THE REGIONS
DIC> @@
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: active
REGION NAME : /AUSTENITE/: austenite
PHASE TYPE /MATRIX/: matrix
PHASE NAME: /NONE/: fcc#1
DIC>
DIC> @@
DIC> @@ ENTER THE inactive PHASES INTO THE REGIONS
DIC> @@
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: inactive
ATTACH TO REGION NAMED /AUSTENITE/: austenite
ATTACHED TO THE RIGHT OF AUSTENITE /YES/: no
PHASE NAME: /NONE/: bcc
 REQUIRED DRIVING FORCE FOR PRECIPITATION: /1E-05/: 1e-5
CONDITION TYPE /CLOSED_SYSTEM/: closed
DIC>
DIC> @@
DIC> @@ ENTER THE INITIAL COMPOSITION FOR FCC
DIC> @@
DIC> enter-composition
REGION NAME : /AUSTENITE/: austenite
PHASE NAME: /FCC_A1/: fcc#1
COMPOSITION TYPE /MOLE_FRACTION/: w-p
PROFILE FOR /C/: C
TYPE /LINEAR/: lin
VALUE OF FIRST POINT : 0.15
VALUE OF LAST POINT : /0.15/: 0.15
DIC>
DIC> @@
DIC> @@ THE BOUNDARY CONDITION IS A CLOSED SYSTEM AS WE DO NOT SPECIFY
DIC> @@ ANYTHING ELSE
DIC> @@
DIC>
DIC> list-prof,,,,,,,
 INTERFACE AT GLOBAL COORDINATE X =  0.00000E+00
 REGION AUSTENITE
 COORDINATE     NP(FCC_A1)      X(FCC_A1,C)     X(FCC_A1,FE)
 0              1               .00693651       .993063
 8.04898E-07    1               .00693651       .993063
 1.65004E-06    1               .00693651       .993063
 2.53744E-06    1               .00693651       .993063
 3.46921E-06    1               .00693651       .993063
 4.44757E-06    1               .00693651       .993063
 5.47485E-06    1               .00693651       .993063
 6.55349E-06    1               .00693651       .993063
 7.68606E-06    1               .00693651       .993063
 8.87526E-06    1               .00693651       .993063
 1.01239E-05    1               .00693651       .993063
 1.1435E-05     1               .00693651       .993063
 1.28117E-05    1               .00693651       .993063
 1.42572E-05    1               .00693651       .993063
 1.57749E-05    1               .00693651       .993063
 1.73685E-05    1               .00693651       .993063
 1.90419E-05    1               .00693651       .993063
 2.07989E-05    1               .00693651       .993063
 2.26437E-05    1               .00693651       .993063
 2.45808E-05    1               .00693651       .993063
 2.66147E-05    1               .00693651       .993063
 2.87504E-05    1               .00693651       .993063
 3.09928E-05    1               .00693651       .993063
 3.33473E-05    1               .00693651       .993063
 3.58196E-05    1               .00693651       .993063
 3.84155E-05    1               .00693651       .993063
 4.11411E-05    1               .00693651       .993063
 4.40031E-05    1               .00693651       .993063
 4.70081E-05    1               .00693651       .993063
 5.01634E-05    1               .00693651       .993063
 5.34765E-05    1               .00693651       .993063
 5.69552E-05    1               .00693651       .993063
 6.06079E-05    1               .00693651       .993063
```

```
 6.44432E-05    1               .00693651       .993063
 6.84703E-05    1               .00693651       .993063
 7.26987E-05    1               .00693651       .993063
 7.71385E-05    1               .00693651       .993063
 8.18003E-05    1               .00693651       .993063
 8.66952E-05    1               .00693651       .993063
 9.18349E-05    1               .00693651       .993063
 9.72315E-05    1               .00693651       .993063
 1.02898E-04    1               .00693651       .993063
 1.08848E-04    1               .00693651       .993063
 1.15095E-04    1               .00693651       .993063
 1.21655E-04    1               .00693651       .993063
 1.28542E-04    1               .00693651       .993063
 1.35774E-04    1               .00693651       .993063
 1.43368E-04    1               .00693651       .993063
 1.51341E-04    1               .00693651       .993063
 1.59713E-04    1               .00693651       .993063
 1.68504E-04    1               .00693651       .993063
 1.77734E-04    1               .00693651       .993063
 1.87426E-04    1               .00693651       .993063
 1.97602E-04    1               .00693651       .993063
 2.08287E-04    1               .00693651       .993063
 2.19506E-04    1               .00693651       .993063
 2.31286E-04    1               .00693651       .993063
 2.43655E-04    1               .00693651       .993063
 2.56643E-04    1               .00693651       .993063
 2.7028E-04     1               .00693651       .993063
 2.84599E-04    1               .00693651       .993063
 2.99634E-04    1               .00693651       .993063
 3.1542E-04     1               .00693651       .993063
 3.31996E-04    1               .00693651       .993063
 3.49401E-04    1               .00693651       .993063
 3.67676E-04    1               .00693651       .993063
 3.86865E-04    1               .00693651       .993063
 4.07013E-04    1               .00693651       .993063
 4.28168E-04    1               .00693651       .993063
 4.50382E-04    1               .00693651       .993063
 4.73706E-04    1               .00693651       .993063
 4.98196E-04    1               .00693651       .993063
 5.2391E-04     1               .00693651       .993063
 5.50911E-04    1               .00693651       .993063
 5.79261E-04    1               .00693651       .993063
 6.09029E-04    1               .00693651       .993063
 6.40286E-04    1               .00693651       .993063
 6.73105E-04    1               .00693651       .993063
 7.07565E-04    1               .00693651       .993063
 7.43748E-04    1               .00693651       .993063
 7.8174E-04     1               .00693651       .993063
 8.21632E-04    1               .00693651       .993063
 8.63519E-04    1               .00693651       .993063
 9.075E-04      1               .00693651       .993063
 9.5368E-04     1               .00693651       .993063
 .00100217      1               .00693651       .993063
 .00105308      1               .00693651       .993063
 .00110654      1               .00693651       .993063
 .00116267      1               .00693651       .993063
 .00122161      1               .00693651       .993063
 .0012835       1               .00693651       .993063
 .00134848      1               .00693651       .993063
 .00141671      1               .00693651       .993063
 .00148835      1               .00693651       .993063
 .00156357      1               .00693651       .993063
 .00164255      1               .00693651       .993063
 .00172548      1               .00693651       .993063
 .00181256      1               .00693651       .993063
 .001904        1               .00693651       .993063
 .002           1               .00693651       .993063
 INTERFACE AT GLOBAL COORDINATE X =  2.00000E-03
DIC>
DIC> @@
DIC> @@ SET THE SIMULATION TIME
DIC> @@
DIC> set-simulation-time
END TIME FOR INTEGRATION /.1/: 1e9
AUTOMATIC TIMESTEP CONTROL /YES/:
MAX TIMESTEP DURING INTEGRATION /100000000/:
INITIAL TIMESTEP : /1E-07/:
SMALLEST ACCEPTABLE TIMESTEP : /1E-07/:
DIC>
DIC>
DIC>
DIC> @@
DIC> @@ IMPLICIT (1) TIME INTEGRATION IS USED INSTEAD OF THE MORE ACCURATE
DIC> @@ (BUT LESS STABLE) TRAPETZOIDAL METHOD WHICH IS THE DEFAULT.
DIC> @@
DIC> set-option DEGREE_OF_IMPLICITY 1.0
DIC>
DIC> @@
DIC> @@ SAVE THE SET UP TO A NEW STORE FILE AND EXIT
DIC> @@
DIC> save exb1b Y
DIC>
DIC> set-inter
 --OK---
DIC>
```

exb1b-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb1b\run.DCM.test"
DIC>
DIC>
DIC> @@ exb1b_run.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR RUNNING EXAMPLE b1b
DIC> @@
DIC>
DIC> @@
DIC> @@ ENTER THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  0.00000E+00
DIC> read exb1b
 OK
DIC>
DIC> @@
DIC> @@ START THE SIMULATION
DIC> @@
DIC> sim y
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 U-FRACTION IN SYSTEM:  C = .00698495916383108  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
 U-FRACTION IN SYSTEM:  C = .00698495916383108  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
  1  GRIDPOINT(S) ADDED   TO   CELL #1   REGION: AUSTENITE
 INFO: PHASE BCC_A2 IS SCHEDULED TO APPEAR
  1  GRIDPOINT(S) ADDED   TO   CELL #1   REGION: AUSTENITE
   REGION STATUS CHANGE, ITERATING: TIME=  0.50000000E-07
  1  GRIDPOINT(S) ADDED   TO   CELL #1   REGION: AUSTENITE
   REGION STATUS CHANGE, ITERATING: TIME=  0.25000000E-07
 TIME =  0.25000000E-07 DT =  0.25000000E-07
 U-FRACTION IN SYSTEM:  C = .00698495916383108  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
 MUST SAVE WORKSPACE ON FILE
 WORKSPACE SAVED ON FILE
 RECLAIMING WORKSPACE

 KEEPING TIME-RECORD FOR TIME    0.0000000
 AND FOR TIME                   0.25000000E-07
 WORKSPACE RECLAIMED
  Trying old scheme                      3
 START VALUE(S) FOR INTERFACE #2 R_BCC_A2/AUSTENITE, CELL #1
 ---------------------------------------------------------------
  20  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: AUSTENITE

  Trying old scheme                      3
 U-FRACTION IN SYSTEM:  C = .00698156310125388  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
 U-FRACTION IN SYSTEM:  C = .00698156310125388  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
  1  GRIDPOINT(S) ADDED   TO   CELL #1   REGION: R_BCC_A2
 4.848065353536785E-003        4.848091905343611E-003        0.640161288181735        3.043446661679094E-003        4.863748717832611E-
003        5.207814605731493E-003        2.964933799699408E-003        4.124118149768927E-003        2.854849216965825E-
003        2.900580522124421E-003        2.874656387338556E-003        2.860055810344646E-003        2.855270672160098E-
003        2.855476546657522E-003        2.854734016801175E-003        2.854760790301994E-003        2.854774332530540E-
003        2.854727109430693E-003        2.854729190774520E-003        2.854729446829519E-003        2.854726782500090E-
003        2.854727019195424E-003        2.854726875628526E-003        2.854726788763905E-003        2.854726808796026E-003


     ERROR RETURN FROM NS01A BECAUSE THERE HAVE BEEN   25 CALLS OF CALFUN
  RESCALING
  4  GRIDPOINT(S) ADDED   TO   CELL #1   REGION: R_BCC_A2
 2.866274113410890E-003        2.866165756161273E-003        7.120621596271988E-003        9.770889882496736E-004        2.455448035442813E-
003        7.629037466095791E-005        7.738742468887819E-005        9.537961602733466E-006        5.350404292657428E-
007        7.494705349070975E-011        8.665068991379627E-016        4.475882884430830E-025       TIME =  0.12500000E-06 DT =  0.10000000E-
06 SUM OF SQUARES =  0.44758829E-24
 CELL # 1 VELOCITY AT INTERFACE # 2 IS    20.508379     AND    20.508379
 POSITION OF INTERFACE R_BCC_A2 / AUSTENITE IS   0.30508379E-05
 U-FRACTION IN SYSTEM:  C = .00698116131758942  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
  CPU time used in timestep                    1  seconds
  8  GRIDPOINT(S) ADDED   TO   CELL #1   REGION: R_BCC_A2
 1.622043683846508E-004        1.622367887784417E-004        7.833396504907085E-010        5.412785760911286E-010        6.572998732089805E-
011        4.472325000686400E-013        1.465950470830037E-013        9.643738601951300E-012        4.360979563915932E-
014        1.264297758897139E-011        1.460133055602959E-014        1.431308683654039E-011        5.145413903971377E-
015        1.528994825611976E-011        1.861836721905488E-015        1.587334855613868E-011        6.837235644616751E-016

output ignored...



... output resumed

 TOTAL SIZE OF SYSTEM:  .002 [m]
  7  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: R_BCC_A2

  CPU time used in timestep                    0  seconds
 2.605771336599939E-005        2.605874004060590E-005        1.908742751358646E-
017       TIME =  0.66706428E+09 DT =  0.10000000E+09 SUM OF SQUARES =  0.19087428E-16
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.20098632E-15 AND  -0.20098632E-15
 POSITION OF INTERFACE R_BCC_A2 / AUSTENITE IS   0.13798088E-02
 U-FRACTION IN SYSTEM:  C = .00698226857547703  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
  1  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: AUSTENITE

  CPU time used in timestep                    0  seconds
 7.133791546665525E-005        7.134470143220694E-005        2.480895576768879E-
022       TIME =  0.76706428E+09 DT =  0.10000000E+09 SUM OF SQUARES =  0.24808956E-21
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.21716814E-15 AND   0.21716814E-15
 POSITION OF INTERFACE R_BCC_A2 / AUSTENITE IS   0.13798305E-02
 U-FRACTION IN SYSTEM:  C = .0069820471208938  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
  29  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: R_BCC_A2

  CPU time used in timestep                    0  seconds
 8.338690001653589E-005        8.339482740199053E-005        1.770087011002676E-
028       TIME =  0.86706428E+09 DT =  0.10000000E+09 SUM OF SQUARES =  0.17700870E-27
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.23491983E-15 AND  -0.23491983E-15
```

```
 POSITION OF INTERFACE R_BCC_A2 / AUSTENITE IS   0.13798070E-02
 U-FRACTION IN SYSTEM:  C = .00698228667754199  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
  1  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: AUSTENITE

  CPU time used in timestep                    0  seconds
 5.418843480567073E-005        5.419534772435475E-005        1.129096246098665E-
027       TIME =  0.96706428E+09 DT =  0.10000000E+09 SUM OF SQUARES =  0.11290962E-26
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.13071835E-15 AND   0.13071835E-15
 POSITION OF INTERFACE R_BCC_A2 / AUSTENITE IS   0.13798201E-02
 U-FRACTION IN SYSTEM:  C = .00698215337908559  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
  17  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: R_BCC_A2

  CPU time used in timestep                    0  seconds
 2.073373790420605E-005        2.073611727676384E-005        2.587623169920472E-
028       TIME =  0.10000000E+10 DT =   32935717.     SUM OF SQUARES =  0.25876232E-27
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.95160811E-16 AND  -0.95160811E-16
 POSITION OF INTERFACE R_BCC_A2 / AUSTENITE IS   0.13798170E-02
 U-FRACTION IN SYSTEM:  C = .00698218533960413  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
 MUST SAVE WORKSPACE ON FILE
 WORKSPACE SAVED ON FILE
 RECLAIMING WORKSPACE
 DELETING TIME-RECORD FOR TIME    0.0000000
 DELETING TIME-RECORD FOR TIME   0.25000000E-07
 DELETING TIME-RECORD FOR TIME   0.12500000E-06
 DELETING TIME-RECORD FOR TIME   0.19118010E-04
 DELETING TIME-RECORD FOR TIME   0.57104030E-04
 DELETING TIME-RECORD FOR TIME   0.13307607E-03
 DELETING TIME-RECORD FOR TIME   0.28502015E-03
 DELETING TIME-RECORD FOR TIME   0.58890831E-03
 DELETING TIME-RECORD FOR TIME   0.11966846E-02
 DELETING TIME-RECORD FOR TIME   0.24122373E-02
 DELETING TIME-RECORD FOR TIME   0.48433425E-02
 DELETING TIME-RECORD FOR TIME   0.97055531E-02
 DELETING TIME-RECORD FOR TIME   0.19429974E-01
 DELETING TIME-RECORD FOR TIME   0.38878816E-01
 DELETING TIME-RECORD FOR TIME   0.77776501E-01
 DELETING TIME-RECORD FOR TIME   0.15557187
 DELETING TIME-RECORD FOR TIME   0.31116261
 DELETING TIME-RECORD FOR TIME   0.62234408
 DELETING TIME-RECORD FOR TIME    1.2447070
 DELETING TIME-RECORD FOR TIME    2.4894329
 DELETING TIME-RECORD FOR TIME    4.9788847
 DELETING TIME-RECORD FOR TIME    9.9577884
 DELETING TIME-RECORD FOR TIME    19.915596
 DELETING TIME-RECORD FOR TIME    39.831210
 DELETING TIME-RECORD FOR TIME    79.662439
 DELETING TIME-RECORD FOR TIME    159.32490
 DELETING TIME-RECORD FOR TIME    318.64981
 DELETING TIME-RECORD FOR TIME    637.29964
 DELETING TIME-RECORD FOR TIME    1274.5993
 DELETING TIME-RECORD FOR TIME    2549.1986
 DELETING TIME-RECORD FOR TIME    5098.3973
 DELETING TIME-RECORD FOR TIME    10196.795
 DELETING TIME-RECORD FOR TIME    20393.589
 DELETING TIME-RECORD FOR TIME    40787.178
 DELETING TIME-RECORD FOR TIME    81574.357
 DELETING TIME-RECORD FOR TIME    163148.71
 DELETING TIME-RECORD FOR TIME    326297.43
 DELETING TIME-RECORD FOR TIME    652594.85
 DELETING TIME-RECORD FOR TIME    1305189.7
 DELETING TIME-RECORD FOR TIME    2610379.4
 DELETING TIME-RECORD FOR TIME    5220758.8
 DELETING TIME-RECORD FOR TIME    10441518.
 DELETING TIME-RECORD FOR TIME    20883035.
 DELETING TIME-RECORD FOR TIME    41766071.
 DELETING TIME-RECORD FOR TIME    83532141.
 DELETING TIME-RECORD FOR TIME   0.16706428E+09
 DELETING TIME-RECORD FOR TIME   0.26706428E+09
 DELETING TIME-RECORD FOR TIME   0.36706428E+09
 DELETING TIME-RECORD FOR TIME   0.46706428E+09
 DELETING TIME-RECORD FOR TIME   0.56706428E+09
 DELETING TIME-RECORD FOR TIME   0.66706428E+09
 DELETING TIME-RECORD FOR TIME   0.76706428E+09
 DELETING TIME-RECORD FOR TIME   0.86706428E+09

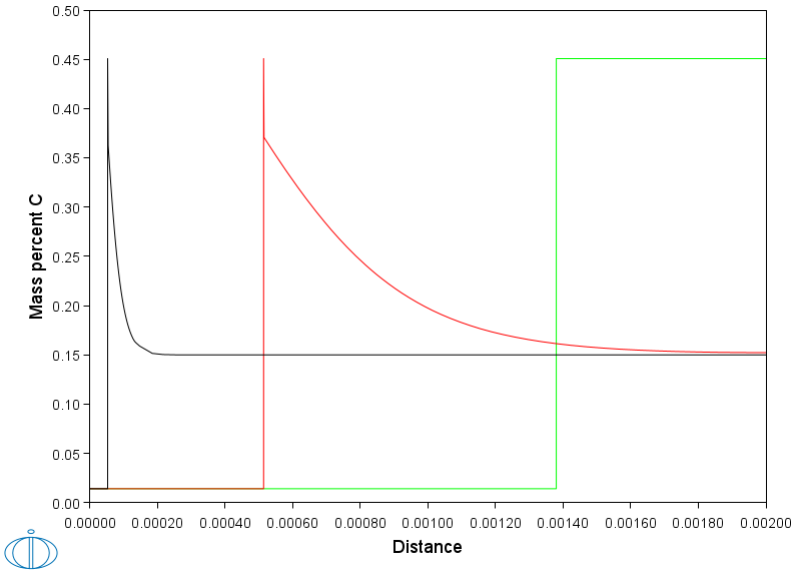
 KEEPING TIME-RECORD FOR TIME   0.96706428E+09
 AND FOR TIME                   0.10000000E+10
 WORKSPACE RECLAIMED

 TIMESTEP AT    0.100000000E+10 SELECTED

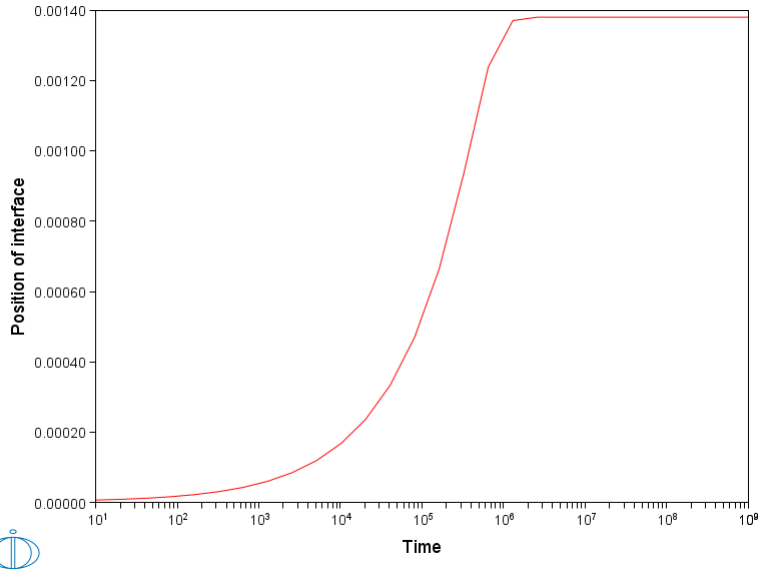
DIC>
DIC>
DIC>
DIC>
DIC>
DIC> @@
DIC> @@ THE SIMULATION IS FINISHED
DIC> @@
DIC>
DIC> set-inter
 --OK---
DIC>
```

exb1b-plot

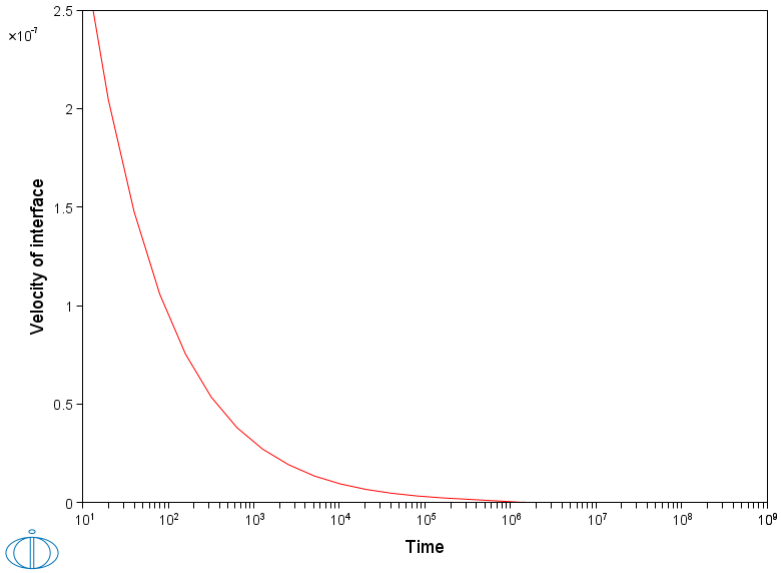
```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb1b\plot.DCM.test"
DIC>
DIC>
DIC> @@ exb1b_plot.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR GENERATING GRAPHICAL OUTPUT FOR EXAMPLE b1b
DIC> @@
DIC>
DIC> @@
DIC> @@ GO TO THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  1.00000E+09
DIC> read exb1b
 OK
DIC>
DIC> @@
DIC> @@ GO TO THE POST PROCESSOR
DIC> @@
DIC> post
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1:
POST-1: @@
POST-1: @@ PLOT THE CARBON CONCENTRATIONS AT DIFFERENT TIMES
POST-1: @@
POST-1: s-d-a y w-p c
POST-1: s-d-a x dist glob
  INFO: Distance is set as independent variable
POST-1: s-p-c time 1e3,1e5,1e9
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```




```
POST-1:
POST-1:
POST-1:Hit RETURN to continue
POST-1:
POST-1: sel-plot new
POST-1:
POST-1: @@
POST-1: @@ PLOT THE POSITION OF THE BCC/FCC INTERPHASE
POST-1: @@
POST-1: s-d-a x time
  INFO: Time is set as independent variable
POST-1: s-d-a y
VARIABLE : pos
INTERFACE : aus
UPPER OR LOWER INTERFACE OF REGION AUSTENITE#1 /LOWER/: lower
POST-1:
POST-1: set_axis_type
AXIS (X, Y OR Z) : x
AXIS TYPE /LINEAR/: log
POST-1:
POST-1: s-s-s
AXIS (X, Y OR Z) : x
AUTOMATIC SCALING  (Y OR N) /N/: n
MIN VALUE : 10
MAX VALUE : 1e9
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
WORKING ...
WORKING ...           OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```




```
POST-1:
POST-1:
POST-1:Hit RETURN to continue
POST-1:
POST-1: sel-plot new
POST-1:
POST-1: @@
POST-1: @@ PLOT THE VELOCITY OF THE BCC/FCC INTERPHASE
POST-1: @@
POST-1: s-d-a
AXIS (X, Y OR Z) : y
VARIABLE : velocity
INTERFACE : aus
UPPER OR LOWER INTERFACE OF REGION AUSTENITE#1 /LOWER/: lower
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
WORKING ...
WORKING ...           OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

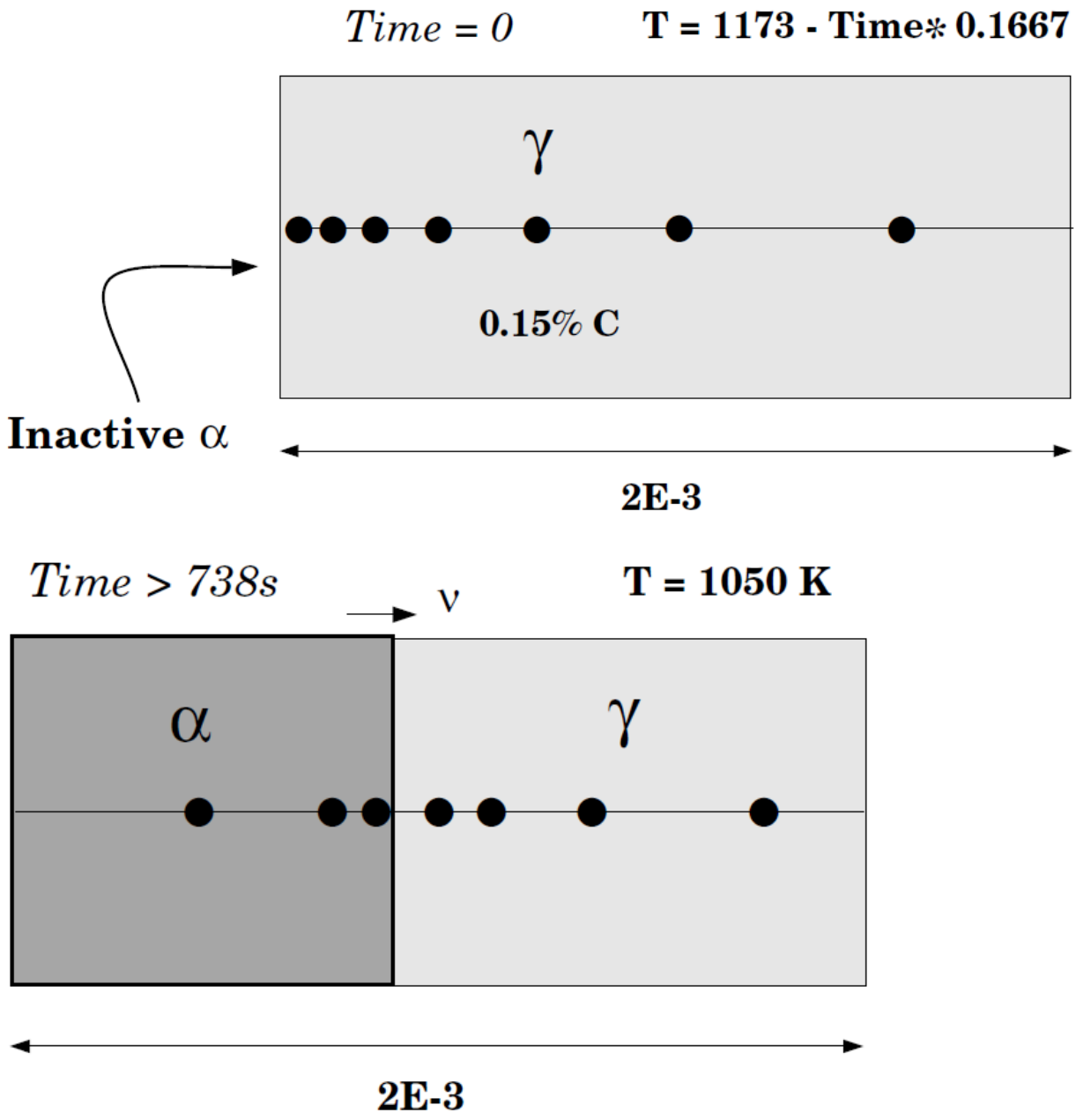



```
POST-1:
POST-1:
POST-1:
POST-1:
POST-1: set-inter
 --OK---
POST-1:
```

Example exb1c

γ to α transformation in a binary Fe-C alloy: Gradual cool down to 1050 K

This is the same example as in exb1a and exb1b but now the simulation starts at a higher temperature and assumes a gradual cooling down to 1050 K. When 1050 K is reached, the temperature is kept constant and thus has an isothermal transformation. As in exb1b, ferrite is in an inactive phase adjacent to the initial austenite.



exb1c-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb1c\setup.DCM.test"
SYS: @@
SYS: @@ Moving boundary problem.
SYS: @@ Austenite to ferrite transformation in a binary Fe-C alloy
SYS: @@ This is the same example as in exb1a and exb1b but now the
SYS: @@ simulation starts at a higher temperature and assumes a gradual cooling
SYS: @@ down to 1050 K.
SYS: @@
SYS: @@ When 1050 K is reached, the temperature is kept constant and thus has an
SYS: @@ isothermal transformation. As in exb1b ferrite is an inactive
SYS: @@ phase adjacent to the initial austenite.
SYS: @@----------------------------------------------------------------------
SYS:
SYS: @@ exb1c_setup.DCM
SYS:
SYS: @@
SYS: @@ START BY GOING TO THE DATABASE MODULE
SYS: @@
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                       /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12:
TDB_TCFE12: @@
TDB_TCFE12: @@ USE A THERMODYNAMIC DATABASE TO RETRIEVE DATA
TDB_TCFE12: @@
TDB_TCFE12: sw FEDEMO
 Current database: Iron Demo Database v6.0

 VA                       /-  DEFINED
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ DEFINE THE SYSTEM TO WORK WITH
TDB_FEDEMO: @@
TDB_FEDEMO: def-sys fe c
 FE                       C  DEFINED
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ EXCLUDE THE THERMODYNAMIC DATA FOR THE PHASES THAT ARE NOT NEEDED
TDB_FEDEMO: @@
TDB_FEDEMO: rej ph * all
 GAS:G                    LIQUID:L                 BCC_A2
 C14_LAVES                CBCC_A12                 CEMENTITE_D011
 CUB_A13                  DIAMOND_A4               FCC_A1
 GRAPHITE_A9              HCP_A3                   KSI_CARBIDE
 M23C6_D84                M5C2                     M7C3_D101
   REJECTED
TDB_FEDEMO: res ph fcc bcc
 FCC_A1                   BCC_A2  RESTORED
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ RETRIEVE DATA FROM THE DATABASE FILE
TDB_FEDEMO: @@
TDB_FEDEMO: get
09:10:00,934 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ MOBILITY/DIFFUSIVITY DATA ARE STORED IN A SEPARATE DATABASE FILE.
TDB_FEDEMO: @@ SWITCH TO A MOBILITY DATABASE TO RETRIEVE DATA
TDB_FEDEMO: @@
TDB_FEDEMO: app
 Use one of these databases

 TCFE12  =  Steels/Fe-Alloys  v12.0
 TCFE9   =  Steels/Fe-Alloys  v9.3
 SSUB6   =  SGTE Substances  v6.0
 FEDEMO  =  Iron Demo Database v6.0
 MOB2    =  Alloys Mobility  v2.7
 MOBFE7  =  Steels/Fe-Alloys Mobility  v7.1
 MOBFE4  =  Steels/Fe-Alloys Mobility  v4.0
 MOBFE2  =  Steels/Fe-Alloys Mobility  v2.0
 MFEDEMO =  Fe-Alloys Mobility demo database v5.0
 USER    =  User defined Database

DATABASE NAME /FEDEMO/: MFEDEMO
 Current database: Fe-Alloys Mobility demo database v5.0

 VA  DEFINED
APP: def-sys fe c
 FE                       C  DEFINED
APP: rej ph * all
```

```
 BCC_A2                  FCC_A1                  CEMENTITE_D011
 LIQUID:L  REJECTED
APP: res ph fcc bcc
 FCC_A1                  BCC_A2  RESTORED
APP: get
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
APP:
APP: @@
APP: @@ ENTER THE DICTRA MONITOR WHERE THE SYSTEM IS SET UP
APP: @@
APP: go d-m
 NO TIME STEP DEFINED
DIC>
DIC> @@
DIC> @@ ENTER GLOBAL CONDITION T
DIC> @@
DIC> @@ ASSUME THAT THE COOLING RATE IS 10K/MINUTE DOWN TO 1050K
DIC> @@
DIC> set-cond
GLOBAL OR BOUNDARY CONDITION /GLOBAL/: glob
VARIABLE : T
LOW TIME LIMIT /0/: 0
T(TIME,X)= 1173-time*0.1667;
HIGH TIME LIMIT /*/: 738
ANY MORE RANGES /N/: y
T(TIME,X)= 1050;
HIGH TIME LIMIT /*/: *
ANY MORE RANGES /N/: N
DIC>
DIC> @@
DIC> @@ START BY ENTERING THE REGION austenite WHERE WE PUT THE fcc PHASE
DIC> @@
DIC> enter-region
REGION NAME : austenite
DIC>
DIC> @@
DIC> @@ ENTER THE GRID INTO THE REGION
DIC> @@
DIC> enter-grid
REGION NAME : /AUSTENITE/: austenite
WIDTH OF REGION /1/: 20e-4
TYPE /AUTO/: AUTO
DIC>
DIC> @@
DIC> @@ ENTER THE active PHASES INTO THE REGIONS
DIC> @@
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: act
REGION NAME : /AUSTENITE/: austenite
PHASE TYPE /MATRIX/: matrix
PHASE NAME: /NONE/: fcc#1
DIC>
DIC> @@
DIC> @@ ENTER THE inactive PHASES INTO THE REGIONS
DIC> @@
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: inact
ATTACH TO REGION NAMED /AUSTENITE/: austenite
ATTACHED TO THE RIGHT OF AUSTENITE /YES/: no
PHASE NAME: /NONE/: bcc
 REQUIRED DRIVING FORCE FOR PRECIPITATION: /1E-05/: 1e-5
CONDITION TYPE /CLOSED_SYSTEM/: closed
DIC>
DIC> @@
DIC> @@ ENTER THE INITIAL COMPOSITION FOR FCC
DIC> @@
DIC> enter-composition
REGION NAME : /AUSTENITE/: austenite
PHASE NAME: /FCC_A1/: fcc#1
COMPOSITION TYPE /MOLE_FRACTION/: w-p
PROFILE FOR /C/: C
TYPE /LINEAR/: lin
VALUE OF FIRST POINT : 0.15
VALUE OF LAST POINT : /0.15/: 0.15
DIC>
DIC> @@
DIC> @@ THE BOUNDARY CONDITION IS A CLOSED SYSTEM AS WE DO NOT SPECIFY
DIC> @@ ANYTHING ELSE.
DIC> @@
DIC>
DIC> @@
DIC> @@ SET THE SIMULATION TIME
DIC> @@
DIC> set-simulation-time
END TIME FOR INTEGRATION /.1/: 738
AUTOMATIC TIMESTEP CONTROL /YES/:
MAX TIMESTEP DURING INTEGRATION /73.8/:
INITIAL TIMESTEP : /1E-07/:
SMALLEST ACCEPTABLE TIMESTEP : /1E-07/:
DIC>
DIC>
DIC> @@
DIC> @@ IMPLICIT (1) TIME INTEGRATION IS USED INSTEAD OF THE MORE ACCURATE
DIC> @@ (BUT LESS STABLE) TRAPETZOIDAL METHOD WHICH IS THE DEFAULT.
DIC> @@
DIC> set-option DEGREE_OF_IMPLICITY 1.0
DIC>
DIC> @@
DIC> @@ SAVE THE SET UP TO A NEW STORE FILE AND EXIT
DIC> @@
DIC> save exb1c Y
DIC>
```

```
DIC> set-inter
 --OK---
DIC>
```

exb1c-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb1c\run.DCM.test"
DIC>
DIC>
DIC> @@ exb1c_run.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR RUNNING EXAMPLE exb1c
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  0.00000E+00
DIC> read exb1c
 OK
DIC>
DIC> @@
DIC> @@ START THE SIMULATION
DIC> @@
DIC> sim
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 Region: AUSTENITE
 geometric    1.20000     dense at    0.00000       57 points
 U-FRACTION IN SYSTEM:  C = .00698495916383109  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
 U-FRACTION IN SYSTEM:  C = .00698495916383109  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
 TIME =  0.10000000E-06 DT =  0.10000000E-06 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00698495916383109  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.10010000E-03 DT =  0.10000000E-03 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00698495916383108  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
  CPU time used in timestep                    0  seconds
 TIME =   1.7794466     DT =   1.7793465     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00698495916383108  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
  CPU time used in timestep                    0  seconds
 TIME =   5.3381396     DT =   3.5586930     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00698495916383108  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
  CPU time used in timestep                    0  seconds
 TIME =   12.455526     DT =   7.1173861     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00698495916383109  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
  CPU time used in timestep                    0  seconds
 TIME =   26.690298     DT =   14.234772     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00698495916383109  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
  CPU time used in timestep                    0  seconds
 TIME =   55.159842     DT =   28.469544     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00698495916383109  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
  CPU time used in timestep                    0  seconds
 TIME =   92.059842     DT =   36.900000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00698495916383108  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
  CPU time used in timestep                    0  seconds
 TIME =   128.95984     DT =   36.900000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00698495916383109  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
  CPU time used in timestep                    0  seconds
 TIME =   165.85984     DT =   36.900000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00698495916383109  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
  CPU time used in timestep                    0  seconds
 TIME =   202.75984     DT =   36.900000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00698495916383109  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
  CPU time used in timestep                    0  seconds
 TIME =   239.65984     DT =   36.900000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00698495916383109  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
  CPU time used in timestep                    0  seconds
 TIME =   276.55984     DT =   36.900000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00698495916383109  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
  CPU time used in timestep                    0  seconds
 INFO: PHASE BCC_A2 IS SCHEDULED TO APPEAR
 INFO: BACKTRACING WITH SMALLER TIMESTEP   9.2250
 TIME =   285.78484     DT =   9.2250000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00698495916383109  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
  CPU time used in timestep                    0  seconds
 INFO: PHASE BCC_A2 IS SCHEDULED TO APPEAR
   REGION STATUS CHANGE, ITERATING: TIME=   295.00984
   REGION STATUS CHANGE, ITERATING: TIME=   290.39734
   REGION STATUS CHANGE, ITERATING: TIME=   288.09109
   REGION STATUS CHANGE, ITERATING: TIME=   289.24422
   REGION STATUS CHANGE, ITERATING: TIME=   288.66765
   REGION STATUS CHANGE, ITERATING: TIME=   288.95594
   REGION STATUS CHANGE, ITERATING: TIME=   288.81180
   REGION STATUS CHANGE, ITERATING: TIME=   288.73972
   REGION STATUS CHANGE, ITERATING: TIME=   288.77576
   REGION STATUS CHANGE, ITERATING: TIME=   288.75774
   REGION STATUS CHANGE, ITERATING: TIME=   288.74873
   REGION STATUS CHANGE, ITERATING: TIME=   288.75324
 TIME =   288.75324     DT =   2.9683960
 U-FRACTION IN SYSTEM:  C = .00698495916383109  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
 MUST SAVE WORKSPACE ON FILE
 WORKSPACE SAVED ON FILE
 RECLAIMING WORKSPACE
 DELETING TIME-RECORD FOR TIME    0.0000000
 DELETING TIME-RECORD FOR TIME   0.10000000E-06
 DELETING TIME-RECORD FOR TIME   0.10010000E-03
 DELETING TIME-RECORD FOR TIME    1.7794466
 DELETING TIME-RECORD FOR TIME    5.3381396
 DELETING TIME-RECORD FOR TIME    12.455526
 DELETING TIME-RECORD FOR TIME    26.690298
 DELETING TIME-RECORD FOR TIME    55.159842
 DELETING TIME-RECORD FOR TIME    92.059842
```

```
 DELETING TIME-RECORD FOR TIME    128.95984
 DELETING TIME-RECORD FOR TIME    165.85984
 DELETING TIME-RECORD FOR TIME    202.75984
 DELETING TIME-RECORD FOR TIME    239.65984
 DELETING TIME-RECORD FOR TIME    276.55984

 KEEPING TIME-RECORD FOR TIME    285.78484
 AND FOR TIME                    288.75324
 WORKSPACE RECLAIMED
  Trying old scheme                      3
 START VALUE(S) FOR INTERFACE #2 R_BCC_A2/AUSTENITE, CELL #1
 ------------------------------------------------------------
  Trying old scheme                      3
 U-FRACTION IN SYSTEM:  C = .0069816240380179  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
 U-FRACTION IN SYSTEM:  C = .0069816240380179  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
  1  GRIDPOINT(S) ADDED   TO   CELL #1   REGION: R_BCC_A2


output ignored...



... output resumed

TIME =  0.44276225E+09 DT =  0.10000000E+09 SUM OF SQUARES =  0.54017547E-21
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.38762941E-16 AND   0.38762941E-16
 POSITION OF INTERFACE R_BCC_A2 / AUSTENITE IS   0.13786592E-02
 U-FRACTION IN SYSTEM:  C = .00699399188702824  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
  1  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: R_BCC_A2

  CPU time used in timestep                    0  seconds
 1.403407489400562E-004        1.403591057696059E-004        4.346038603478281E-
017       TIME =  0.54276225E+09 DT =  0.10000000E+09 SUM OF SQUARES =  0.43460386E-16
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.20098536E-16 AND  -0.20098536E-16
 POSITION OF INTERFACE R_BCC_A2 / AUSTENITE IS   0.13786572E-02
 U-FRACTION IN SYSTEM:  C = .00699401238226739  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
  1  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: AUSTENITE

  CPU time used in timestep                    0  seconds
 9.017858690391845E-006        9.020271482103977E-006        1.248071023428739E-
020       TIME =  0.64276225E+09 DT =  0.10000000E+09 SUM OF SQUARES =  0.12480710E-19
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.49723170E-17 AND  -0.49723170E-17
 POSITION OF INTERFACE R_BCC_A2 / AUSTENITE IS   0.13786567E-02
 U-FRACTION IN SYSTEM:  C = .00699401745272732  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
  1  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: AUSTENITE

  CPU time used in timestep                    0  seconds
 4.341532094479382E-005        4.341663060354274E-005        9.820511580670602E-
019       TIME =  0.74276225E+09 DT =  0.10000000E+09 SUM OF SQUARES =  0.98205116E-18
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.27434605E-16 AND   0.27434605E-16
 POSITION OF INTERFACE R_BCC_A2 / AUSTENITE IS   0.13786594E-02
 U-FRACTION IN SYSTEM:  C = .0069939894766214  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
  1  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: R_BCC_A2

  CPU time used in timestep                    0  seconds
 5.229084408867828E-005        5.229877462615132E-005        2.006819806129132E-
025       TIME =  0.84276225E+09 DT =  0.10000000E+09 SUM OF SQUARES =  0.20068198E-24
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.85704577E-17 AND  -0.85704577E-17
 POSITION OF INTERFACE R_BCC_A2 / AUSTENITE IS   0.13786585E-02
 U-FRACTION IN SYSTEM:  C = .00699399821624293  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
  1  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: AUSTENITE

  CPU time used in timestep                    0  seconds
 1.959794758807766E-005        1.959643097242937E-005        6.675784762387637E-
029       TIME =  0.94276225E+09 DT =  0.10000000E+09 SUM OF SQUARES =  0.66757848E-28
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.30105396E-16 AND  -0.30105396E-16
 POSITION OF INTERFACE R_BCC_A2 / AUSTENITE IS   0.13786555E-02
 U-FRACTION IN SYSTEM:  C = .00699402891585532  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
  1  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: AUSTENITE

  CPU time used in timestep                    0  seconds
 2.362913132365089E-004        2.363098123700666E-004        2.781799323798323E-
018       TIME =  0.10000000E+10 DT =   57237752.     SUM OF SQUARES =  0.27817993E-17
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.45867886E-16 AND   0.45867886E-16
 POSITION OF INTERFACE R_BCC_A2 / AUSTENITE IS   0.13786582E-02
 U-FRACTION IN SYSTEM:  C = .00699400214391535  FE = 1
 TOTAL SIZE OF SYSTEM:  .002 [m]
 MUST SAVE WORKSPACE ON FILE
 WORKSPACE SAVED ON FILE
 RECLAIMING WORKSPACE
 DELETING TIME-RECORD FOR TIME    738.00000
 DELETING TIME-RECORD FOR TIME    755.01850
 DELETING TIME-RECORD FOR TIME    789.05550
 DELETING TIME-RECORD FOR TIME    857.12950
 DELETING TIME-RECORD FOR TIME    993.27750
 DELETING TIME-RECORD FOR TIME    1265.5735
 DELETING TIME-RECORD FOR TIME    1810.1655
 DELETING TIME-RECORD FOR TIME    2899.3495
 DELETING TIME-RECORD FOR TIME    5077.7175
 DELETING TIME-RECORD FOR TIME    9434.4536
 DELETING TIME-RECORD FOR TIME    18147.926
 DELETING TIME-RECORD FOR TIME    35574.870
 DELETING TIME-RECORD FOR TIME    70428.758
 DELETING TIME-RECORD FOR TIME    140136.53
 DELETING TIME-RECORD FOR TIME    279552.09
 DELETING TIME-RECORD FOR TIME    558383.19
 DELETING TIME-RECORD FOR TIME    1116045.4
 DELETING TIME-RECORD FOR TIME    2231369.8
 DELETING TIME-RECORD FOR TIME    4462018.7
 DELETING TIME-RECORD FOR TIME    8923316.4
 DELETING TIME-RECORD FOR TIME    17845912.
 DELETING TIME-RECORD FOR TIME    35691103.
 DELETING TIME-RECORD FOR TIME    71381484.
 DELETING TIME-RECORD FOR TIME   0.14276225E+09
 DELETING TIME-RECORD FOR TIME   0.24276225E+09
 DELETING TIME-RECORD FOR TIME   0.34276225E+09
 DELETING TIME-RECORD FOR TIME   0.44276225E+09
 DELETING TIME-RECORD FOR TIME   0.54276225E+09
```

```
 DELETING TIME-RECORD FOR TIME   0.64276225E+09
 DELETING TIME-RECORD FOR TIME   0.74276225E+09
 DELETING TIME-RECORD FOR TIME   0.84276225E+09

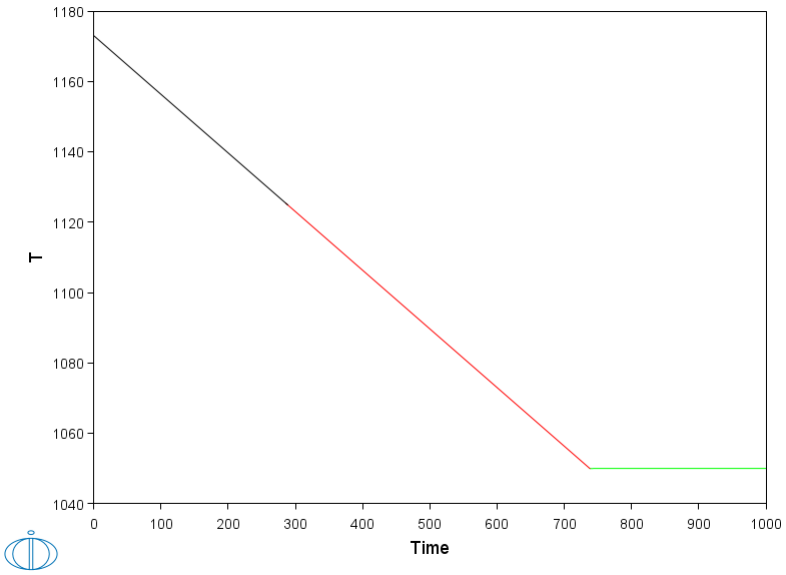
 KEEPING TIME-RECORD FOR TIME   0.94276225E+09
 AND FOR TIME                   0.10000000E+10
 WORKSPACE RECLAIMED

 TIMESTEP AT    0.100000000E+10 SELECTED

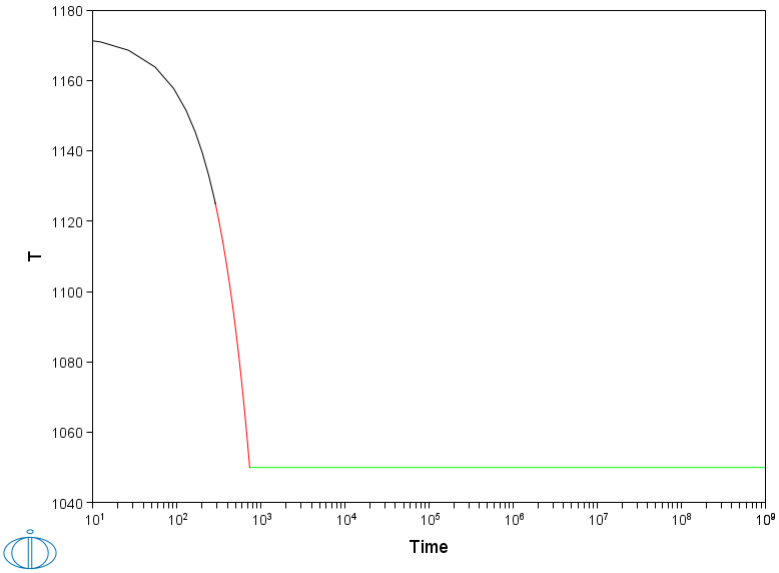
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC> @@
DIC> @@ THE SIMULATION IS FINISHED
DIC> @@
DIC>
DIC> set-inter
 --OK---
DIC>
```

exb1c-plot

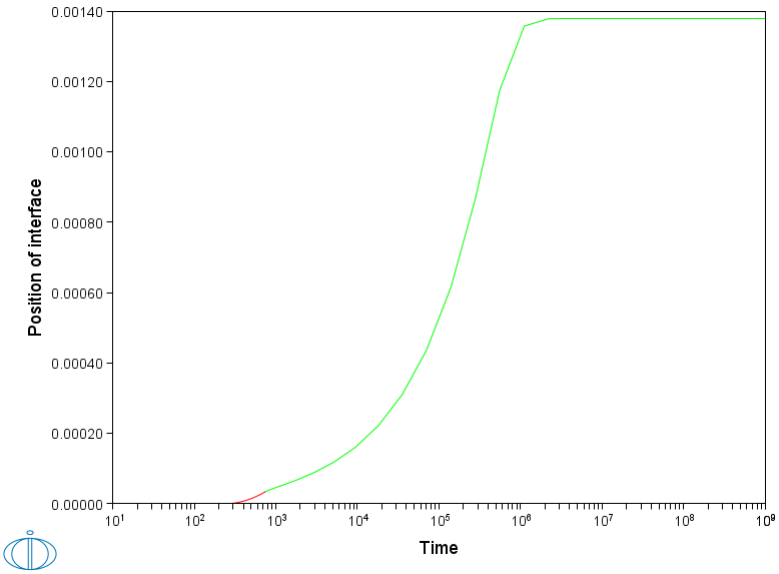
```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb1c\plot.DCM.test"
DIC>
DIC>
DIC> @@ exb1c_plot.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR GENERATING GRAPHICAL OUTPUT FOR EXAMPLE b1c
DIC> @@
DIC>
DIC> @@
DIC> @@ GO TO THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  1.00000E+09
DIC> read exb1c
 OK
DIC>
DIC> @@
DIC> @@ GO TO THE POST PROCESSOR
DIC> @@
DIC> post
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1:
POST-1: @@
POST-1: @@ PLOT TEMPERATURE VS. TIME
POST-1: @@
POST-1: s-d-a y t
POST-1: s-d-a x time
  INFO: Time is set as independent variable
POST-1: s-p-c
CONDITION /TIME/: interface
INTERFACE : austenite
UPPER OR LOWER INTERFACE OF REGION AUSTENITE#1 /LOWER/: lower
POST-1: s-s-s x n 0 1000
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
WORKING ...
WORKING ...           OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```



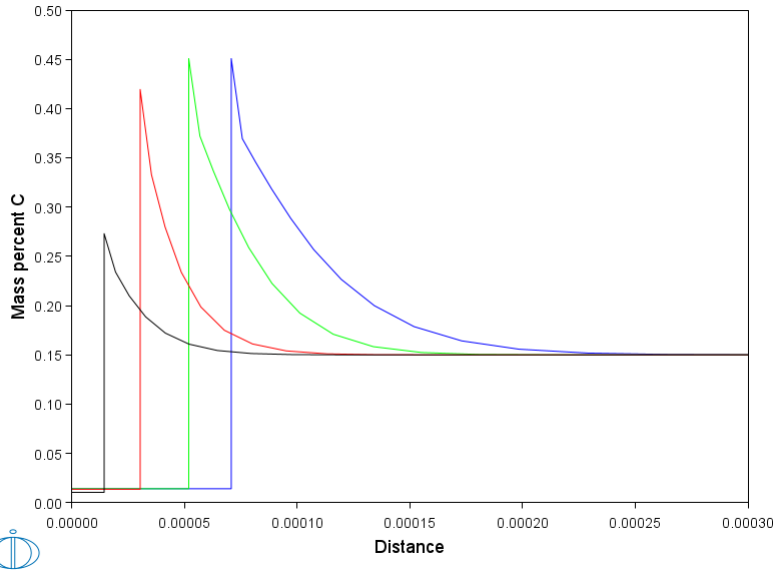

```
POST-1:
POST-1:
POST-1:
POST-1:
POST-1:@?<Hit_return_to_continue>
POST-1:
POST-1: @@
POST-1: @@ PLOT VS. LOG TIME
POST-1: @@
POST-1: set-axis-type x log
POST-1: s-s-s x n 10 1e9
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```




```
POST-1:
POST-1:
POST-1:
POST-1:@?<Hit_return_to_continue>
POST-1:
POST-1: @@
POST-1: @@ PLOT THE POSITION OF THE BCC/FCC INTERPHASE
POST-1: @@
POST-1: s-d-a
AXIS (X, Y OR Z) : y
VARIABLE : position
INTERFACE : austenite
UPPER OR LOWER INTERFACE OF REGION AUSTENITE#1 /LOWER/: lower
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
WORKING ...
WORKING ...           OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```




```
POST-1:
POST-1:
POST-1:
POST-1:
POST-1:@?<Hit_return_to_continue>
POST-1:
POST-1: @@
POST-1: @@ PLOT THE CARBON CONCENTRATION VS. DISTANCE
POST-1: @@
POST-1: s-d-a y w-p c
POST-1: s-d-a x dis glob
  INFO: Distance is set as independent variable
POST-1: s-p-c time 500,700,1200,2000
POST-1: set-axis-type x lin
POST-1: s-s-s x n 0 3e-4
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
WORKING ...OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

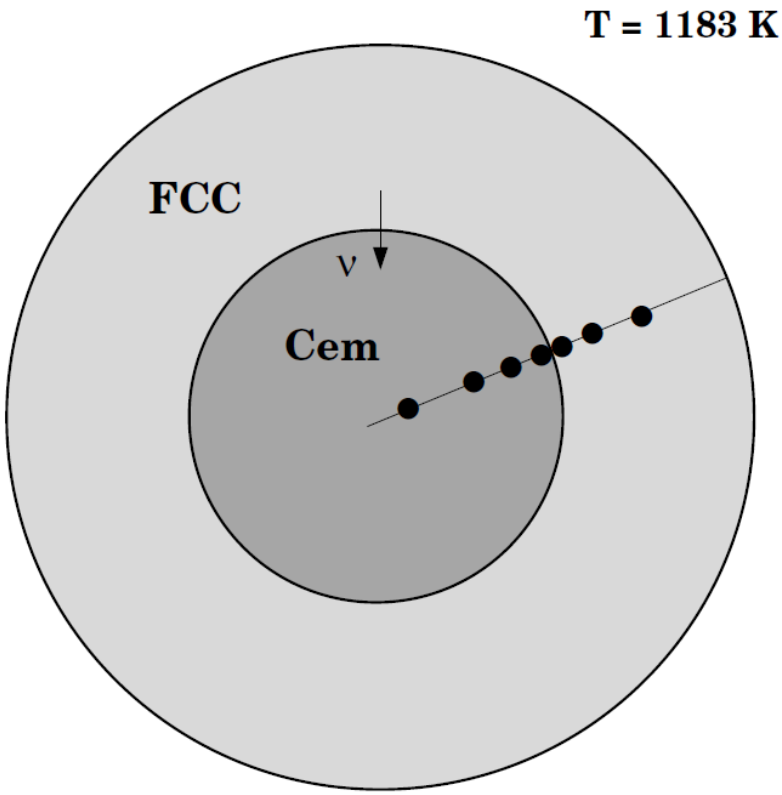



```
POST-1:
POST-1:
POST-1:
POST-1:
POST-1:@?<Hit_return_to_continue>
POST-1: set-inter
 --OK---
POST-1:
```

Example exb2

Cementite dissolution in an Fe-Cr-C alloy

This example calculates the dissolution of a spherical cementite particle in an austenite matrix. This case is from Z.-K. Liu, L. Höglund, B. Jönsson and J. Ågren (Metall. Trans.A, v.22A, 1991, pp. 1745-1752). In order to achieve the correct average composition in the calculation it is necessary to take into account the fact that the calculation is set up using the volume fraction of the phases. To calculate the initial state at the heat treatment temperature we need first to determine the state at the normalizing temperature. To calculate the volume fraction of the phases we need to enter a number of functions that calculate these quantities.



exb2-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb2\setup.DCM.test"
SYS: @@
SYS: @@ Moving boundary problem.
SYS: @@ Cementite dissolution in an Fe-Cr-C alloy
SYS: @@ This example calculates the dissolution of a spherical cementite
SYS: @@ particle in an austenite matrix.
SYS: @@ This case is from Z.-K. Liu, L. Hï¿½glund, B. Jï¿½nsson and J. ï¿½gren:
SYS: @@ Metall. Trans.A, v.22A (1991), pp. 1745-1752.
SYS: @@----------------------------------------------------------------------
SYS: @@
SYS: @@ In order to achieve the correct average composition in the calculation
SYS: @@ it is necessary to take into account that the calculation is set up
SYS: @@ using the volume fraction of the phases. To calculate the initial
SYS: @@ state at the heat treatment temperature we first need to determine
SYS: @@ the state at the normalizing temperature. To calculate the volume
SYS: @@ fraction of the phases we need to enter a number of functions
SYS: @@ that calculate these quantities. NOTE: The volume fractions are
SYS: @@ determined by assuming that only the substitutional components
SYS: @@ contribute to the volume of a system, whereas the interstitial
SYS: @@ components do not.
SYS: @@
SYS: @@ The total radius of the system can be calculated from the relation:
SYS: @@
SYS: @@    3
SYS: @@   R       V
SYS: @@    cem     cem    f
SYS: @@   ----  = ---- = V
SYS: @@    3             cem
SYS: @@   R       V
SYS: @@    tot     tot
SYS: @@
SYS: @@
SYS: @@
SYS: SET_GES_VERSION
USE GES VERSION 5 OR 6 /6/: 5
SYS: @@ RETRIEVE DATA FROM THE DATABASES
SYS: @@
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                       /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12:
TDB_TCFE12: @@
TDB_TCFE12: @@ USE A THERMODYNAMIC DATABASE TO RETRIEVE THE DATA
TDB_TCFE12: @@
TDB_TCFE12: sw FEDEMO
 Current database: Iron Demo Database v6.0

 VA                       /-  DEFINED
TDB_FEDEMO: def-sys fe cr c
 FE                       CR                       C
   DEFINED
TDB_FEDEMO: rej ph * all
 GAS:G                    LIQUID:L                 BCC_A2
 C14_LAVES                CBCC_A12                 CEMENTITE_D011
 CHI_A12                  CUB_A13                  DIAMOND_A4
 FCC_A1                   GRAPHITE_A9              HCP_A3
 KSI_CARBIDE              M23C6_D84                M3C2_D510
 M5C2                     M7C3_D101                SIGMA_D8B
   REJECTED
TDB_FEDEMO: res ph fcc bcc cem
 FCC_A1                   BCC_A2                   CEMENTITE_D011
   RESTORED
TDB_FEDEMO: get
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 Creating a new composition set FCC_A1#2
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ SWITCH TO A MOBILITY DATABASE TO RETRIEVE THE MOBILITY DATA
TDB_FEDEMO: @@
TDB_FEDEMO: app mfedemo
 Current database: Fe-Alloys Mobility demo database v5.0

 VA  DEFINED
APP: def-sys fe cr c
 FE                       CR                       C
   DEFINED
APP: rej ph * all
 BCC_A2                   FCC_A1                   CEMENTITE_D011
 LIQUID:L  REJECTED
APP: res ph fcc cementite
 FCC_A1                   CEMENTITE_D011  RESTORED
```

```
APP: get
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 Creating a new composition set FCC_A1#3
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
APP:
APP: @@
APP: @@ ENTER THE POLY-3 MONITOR
APP: @@
APP: go p-3

 POLY version  3.32
POLY:
POLY: @@
POLY: @@ SET THE CONDITIONS AT THE NORMALIZING TEMPERATURE
POLY: @@
POLY: set-cond T=1008,P=101325,N=1
POLY: set-cond X(CR)=0.0206,X(C)=0.0391
POLY:
POLY:
POLY: @@
POLY: @@ ENTER FUNCTIONS TO DETERMINE THE VOLUME-FRACTIONS
POLY: @@
POLY:
POLY: @@ Radius of the cementite particle
POLY: ent-symb var rcem=0.5255e-6;
POLY:
POLY: @@ total number of moles of substitutional components
POLY: ent-symb func nstot=n(fe)+n(cr);
POLY:
POLY: @@ number of moles of substitutional components in cementite
POLY: ent-symb func nscem=n(cem,fe)+n(cem,cr);
POLY:
POLY: @@ volume fraction (U-fraction) of cementite
POLY: ent-symb func vfcem=nscem/nstot;
POLY:
POLY: @@ total radius of the system
POLY: ent-symb func rtot=rcem/vfcem**(1/3);
POLY:
POLY: @@ radius of the surrounding austenite matrix
POLY: ent-symb func rmat=rtot-rcem;
POLY:
POLY:
POLY: @@
POLY: @@ COMPUTE THE EQUILIBRIUM
POLY: @@
POLY: compute-eq
 Using global minimization procedure
Calculated          4113 grid points in      0.019 s
Found the set of lowest grid points in       0.001 s
 Calculated solution in      0.012 s using 2 iterations. Total time      0.032  s
POLY:
POLY:
POLY: @@
POLY: @@ SHOW THE COMPUTED VALUES TO BE USED IN THE DICTRA CALCULATION
POLY: @@
POLY: show rmat
 RMAT=5.3924863E-7
POLY: show w(cem,cr),w(bcc,cr),w(bcc,c)
 W(CEMENTITE_D011,CR)=0.12581645
 W(BCC_A2,CR)=4.4332285E-3
 W(BCC_A2,C)=1.5102149E-4
POLY:
POLY: ent var wmatcr=w(bcc,cr);
POLY: ent var wmatc=w(bcc,c);
POLY: ent var wcemcr=w(cem,cr);
POLY:
POLY:
POLY: @@
POLY: @@ ENTER THE DICTRA MONITOR
POLY: @@
POLY: go d-m
 NO TIME STEP DEFINED
 *** ENTERING BCC_A2 AS A DIFFUSION NONE PHASE
DIC>
DIC> @@
DIC> @@ ENTER GLOBAL CONDITION T
DIC> @@
DIC> set-cond glob t 0 1183; * n
DIC>
DIC> @@
DIC> @@ ENTER THE REGIONS carb AND aus
DIC> @@
DIC> enter-region
REGION NAME : carb
DIC>
DIC> enter-region
REGION NAME : aus
ATTACH TO REGION NAMED /CARB/:
ATTACHED TO THE RIGHT OF CARB /YES/:
DIC> @@
DIC> @@ ENTER GEOMTRICAL GRIDS INTO THE REGIONS
DIC> @@
DIC>
DIC> @@
DIC> @@ THE INITIAL SIZE OF THE CEMENTITE PARTICLE IS ASSUMED TO BE KNOWN
DIC> @@ (IN THIS CASE THE VALUE IS TAKEN FROM LIU ET AL. WHO ESTIMATED THE
DIC> @@ AVERAGE INITIAL DIAMETER OF THE PARTICLES TO 1.051E-6 METERS).
DIC> @@
DIC> enter-grid
REGION NAME : /CARB/: carb
WIDTH OF REGION /1/: rcem
TYPE /AUTO/: AUTO
DIC>
DIC> @@
```

```
DIC> @@ THE SIZE OF THE FCC REGION CAN BE CALCULATED FROM A MASS BALANCE
DIC> @@ AFTER ESTIMATING THE INITIAL COMPOSITIONS IN THE TWO PHASES
DIC> @@
DIC> enter-grid
REGION NAME : /AUS/: aus
WIDTH OF REGION /1/: rmat
TYPE /AUTO/: AUTO
DIC>
DIC> @@
DIC> @@ ENTER PHASES INTO REGIONS
DIC> @@
DIC> enter-phase act carb  matrix   cementite
DIC> enter-phase act aus   matrix   fcc#1
DIC>
DIC> @@
DIC> @@ ENTER THE INITIAL COMPOSITIONS IN THE PHASES
DIC> @@
DIC> enter-composition
REGION NAME : /CARB/: carb
PHASE NAME: /CEMENTITE_D011/: cementite
DEPENDENT COMPONENT ? /FE/: fe
COMPOSITION TYPE /MOLE_FRACTION/: weig-fraction
PROFILE FOR /CR/: cr lin wcemcr wcemcr
DIC>
DIC> enter-composition
REGION NAME : /AUS/: aus
PHASE NAME: /FCC_A1#1/: fcc#1
DEPENDENT COMPONENT ? /FE/: fe
COMPOSITION TYPE /MOLE_FRACTION/: weig-fraction
PROFILE FOR /C/: CR lin wmatcr wmatcr
PROFILE FOR /CR/: C  lin wmatc wmatc
DIC>
DIC> @@
DIC> @@ SET TO A SPHERICAL GEOMETRY
DIC> @@
DIC> enter-geo
GEOMETRICAL EXPONENT /0/: 2
DIC>
DIC> @@
DIC> @@ SET THE SIMULATION TIME AND OTHER SIMULATION PARAMETERS
DIC> @@
DIC> set-simulation-time
END TIME FOR INTEGRATION /.1/: 10000
AUTOMATIC TIMESTEP CONTROL /YES/:
MAX TIMESTEP DURING INTEGRATION /1000/:
INITIAL TIMESTEP : /1E-07/:
SMALLEST ACCEPTABLE TIMESTEP : /1E-07/:
DIC>
DIC>
DIC> @@
DIC> @@ SAVE THE SET UP TO A NEW STORE FILE AND EXIT
DIC> @@
DIC> save exb2 Y
DIC>
DIC> set-inter
 --OK---
DIC>
```

exb2-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb2\run.DCM.test"
DIC>
DIC>
DIC> @@ exb2_run.DCM
DIC>
DIC> @@
DIC> @@ READ THE SET UP FROM FILE AND START THE SIMULATION
DIC> @@
DIC>
DIC> go d-m
 TIME STEP AT TIME  0.00000E+00
 *** ENTERING BCC_A2 AS A DIFFUSION NONE PHASE
DIC> read exb2
 OK
DIC> sim
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 Region: CARB
 geometric   0.833333     dense at   0.525500E-06   58 points
 Region: AUS
 geometric    1.08382     dense at    0.00000       51 points
 DEGREE OF IMPLICITY SET TO TRAPEZOIDAL RULE
  Trying old scheme                      4
 GENERATING STARTING VALUES FOR CELL #  1 INTERFACE #  2
 DETERMINING INITIAL EQUILIBRIUM VALUES
CALCULATING STARTING VALUES:       9   EQUILIBRIUM CALCULATIONS               DONE     6 OUT OF     9
04
 U-FRACTION IN SYSTEM:  C = .0406910188418179  CR = .0214382349908299
                        FE = .978561765139678
 TOTAL SIZE OF SYSTEM:  5.05626559582E-18 [m^3]
 U-FRACTION IN SYSTEM:  C = .0406910188418179  CR = .0214382349908299
                        FE = .978561765139678
 TOTAL SIZE OF SYSTEM:  5.05626559582E-18 [m^3]
 0.175660348248328        0.175701612808876        0.175660403504846        2.957123333729781E-003        7.707887793871315E-
005        1.690889548904206E-005        5.562776867778342E-006        1.479066404490064E-006        1.412228092434950E-
006        3.874041245636360E-007        3.004856193118965E-007        2.976052984421406E-007        2.974033302220243E-
007        2.932922507067780E-007        2.893522382061154E-007        2.815348251005817E-007        2.824718772169510E-
007        2.661546935677175E-007        2.364445524473569E-007        1.814586159121373E-007        1.822641482962206E-
007        9.101299503087152E-008        1.596613000445222E-009        2.088067599073854E-012        7.527983802043017E-
018       TIME =  0.10000000E-06 DT =  0.10000000E-06 SUM OF SQUARES =  0.71346162E-17
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.42832941E-02 AND  -0.42832941E-02
 POSITION OF INTERFACE CARB / AUS IS   0.52507167E-06
 U-FRACTION IN SYSTEM:  C = .040732123121372  CR = .021438336581268
                        FE = .978561663549239
 TOTAL SIZE OF SYSTEM:  5.05626559582E-18 [m^3]
  CPU time used in timestep                    0  seconds
 2.772719041999777E-005        2.773273773310285E-005        2.772713596612424E-005        2.002835653853146E-009        7.555407620527206E-
010        9.239010091274666E-013        5.787187528338812E-019       TIME =  0.30000000E-06 DT =  0.20000000E-
06 SUM OF SQUARES =  0.45694435E-18
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.12394281E-03 AND  -0.12394281E-03
 POSITION OF INTERFACE CARB / AUS IS   0.52504688E-06
 U-FRACTION IN SYSTEM:  C = .0407324904420209  CR = .0214383423017019
                        FE = .978561657828806
 TOTAL SIZE OF SYSTEM:  5.05626559582E-18 [m^3]
  CPU time used in timestep                    1  seconds
 4.914773225972526E-006        4.913613218541297E-006        4.914583824931072E-006        2.481536531061057E-006        1.956907770231878E-
006        1.041999135846117E-006        6.930107957357825E-008        9.686519095787612E-013        1.763487087268090E-
017       TIME =  0.68198078E-06 DT =  0.38198078E-06 SUM OF SQUARES =  0.69353217E-17
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.15427964E-03 AND  -0.15427964E-03
 POSITION OF INTERFACE CARB / AUS IS   0.52498795E-06
 U-FRACTION IN SYSTEM:  C = .040735146065225  CR = .0214383556812409
                        FE = .978561644449267
 TOTAL SIZE OF SYSTEM:  5.05626559582E-18 [m^3]
  1  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: AUS

  CPU time used in timestep                    0  seconds
 8.844088853911705E-007        8.850205938081172E-007        8.843869459699780E-007        4.649899403666994E-007        4.178128550510212E-
007        3.284325666088787E-007        1.817857970660160E-007        1.817633046140124E-007        1.771708811270311E-
008        1.624691978715939E-013        1.000482022309011E-018       TIME =  0.14459423E-05 DT =  0.76396156E-
06 SUM OF SQUARES =  0.26200937E-18
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.12135631E-03 AND  -0.12135631E-03
 POSITION OF INTERFACE CARB / AUS IS   0.52489524E-06
 U-FRACTION IN SYSTEM:  C = .0407352705138452  CR = .0214383762063272
                        FE = .97856162392418
 TOTAL SIZE OF SYSTEM:  5.05626559582E-18 [m^3]
  CPU time used in timestep                    0  seconds
 1.038513232878385E-006        1.039247075245704E-006        1.038521895728708E-006        7.200021761757777E-008

output ignored...



... output resumed

 U-FRACTION IN SYSTEM:  C = .0407662510909206  CR = .0214380716795954
                        FE = .978561928450912
 TOTAL SIZE OF SYSTEM:  5.05626559582E-18 [m^3]
  1  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: AUS

  CPU time used in timestep                    2  seconds
 2.140724783563910E-007        2.145004979841646E-007        2.141362471402357E-007        5.160654594656812E-008        1.952775185457182E-
008        2.297648576737977E-012        1.737628569940828E-
016       TIME =   6314.3771     DT =   1000.0000     SUM OF SQUARES =  0.83207635E-16
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.14130507E-10 AND  -0.14130507E-10
 POSITION OF INTERFACE CARB / AUS IS   0.26623673E-06
 U-FRACTION IN SYSTEM:  C = .0407664334357307  CR = .0214380677874753
                        FE = .978561932343032
 TOTAL SIZE OF SYSTEM:  5.05626559582E-18 [m^3]
  CPU time used in timestep                    1  seconds
 9.720327142415701E-008        9.744152658146634E-008        9.724120674353808E-008        3.202204430035339E-008        1.303890367511254E-
008        8.772657536632490E-013        2.792532419767100E-
017       TIME =   7314.3771     DT =   1000.0000     SUM OF SQUARES =  0.11293558E-16
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.12493482E-10 AND  -0.12493482E-10
 POSITION OF INTERFACE CARB / AUS IS   0.25374325E-06
 U-FRACTION IN SYSTEM:  C = .0407665123632013  CR = .0214380650409061
                        FE = .978561935089601
 TOTAL SIZE OF SYSTEM:  5.05626559582E-18 [m^3]
  1  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: AUS

  CPU time used in timestep                    2  seconds
 4.216464994108787E-008        4.229656530269648E-008        4.218541984998433E-008        1.751750361842919E-008        7.921588315648908E-
```

```
009        3.042072901503781E-013        8.030876548688946E-
018       TIME =   8314.3771     DT =   1000.0000     SUM OF SQUARES =  0.55486176E-17
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.11324512E-10 AND  -0.11324512E-10
 POSITION OF INTERFACE CARB / AUS IS   0.24241874E-06
 U-FRACTION IN SYSTEM:  C = .0407665586064451  CR = .021438063320265
                        FE = .978561936810242
 TOTAL SIZE OF SYSTEM:  5.05626559582E-18 [m^3]
  CPU time used in timestep                    1  seconds
 1.602357697242259E-008        1.609145505745476E-008        1.603158632453903E-008        8.177362736288252E-009        4.212484456971385E-
009        8.134238185912224E-014        2.459483607910364E-
017       TIME =   9314.3771     DT =   1000.0000     SUM OF SQUARES =  0.24344799E-16
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.10514429E-10 AND  -0.10514429E-10
 POSITION OF INTERFACE CARB / AUS IS   0.23190431E-06
 U-FRACTION IN SYSTEM:  C = .0407665686082386  CR = .0214380618411325
                        FE = .978561938289375
 TOTAL SIZE OF SYSTEM:  5.05626559582E-18 [m^3]
  CPU time used in timestep                    1  seconds
 1.007404255701584E-006        1.006919404263611E-006        1.006516338193728E-006        9.435239092746207E-008        1.073534425436613E-
011        6.060170636922464E-017       TIME =   10000.000     DT =   685.62294     SUM OF SQUARES =  0.42361985E-16
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.97992402E-11 AND  -0.97992402E-11
 POSITION OF INTERFACE CARB / AUS IS   0.22518573E-06
 U-FRACTION IN SYSTEM:  C = .0407665610869387  CR = .0214380609255118
                        FE = .978561939204995
 TOTAL SIZE OF SYSTEM:  5.05626559582E-18 [m^3]
 MUST SAVE WORKSPACE ON FILE
 WORKSPACE SAVED ON FILE
 RECLAIMING WORKSPACE
 DELETING TIME-RECORD FOR TIME    0.0000000
 DELETING TIME-RECORD FOR TIME   0.10000000E-06
 DELETING TIME-RECORD FOR TIME   0.30000000E-06
 DELETING TIME-RECORD FOR TIME   0.68198078E-06
 DELETING TIME-RECORD FOR TIME   0.14459423E-05
 DELETING TIME-RECORD FOR TIME   0.29738654E-05
 DELETING TIME-RECORD FOR TIME   0.60297117E-05
 DELETING TIME-RECORD FOR TIME   0.12141404E-04
 DELETING TIME-RECORD FOR TIME   0.24364789E-04
 DELETING TIME-RECORD FOR TIME   0.48811559E-04
 DELETING TIME-RECORD FOR TIME   0.97705098E-04
 DELETING TIME-RECORD FOR TIME   0.19549218E-03
 DELETING TIME-RECORD FOR TIME   0.39040662E-03
 DELETING TIME-RECORD FOR TIME   0.75073691E-03
 DELETING TIME-RECORD FOR TIME   0.13877144E-02
 DELETING TIME-RECORD FOR TIME   0.24412376E-02
 DELETING TIME-RECORD FOR TIME   0.40939956E-02
 DELETING TIME-RECORD FOR TIME   0.65605117E-02
 DELETING TIME-RECORD FOR TIME   0.10064324E-01
 DELETING TIME-RECORD FOR TIME   0.14884746E-01
 DELETING TIME-RECORD FOR TIME   0.21452460E-01
 DELETING TIME-RECORD FOR TIME   0.30485537E-01
 DELETING TIME-RECORD FOR TIME   0.43317801E-01
 DELETING TIME-RECORD FOR TIME   0.62747907E-01
 DELETING TIME-RECORD FOR TIME   0.95738120E-01
 DELETING TIME-RECORD FOR TIME   0.16171855
 DELETING TIME-RECORD FOR TIME   0.29227689
 DELETING TIME-RECORD FOR TIME   0.53214421
 DELETING TIME-RECORD FOR TIME    1.0118789
 DELETING TIME-RECORD FOR TIME    1.9034061
 DELETING TIME-RECORD FOR TIME    3.6864605
 DELETING TIME-RECORD FOR TIME    7.1077626
 DELETING TIME-RECORD FOR TIME    13.306809
 DELETING TIME-RECORD FOR TIME    24.555689
 DELETING TIME-RECORD FOR TIME    45.854796
 DELETING TIME-RECORD FOR TIME    86.774869
 DELETING TIME-RECORD FOR TIME    168.61502
 DELETING TIME-RECORD FOR TIME    332.29531
 DELETING TIME-RECORD FOR TIME    659.65589
 DELETING TIME-RECORD FOR TIME    1314.3771
 DELETING TIME-RECORD FOR TIME    2314.3771
 DELETING TIME-RECORD FOR TIME    3314.3771
 DELETING TIME-RECORD FOR TIME    4314.3771
 DELETING TIME-RECORD FOR TIME    5314.3771
 DELETING TIME-RECORD FOR TIME    6314.3771
 DELETING TIME-RECORD FOR TIME    7314.3771
 DELETING TIME-RECORD FOR TIME    8314.3771

 KEEPING TIME-RECORD FOR TIME    9314.3771
 AND FOR TIME                    10000.000
 WORKSPACE RECLAIMED

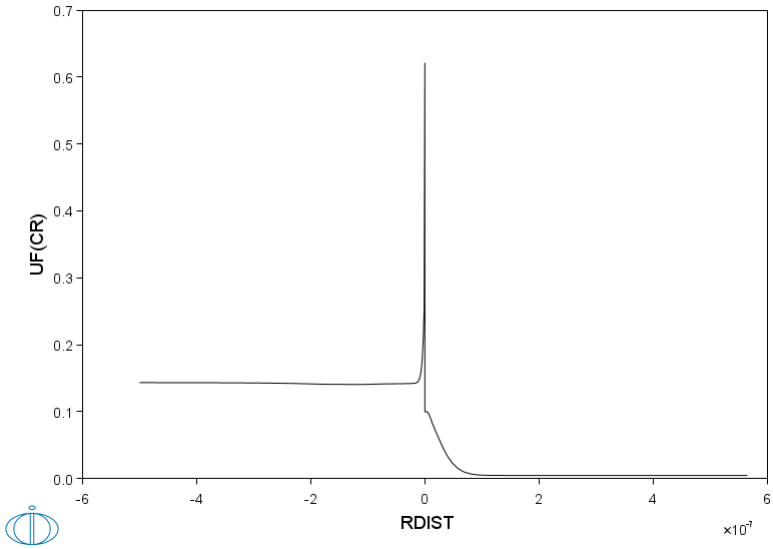
 TIMESTEP AT     10000.0000     SELECTED

DIC>
DIC>
DIC> set-inter
 --OK---
DIC>
```

exb2-plot

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb2\plot.DCM.test"
DIC>
DIC>
DIC> @@ exb2_plot.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR GENERATING GRAPHICAL OUTPUT FOR EXAMPLE b2
DIC> @@
DIC>
DIC> @@
DIC> @@ GO TO THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  1.00000E+04
 *** ENTERING BCC_A2 AS A DIFFUSION NONE PHASE
DIC> read exb2
 OK
DIC>
DIC> @@
DIC> @@ GO TO THE POST PROCESSOR
DIC> @@
DIC> post
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1: @@
POST-1: @@ LET US PLOT CHROMIUM CONCENTRATION PROFILES
POST-1: @@ WE THEN SET THE DISTANCE AS X-AXIS (NOTE THAT DISTANCE IS AUTOMATICALLY
POST-1: @@ SET AS THE INDEPENDENT VARIABLE) AND U-FRACTION CARBON AS Y-AXIS
POST-1: @@ REMEMBER THAT THE PLOT CONDITION ALSO MUST BE SET.
POST-1: @@
POST-1: @@ NOTICE THAT ALL DISTANCES IN THE DATA FILE ARE GIVEN RELATIVE TO THE
POST-1: @@ CEM/FCC INTERFACE. FOR THIS REASON AN OFFSET MUST BE GIVEN TO THE
POST-1: @@ DATA ACCORDING TO THE ACTUAL PARTICLE RADIUS AT THE SPECIFIED TIME.
POST-1: @@
POST-1: enter-symb
Function or table /FUNCTION/: func
NAME: rdist
FUNCTION: gd-poi(carb,u);
POST-1:
POST-1: s-d-a x rdist
POST-1:
POST-1: s-i-v
VARIABLE /TIME/: dist
DISTANCE : /GLOBAL/: glo
POST-1:
POST-1: s-d-a y uf(cr)
POST-1:
POST-1: s-p-c time 10
POST-1:
POST-1: @@
POST-1: @@ SET THE TITLE ON THE PLOT
POST-1: @@
POST-1: set-title Figure b2.1
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

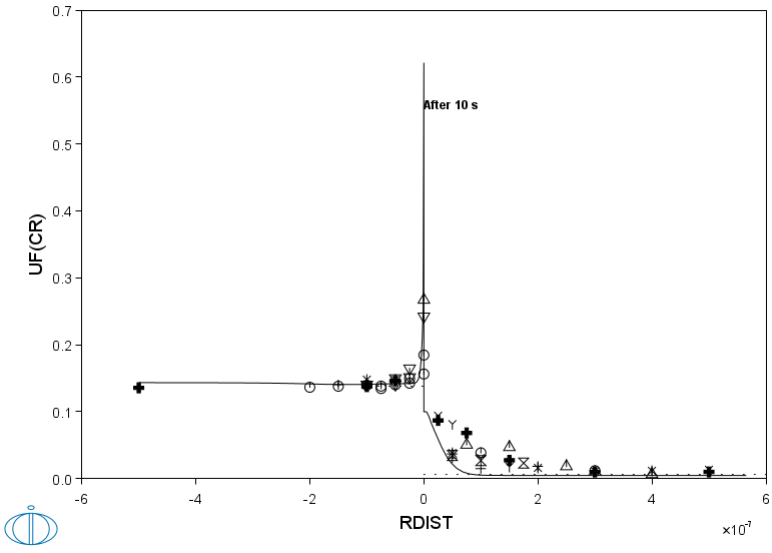
Figure b2.1




```
POST-1:
POST-1:
POST-1:
POST-1:
POST-1:@?<_hit_return_to_continue_>
POST-1:
POST-1: @@
POST-1: @@ INCLUDE EXPERIMENTAL DATA POINTS ON THE PLOT FOR COMPARISION
POST-1: @@
POST-1: @@ FIRST LIST DATASETS
POST-1: @@
POST-1: app y exb2.exp
PROLOGUE NUMBER: /0/: 0
```

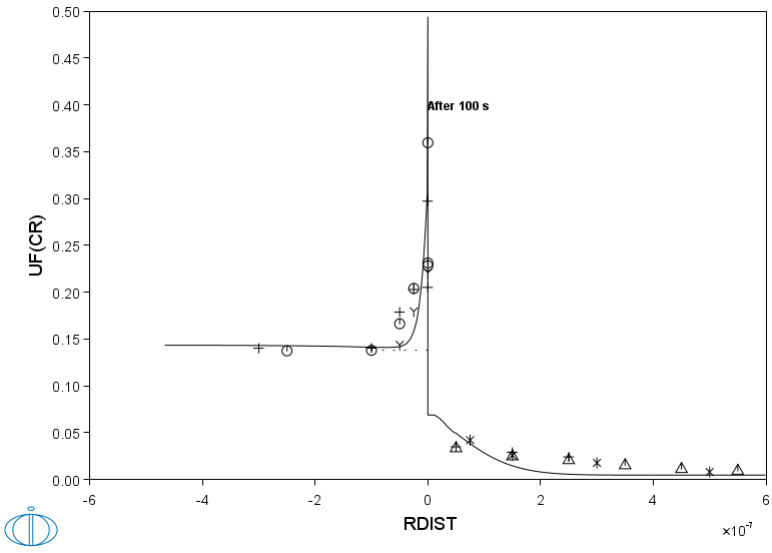
```
DATASET NUMBER(s): /-1/: -1
 DATASET 1 CONCENTRATION PROFILE T=10S
 DATASET 2 CONCENTRATION PROFILE T=100S
 DATASET 3 CONCENTRATION PROFILE T=1000S
 DATASET 4 CONCENTRATION PROFILE T=10000S
 DATASET 5 VOLUME FRACTION CEMENTITE VS. TIME
 DATASET 6 MEAN PARTICLE DIAMETER VS. TIME
POST-1:
POST-1: @@
POST-1: @@ SELECT THE PROPER DATASET
POST-1: @@
POST-1: app y exb2.exp
PROLOGUE NUMBER: /0/: 0
DATASET NUMBER(s): /-1/: 1
POST-1:
POST-1: set-title Figure b2.2
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

Figure b2.2




```
POST-1:
POST-1:
POST-1:
POST-1:
POST-1:@?<_hit_return_to_continue_>
POST-1:
POST-1: @@
POST-1: @@ PLOT ALSO FOR 100, 1000 AND 10000 seconds
POST-1: @@
POST-1:
POST-1: s-p-c time 100
POST-1:
POST-1: app y exb2.exp
PROLOGUE NUMBER: /0/: 0
DATASET NUMBER(s): /-1/: 2
POST-1:
POST-1: set-title Figure b2.3
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

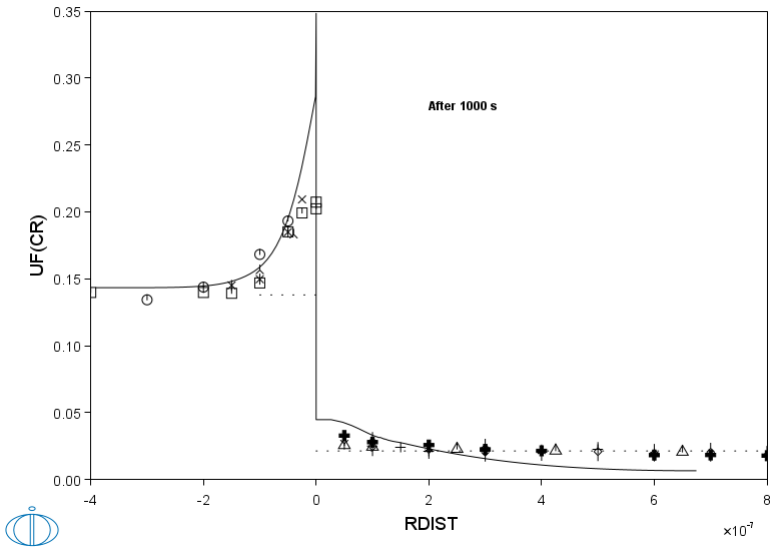
Figure b2.3




```
POST-1:
POST-1:
```

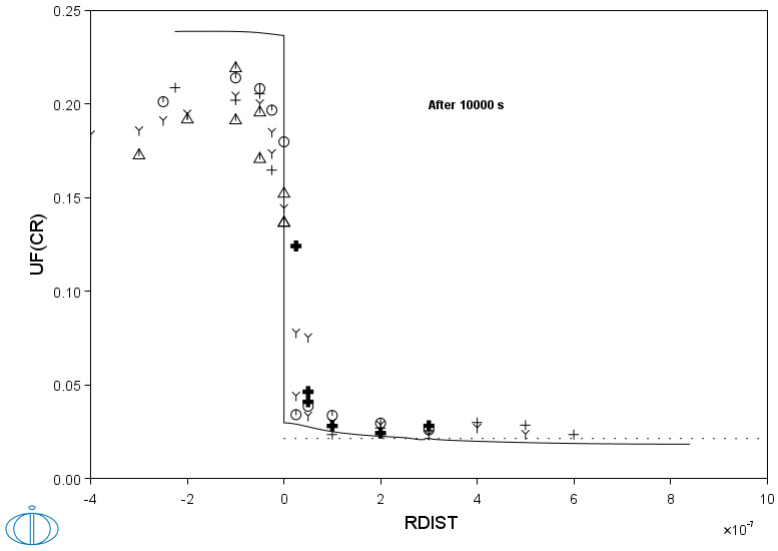
```
POST-1:
POST-1:
POST-1:@?<_hit_return_to_continue_>
POST-1:
POST-1:
POST-1: s-p-c time 1000
POST-1:
POST-1: app y exb2.exp
PROLOGUE NUMBER: /0/: 0
DATASET NUMBER(s): /-1/: 3
POST-1:
POST-1: set-title Figure b2.4
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

Figure b2.4




```
POST-1:
POST-1:
POST-1:
POST-1:
POST-1:@?<_hit_return_to_continue_>
POST-1:
POST-1: s-p-c time 10000
POST-1:
POST-1: app y exb2.exp
PROLOGUE NUMBER: /0/: 0
DATASET NUMBER(s): /-1/: 4
POST-1:
POST-1: set-title Figure b2.5
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

Figure b2.5

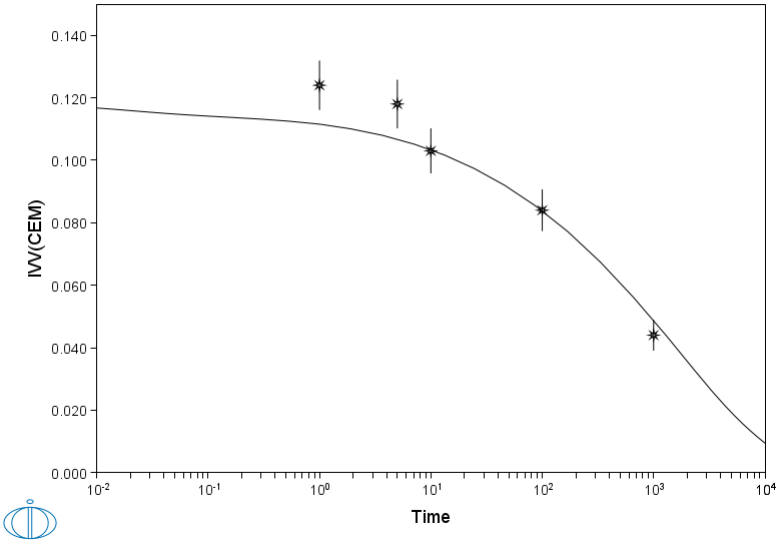



```
POST-1:
POST-1:
POST-1:
POST-1:
POST-1:@?<_hit_return_to_continue_>
POST-1:
POST-1: @@
POST-1: @@ ALSO PLOT HOW THE VOLUME FRACTION OF CEMENTITE VARIES
POST-1: @@ WITH TIME
POST-1: @@
```

```
POST-1: s-d-a y ivv(cem)
POST-1: s-s-s y n 0 .15
POST-1:
POST-1: s-d-a x time
  INFO: Time is set as independent variable
POST-1: set-axis-type x log
POST-1: s-s-s x n .01 10000
POST-1:
POST-1: s-p-c integral
POST-1:
POST-1: app y exb2.exp
PROLOGUE NUMBER: /0/: 0
DATASET NUMBER(s): /-1/: 5
POST-1:
POST-1: set-title Figure b2.6
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y

            OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

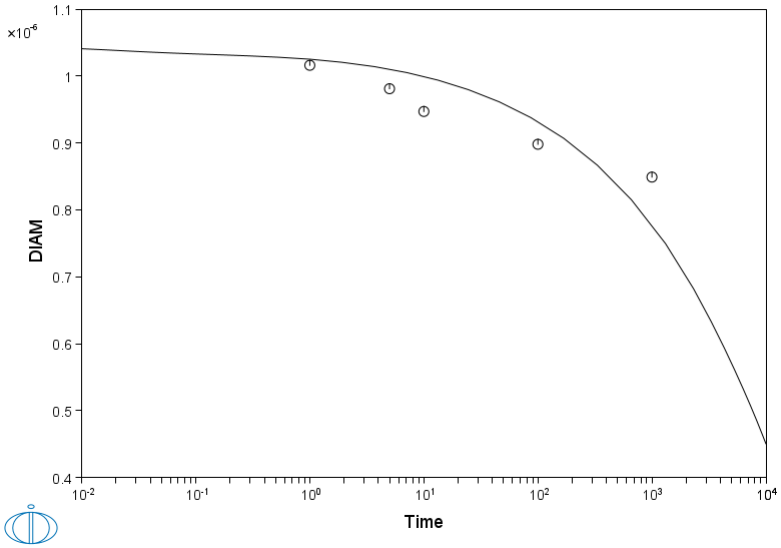
Figure b2.6




```
POST-1:
POST-1:
POST-1:
POST-1:
POST-1:@?<_hit_return_to_continue_>
POST-1:
POST-1: @@
POST-1: @@ ALSO PLOT HOW THE DIAMETER OF CEMENTITE VARIES WITH TIME
POST-1: @@
POST-1: enter func diam=2*poi(carb,u);
POST-1: s-d-a y diam
POST-1:
POST-1: s-p-c interface carb upper
POST-1:
POST-1: app y exb2.exp
PROLOGUE NUMBER: /0/: 0
DATASET NUMBER(s): /-1/: 6
POST-1:
POST-1: set-title Figure b2.7
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y

            OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

Figure b2.7

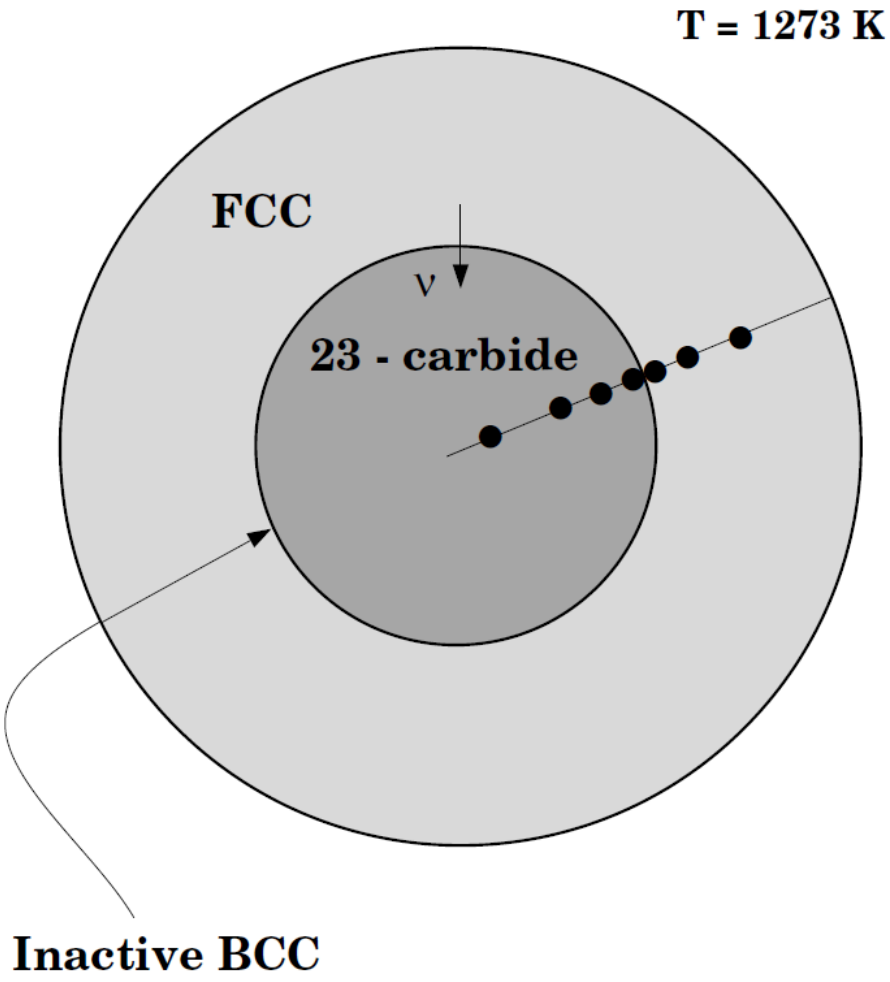



```
POST-1:
POST-1:
POST-1:
POST-1:
POST-1:@?<_hit_return_to_continue_>
POST-1:
POST-1: set-inter
 --OK---
POST-1:
```

Example exb3

Dissolution of 23-carbide in an austenitic matrix

This example calculates the dissolution of an M23C6 particle in an austenite matrix. A film of ferrite is allowed to nucleate around the carbide during the precipitation.



exb3-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb3\setup.DCM.test"
SYS:
SYS: @@ Moving boundary example.
SYS: @@ Dissolution of 23-carbide in an austenitic matrix
SYS: @@ This example calculates the dissolution of an M23C6 particle in an
SYS: @@ austenite matrix. A film of ferrite is allowed to nucleate around the
SYS: @@ carbide during the precipitation.
SYS: @@----------------------------------------------------------------------
SYS:
SYS: @@
SYS: @@ RETRIEVE DATA FROM THE DATABASES
SYS: @@
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                       /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12:
TDB_TCFE12: @@
TDB_TCFE12: @@ USE A DATABASE FOR THERMODYNAMIC DATA
TDB_TCFE12: @@
TDB_TCFE12: sw fedemo
 Current database: Iron Demo Database v6.0

 VA                       /-  DEFINED
TDB_FEDEMO: def-sys fe c cr
 FE                       C                        CR
   DEFINED
TDB_FEDEMO: rej ph *
 GAS:G                    LIQUID:L                 BCC_A2
 C14_LAVES                CBCC_A12                 CEMENTITE_D011
 CHI_A12                  CUB_A13                  DIAMOND_A4
 FCC_A1                   GRAPHITE_A9              HCP_A3
 KSI_CARBIDE              M23C6_D84                M3C2_D510
 M5C2                     M7C3_D101                SIGMA_D8B
   REJECTED
TDB_FEDEMO: res ph fcc bcc m23
 FCC_A1                   BCC_A2                   M23C6_D84
   RESTORED
TDB_FEDEMO: get
09:17:22,976 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 Creating a new composition set FCC_A1#2
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ SWITCH TO A MOBILITY DATABASE TO RETRIEVE THE MOBILITY DATA
TDB_FEDEMO: @@
TDB_FEDEMO: app mfedemo
 Current database: Fe-Alloys Mobility demo database v5.0

 VA  DEFINED
APP: def-sys c cr fe
 C                        CR                       FE
   DEFINED
APP: rej ph *
 BCC_A2                   FCC_A1                   CEMENTITE_D011
 LIQUID:L  REJECTED
APP: res ph fcc bcc
 FCC_A1                   BCC_A2  RESTORED
APP: get
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 Creating a new composition set FCC_A1#3
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
APP:
APP: @@
APP: @@ ENTER THE DICTRA MONITOR
APP: @@
APP: go d-m
 NO TIME STEP DEFINED
 *** ENTERING M23C6_D84 AS A DIFFUSION NONE PHASE
DIC>
DIC>
DIC> @@ THE MOBILITY DATABASE LACKS KINETIC DATA FOR THE M23-CARBIDE
DIC> @@ SO AN ESTIMATE FOR THE MOBILITIES IN THIS PHASE ARE ENTERED.
DIC> ent-mob-est M23 c
M[M23,C](T)= 0;
```

```
 NOTE:  1 of  3 parameters entered
DIC>
DIC> ent-mob-est M23 cr
M[M23,CR](T)= 3e-11*exp(-278000/8.3145/T);
 NOTE:  2 of  3 parameters entered
DIC>
DIC> ent-mob-est M23 fe
M[M23,FE](T)= 1e-11*exp(-275000/8.3145/T);
 NOTE: All necessary parameters entered
DIC>
DIC> @@
DIC> @@ ENTER GLOBAL CONDITION T
DIC> @@
DIC> set-cond glob T 0 1273;   * N
DIC>
DIC> @@
DIC> @@ ENTER THE REGIONS carbide AND matrix
DIC> @@
DIC> enter-region  carbide
DIC> enter-region  matrix
ATTACH TO REGION NAMED /CARBIDE/:
ATTACHED TO THE RIGHT OF CARBIDE /YES/:
DIC> @@
DIC> @@ ASSUME SOME REASONABLE SIZE OF THE CARBIDE PARTICLE
DIC> @@
DIC> enter-grid  carbide  5.00000000E-7 AUTO
DIC> @@
DIC> @@ THE SIZE OF THE FCC REGION WE CAN CALCULATE FROM A MASS BALANCE
DIC> @@ AFTER ESTIMATING THE INITIAL COMPOSITIONS IN THE TWO PHASES.
DIC> @@
DIC> enter-grid  matrix  5.55859755E-7 AUTO
DIC> @@
DIC> @@ ENTER PHASES INTO THE REGION MATRIX. BOUNDARY CONDITIONS ARE GIVEN
DIC> @@ IF THE INACTIVE PHASE bcc IS NUCLEATED
DIC> @@
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: act
REGION NAME : /CARBIDE/: matrix
PHASE TYPE /MATRIX/: matrix
PHASE NAME: /NONE/: fcc#1
DIC>
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: inact
ATTACH TO REGION NAMED /MATRIX/: matrix
ATTACHED TO THE RIGHT OF MATRIX /YES/: no
PHASE NAME: /NONE/: bcc#1
DEPENDENT COMPONENT ? /FE/: fe
 REQUIRED DRIVING FORCE FOR PRECIPITATION: /1E-05/:
CONDITION TYPE /CLOSED_SYSTEM/: closed
DIC>
DIC> @@
DIC> @@ ENTER THE PHASE INTO THE REGION carbide
DIC> @@
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: act
REGION NAME : /CARBIDE/: carbide
PHASE TYPE /MATRIX/: matrix
PHASE NAME: /NONE/: m23c6
DIC>
DIC> @@
DIC> @@ ENTER COMPOSITIONS INTO THE PHASES
DIC> @@
DIC> enter-composition
REGION NAME : /CARBIDE/: carbide
PHASE NAME: /M23C6_D84/: m23c6
DEPENDENT COMPONENT ? /FE/: fe
COMPOSITION TYPE /MOLE_FRACTION/: mole-fraction
PROFILE FOR /CR/: cr lin 0.55079807 0.55079807
DIC>
DIC>
DIC> enter-composition
REGION NAME : /MATRIX/: matrix
PHASE NAME: /FCC_A1#1/: fcc#1
DEPENDENT COMPONENT ? /FE/: fe
COMPOSITION TYPE /MOLE_FRACTION/: mole-fraction
PROFILE FOR /C/: cr lin 8.5203899E-2 8.5203899E-2
PROFILE FOR /CR/: c lin 1.8072433E-4  1.8072433E-4
DIC>
DIC> @@
DIC> @@ SET TO A SPHERICAL GEOMETRY
DIC> @@
DIC> enter-geo
GEOMETRICAL EXPONENT /0/: 2
DIC>
DIC> @@
DIC> @@ SET THE SIMULATION TIME AND OTHER SIMULATION PARAMETERS
DIC> @@
DIC> set-simulation-time
END TIME FOR INTEGRATION /.1/: 8000
AUTOMATIC TIMESTEP CONTROL /YES/:
MAX TIMESTEP DURING INTEGRATION /800/:
INITIAL TIMESTEP : /1E-07/:
SMALLEST ACCEPTABLE TIMESTEP : /1E-07/:
DIC> @@
DIC> @@ SAVE THE SET UP TO A NEW STORE FILE AND EXIT
DIC> @@
DIC> save exb3 Y
DIC>
DIC>
DIC>
DIC> set-inter
 --OK---
DIC>
```

exb3-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb3\run.DCM.test"
DIC>
DIC>
DIC> @@ exb3_run.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR RUNNING EXAMPLE b3
DIC> @@
DIC>
DIC> @@
DIC> @@ ENTER THE DICTRA MONITOR AND READ THE SET UP FROM FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  0.00000E+00
DIC> read exb3
 OK
DIC>
DIC> @@
DIC> @@ WHEN THE FERRITE NUCLEATES WE USE DEFAULT VALUES
DIC> @@ AS STARTING VALUES FOR THE WIDTH OF THE NEW REGION
DIC> @@ AND THE VELOCITY OF THE INTERFACES
DIC> @@
DIC>
DIC> @@
DIC> @@ START THE SIMULATION
DIC> @@
DIC> sim yes
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 Region: CARBIDE
 geometric   0.956620     dense at   0.500000E-06   51 points
 Region: MATRIX
 geometric    1.05195     dense at    0.00000       50 points
 DEGREE OF IMPLICITY SET TO TRAPEZOIDAL RULE
  Trying old scheme                 4
 GENERATING STARTING VALUES FOR CELL #  1 INTERFACE #  2
 DETERMINING INITIAL EQUILIBRIUM VALUES
CALCULATING STARTING VALUES:       9   EQUILIBRIUM CALCULATIONS               DONE     6 OUT OF     9
 U-FRACTION IN SYSTEM:  C = .0278637912207471  CR = .149918318671311
                        FE = .850081681459196
 TOTAL SIZE OF SYSTEM:  4.93068569406E-18 [m^3]
 U-FRACTION IN SYSTEM:  C = .0278637912207471  CR = .149918318671311
                        FE = .850081681459196
 TOTAL SIZE OF SYSTEM:  4.93068569406E-18 [m^3]
 0.564525001046130        0.564658892752918        0.564525829496762        1.010918370997740E-002        2.719677100264318E-
004        6.785040686883620E-005        1.215315579807402E-005        4.866561139048117E-006        4.600898530266347E-
006        1.065354242442190E-007        8.588439242735395E-008        5.106291897372686E-008        5.522545709592756E-
008        2.440343683814056E-008        2.876055304151570E-010        1.192136903749214E-015        5.399350026632977E-
020       TIME =  0.10000000E-06 DT =  0.10000000E-06 SUM OF SQUARES =  0.73236392E-21
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.18307019E-02 AND  -0.18307019E-02
 POSITION OF INTERFACE CARBIDE / MATRIX IS   0.49981693E-06
 U-FRACTION IN SYSTEM:  C = .027878406862065  CR = .149918515634161
                        FE = .850081484496346
 TOTAL SIZE OF SYSTEM:  4.93068569406E-18 [m^3]
  CPU time used in timestep                    6  seconds
 1.169573305641419E-004        1.169808091698651E-004        1.169556456870664E-004        6.196379839283318E-009        3.575390208997375E-
010        5.633278916665288E-016        1.123078553233749E-022       TIME =  0.30000000E-06 DT =  0.20000000E-
06 SUM OF SQUARES =  0.10429154E-21
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.37512517E-04 AND  -0.37512517E-04
 POSITION OF INTERFACE CARBIDE / MATRIX IS   0.49980943E-06
 U-FRACTION IN SYSTEM:  C = .0278783962800807  CR = .14991852270919
                        FE = .850081477421317
 TOTAL SIZE OF SYSTEM:  4.93068569406E-18 [m^3]
  1  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: MATRIX

  CPU time used in timestep                    1  seconds
 1.635955480785716E-006        1.636388953882924E-006        1.634950881787669E-006        1.008577264185604E-007        2.605673330761522E-
009        3.122189829853064E-014        3.380706863199773E-021       TIME =  0.70000000E-06 DT =  0.40000000E-
06 SUM OF SQUARES =  0.50294281E-21
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.42504001E-04 AND  -0.42504001E-04
 POSITION OF INTERFACE CARBIDE / MATRIX IS   0.49979243E-06
 U-FRACTION IN SYSTEM:  C = .0278783834690609  CR = .149918538694267
                        FE = .85008146143624
 TOTAL SIZE OF SYSTEM:  4.93068569406E-18 [m^3]
  CPU time used in timestep                    1  seconds
 1.554949973990134E-004        1.555520585604812E-004        1.554464678200233E-004        4.605861270131429E-008        3.402806768460703E-
010        4.132556837568250E-015        6.323779032804117E-024       TIME =  0.15000000E-05 DT =  0.80000000E-
06 SUM OF SQUARES =  0.97597228E-26


output ignored...



... output resumed

 3.460859970899211E-008        3.853190469634759E-012        2.001231773467918E-
017       TIME =   5415.3212     DT =   800.00000     SUM OF SQUARES =  0.31370702E-18
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.73043932E-12 AND  -0.73043932E-12
 POSITION OF INTERFACE CARBIDE / MATRIX IS   0.39393387E-06
 U-FRACTION IN SYSTEM:  C = .0278045747992993  CR = .149761222842389
                        FE = .850238777288118
 TOTAL SIZE OF SYSTEM:  4.93068569406E-18 [m^3]
  1  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: MATRIX

  CPU time used in timestep                    2  seconds
 6.858629046833883E-008        6.860675426478936E-008        6.851615902357036E-008        4.292891739626284E-008        3.383169652306525E-
008        1.672092142420378E-008        4.330932377463012E-010        3.163126106530902E-016        1.788682455549798E-
019       TIME =   6215.3212     DT =   800.00000     SUM OF SQUARES =  0.17885846E-18
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.31270352E-12 AND  -0.31270352E-12
 POSITION OF INTERFACE CARBIDE / MATRIX IS   0.39368370E-06
 U-FRACTION IN SYSTEM:  C = .0278045741427574  CR = .149761222649802
                        FE = .850238777480705
 TOTAL SIZE OF SYSTEM:  4.93068569406E-18 [m^3]
  CPU time used in timestep                    1  seconds
 2.273791115955303E-008        2.274294268683420E-008        2.269665075037888E-008        1.473090656995474E-008        1.327507618347487E-
008        1.072170431932875E-008        6.052324004763496E-009        6.050923875924521E-009        7.828035657731571E-
010        1.529672638853664E-016       TIME =   7015.3212     DT =   800.00000     SUM OF SQUARES =  0.32166961E-16
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.77221693E-13 AND  -0.77221693E-13
 POSITION OF INTERFACE CARBIDE / MATRIX IS   0.39362193E-06
```

```
 U-FRACTION IN SYSTEM:  C = .0278045711605603  CR = .14976122253633
                        FE = .850238777594177
 TOTAL SIZE OF SYSTEM:  4.93068569406E-18 [m^3]
  2  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: MATRIX

  CPU time used in timestep                    1  seconds
 7.498872074462225E-009        7.499583350637715E-009        7.474637936974678E-009        4.798597276766772E-009        4.699672603772302E-
009        4.435257557809628E-009        3.992242270087134E-009        3.994347546230775E-009        3.121899460163433E-
009        1.735516641033211E-009        1.783617777939991E-010        4.266439313867035E-014        4.942555297317298E-
020       TIME =   7815.3212     DT =   800.00000     SUM OF SQUARES =  0.49128237E-19
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.55609981E-13 AND   0.55609981E-13
 POSITION OF INTERFACE CARBIDE / MATRIX IS   0.39366641E-06
 U-FRACTION IN SYSTEM:  C = .0278045718693421  CR = .149761222536683
                        FE = .850238777593824
 TOTAL SIZE OF SYSTEM:  4.93068569406E-18 [m^3]
  30  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: CARBIDE

  CPU time used in timestep                    1  seconds
 4.540520188412860E-008        4.540422609731397E-008        4.565368229203065E-008        2.167037238033167E-008        2.150611328750977E-
008        2.116885212786793E-008        2.051269756755002E-008        2.051039107235970E-008        1.922150641194746E-
008        1.677392563020693E-008        1.237154982216541E-008        1.237235227866483E-008        5.577643993147913E-
009        2.423841833983940E-012        6.004102742837816E-
019       TIME =   8000.0000     DT =   184.67878     SUM OF SQUARES =  0.59047825E-18
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.32313253E-12 AND   0.32313253E-12
 POSITION OF INTERFACE CARBIDE / MATRIX IS   0.39372609E-06
 U-FRACTION IN SYSTEM:  C = .0278045713957348  CR = .149761222535494
                        FE = .850238777595013
 TOTAL SIZE OF SYSTEM:  4.93068569406E-18 [m^3]
 MUST SAVE WORKSPACE ON FILE
 WORKSPACE SAVED ON FILE
 RECLAIMING WORKSPACE
 DELETING TIME-RECORD FOR TIME    59.256552
 DELETING TIME-RECORD FOR TIME    73.143953
 DELETING TIME-RECORD FOR TIME    73.143963
 DELETING TIME-RECORD FOR TIME    73.143983
 DELETING TIME-RECORD FOR TIME    73.144023
 DELETING TIME-RECORD FOR TIME    73.144103
 DELETING TIME-RECORD FOR TIME    73.144263
 DELETING TIME-RECORD FOR TIME    73.144583
 DELETING TIME-RECORD FOR TIME    73.145223
 DELETING TIME-RECORD FOR TIME    73.146503
 DELETING TIME-RECORD FOR TIME    73.149063
 DELETING TIME-RECORD FOR TIME    73.154183
 DELETING TIME-RECORD FOR TIME    73.164423
 DELETING TIME-RECORD FOR TIME    73.184903
 DELETING TIME-RECORD FOR TIME    73.225863
 DELETING TIME-RECORD FOR TIME    73.307783
 DELETING TIME-RECORD FOR TIME    73.471623
 DELETING TIME-RECORD FOR TIME    73.799303
 DELETING TIME-RECORD FOR TIME    74.454663
 DELETING TIME-RECORD FOR TIME    75.765383
 DELETING TIME-RECORD FOR TIME    78.386823
 DELETING TIME-RECORD FOR TIME    83.629703
 DELETING TIME-RECORD FOR TIME    94.115463
 DELETING TIME-RECORD FOR TIME    115.08698
 DELETING TIME-RECORD FOR TIME    157.03002
 DELETING TIME-RECORD FOR TIME    240.91610
 DELETING TIME-RECORD FOR TIME    408.68826
 DELETING TIME-RECORD FOR TIME    744.23258
 DELETING TIME-RECORD FOR TIME    1415.3212
 DELETING TIME-RECORD FOR TIME    2215.3212
 DELETING TIME-RECORD FOR TIME    3015.3212
 DELETING TIME-RECORD FOR TIME    3815.3212
 DELETING TIME-RECORD FOR TIME    4615.3212
 DELETING TIME-RECORD FOR TIME    5415.3212
 DELETING TIME-RECORD FOR TIME    6215.3212
 DELETING TIME-RECORD FOR TIME    7015.3212

 KEEPING TIME-RECORD FOR TIME    7815.3212
 AND FOR TIME                    8000.0000
 WORKSPACE RECLAIMED

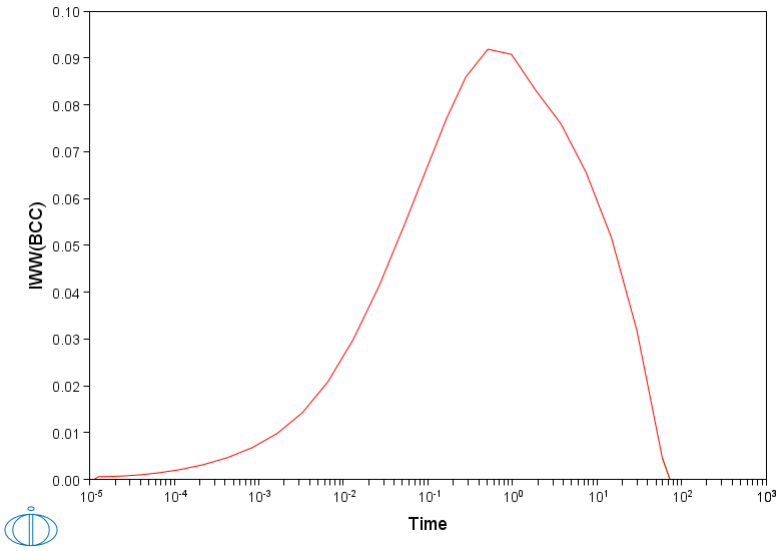
 TIMESTEP AT     8000.00000     SELECTED

DIC>
DIC> set-inter
 --OK---
DIC>
```

exb3-plot

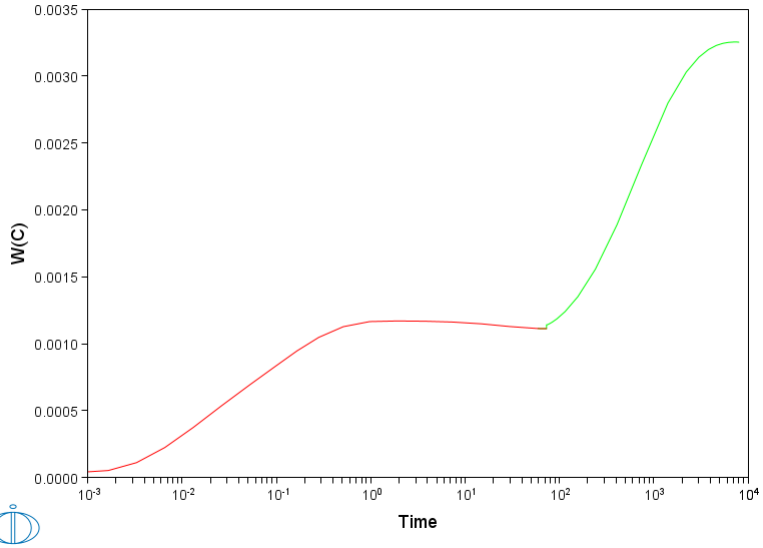
```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb3\plot.DCM.test"
DIC>
DIC>
DIC> @@ exb3_plot.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR GENERATING GRAPHICAL OUTPUT FOR EXAMPLE b3
DIC> @@
DIC>
DIC> @@
DIC> @@ ENTER THE DICTRA MODULE AND SPECIFY THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  8.00000E+03
DIC> read exb3
 OK
DIC>
DIC> @@
DIC> @@ ENTER THE DICTRA POST PROCESSOR
DIC> @@
DIC> post
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1: @@
POST-1: @@ LET US SEE HOW THE AMOUNT OF FERRITE VARIED DURING THE
POST-1: @@ SIMULATION
POST-1: @@
POST-1: s-d-a y iww(bcc)
POST-1: s-d-a x time
  INFO: Time is set as independent variable
POST-1: s-ax-typ x log
POST-1: s-s-s x n 1E-5 1E3
POST-1: s-s-s y n 0 0.1
POST-1:
POST-1: set-tit Figure b3.1
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
WORKING ...
WORKING ...           OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

Figure b3.1



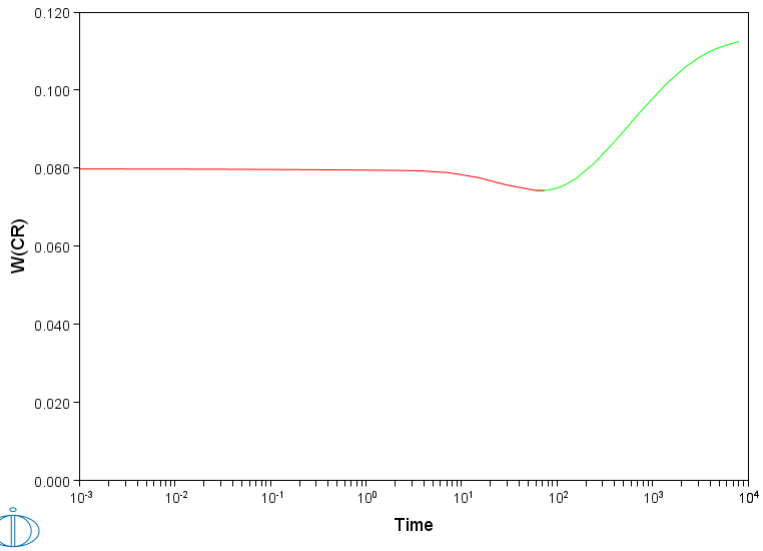

```
POST-1:
POST-1:
POST-1:@?<_hit_return_to_continue_>
POST-1:
POST-1: @@
POST-1: @@ NOW LOOK AT THE ALLOYING ELEMENTS AT THE UPPER BOUND OF THE SYSTEM
POST-1: @@
POST-1: s-d-a y w(c)
POST-1: s-s-s x n 1E-3 1E4
POST-1: s-p-c interface last
POST-1:
POST-1: set-tit Figure b3.2
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
WORKING ...
WORKING ...           OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

Figure b3.2



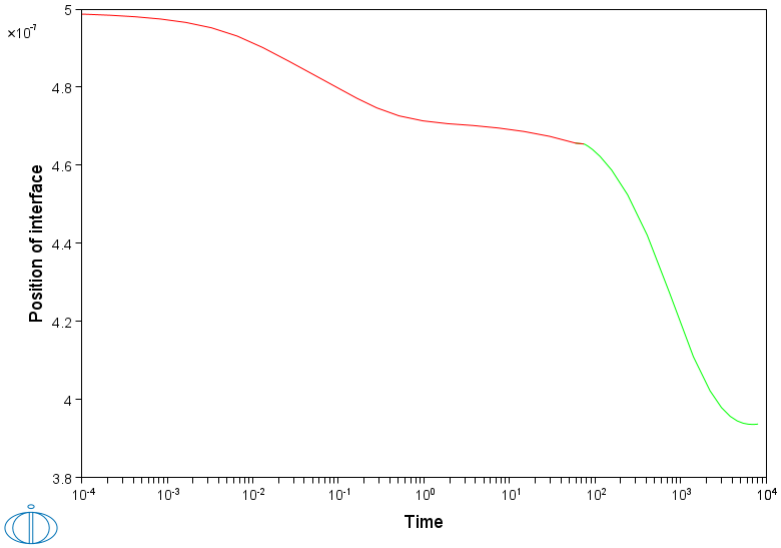

```
POST-1:
POST-1:
POST-1:@?<_hit_return_to_continue_>
POST-1:
POST-1: s-d-a y w(cr)
POST-1: s-s-s y n 0 0.12
POST-1:
POST-1: set-tit Figure b3.3
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
WORKING ...
WORKING ...           OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

Figure b3.3




```
POST-1:
POST-1:
POST-1:@?<_hit_return_to_continue_>
POST-1:
POST-1: @@
POST-1: @@ AND FINALLY LOOK AT THE CHANGE OF RADIUS OF THE M23-CARBIDE
POST-1: @@
POST-1: s-d-a y position carbide upper
POST-1: s-s-s x n 1E-4 1E4
POST-1:
POST-1: set-tit Figure b3.4
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
WORKING ...
WORKING ...           OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

Figure b3.4

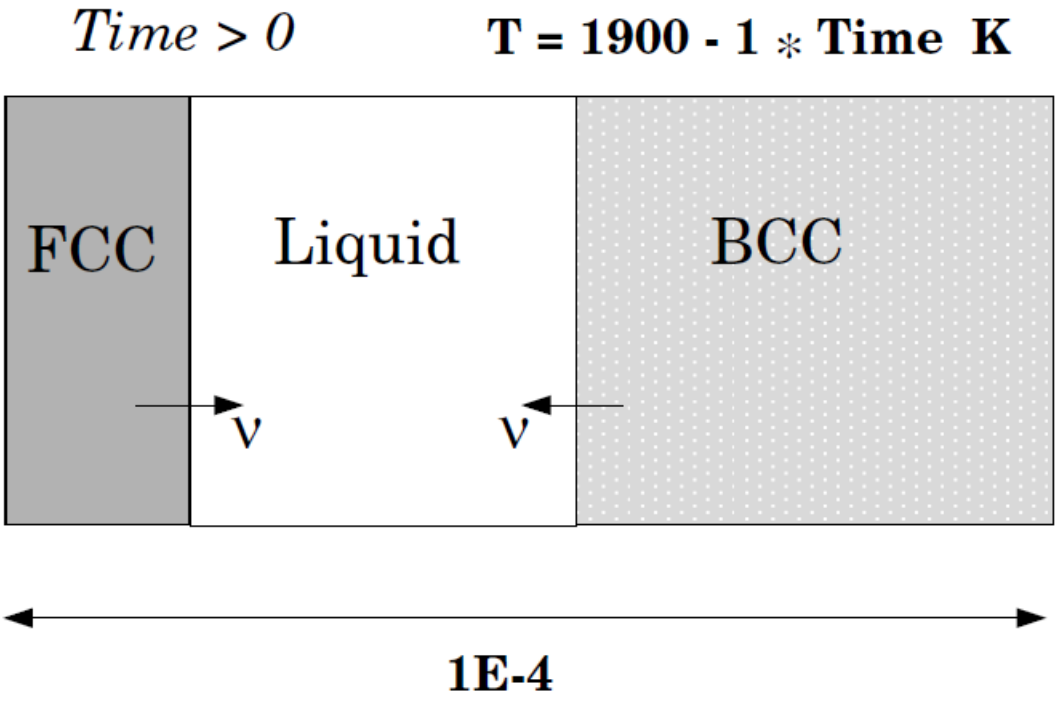



```
POST-1:
POST-1:
POST-1:@?<_hit_return_to_continue_>
POST-1:
POST-1:
POST-1: set-inter
 --OK---
POST-1:
```

Example exb4a

Solidification path of a Fe-18%Cr-8%Ni alloy: Eutectic reaction

This example demonstrates the solidification path of an Fe-18%Cr-8%Ni alloy. A eutectic reaction is assumed, LIQUID -> BCC + FCC. Hence the BCC and FCC regions should be on separate sides of the liquid region. Comparison is made with both a Scheil-Gulliver simulation and equilibrium solidification conditions, both made with Thermo-Calc.



exb4a-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb4a\setup.DCM.test"
SYS: @@
SYS: @@ Moving boundary problem.
SYS: @@ Solidification path of an Fe-18%Cr-8%Ni alloy: Eutectic reaction
SYS: @@ This example demonstrates the solidification path of an Fe-18%Cr-8%Ni
SYS: @@ alloy. A eutectic reaction is assumed, LIQUID -> BCC + FCC. Hence the
SYS: @@ BCC and FCC regions should be on separate sides of the liquid region.
SYS: @@ Comparison is made with both a Scheil-Gulliver simulation and equilibrium
SYS: @@ solidification conditions, both done in Thermo-Calc.
SYS: @@----------------------------------------------------------------------
SYS:
SYS: @@ exb4a_setup.DCM
SYS:
SYS:
SYS: @@
SYS: @@ START BY GOING TO THE DATABASE MODULE
SYS: @@
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                     /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12:
TDB_TCFE12: @@ USE A THERMODYNAMIC DATABASE TO RETRIEVE DATA
TDB_TCFE12: sw tcfe9
 Current database: Steels/Fe-Alloys  v9.3

 VA                     /-  DEFINED
 L12_FCC                B2_BCC                 DICTRA_FCC_A1
   REJECTED
TDB_TCFE9:
TDB_TCFE9: @@ DEFINE THE SYSTEM TO WORK WITH
TDB_TCFE9: def-sys fe ni cr
 FE                     NI                     CR
   DEFINED
TDB_TCFE9:
TDB_TCFE9: @@ EXCLUDE THE THERMODYNAMIC DATA FOR THE PHASES THAT ARE NOT NEEDED
TDB_TCFE9: rej ph /all
 LIQUID:L               BCC_A2                 FCC_A1
 HCP_A3                 CBCC_A12               CUB_A13
 SIGMA                  CHI_A12                LAVES_PHASE_C14
 CR3SI                  NBNI3                  NI3TI
 CRZN17                 BETA1                  GAMMA
 AL5FE4                 CENI2                  CENI5
   REJECTED
TDB_TCFE9: res ph fcc liq bcc
 FCC_A1                 LIQUID:L               BCC_A2
   RESTORED
TDB_TCFE9:
TDB_TCFE9: @@ RETRIEVE DATA FROM THE DATABASE FILE
TDB_TCFE9: get
09:25:59,252 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_TCFE9:
TDB_TCFE9: @@
TDB_TCFE9: @@ MOBILITY/DIFFUSIVITY DATA ARE STORED IN A SEPARATE DATABASE FILE.
TDB_TCFE9: @@ SWITCH TO A MOBILITY DATABASE AND APPEND THE DATA
TDB_TCFE9: @@
TDB_TCFE9: app
 Use one of these databases

 TCFE12  =  Steels/Fe-Alloys  v12.0
 TCFE9   =  Steels/Fe-Alloys  v9.3
 SSUB6   =  SGTE Substances  v6.0
 FEDEMO  =  Iron Demo Database v6.0
 MOB2    =  Alloys Mobility  v2.7
 MOBFE7  =  Steels/Fe-Alloys Mobility  v7.1
 MOBFE4  =  Steels/Fe-Alloys Mobility  v4.0
 MOBFE2  =  Steels/Fe-Alloys Mobility  v2.0
 MFEDEMO =  Fe-Alloys Mobility demo database v5.0
 USER    =  User defined Database

DATABASE NAME /TCFE9/: mobfe4
 Current database: Steels/Fe-Alloys Mobility  v4.0

 VA  DEFINED
 B2_BCC  REJECTED
APP: def-sys fe ni cr
 FE                     NI                     CR
   DEFINED
APP: rej ph /all
 BCC_A2                 FCC_A1                 HCP_A3
 LIQUID:L  REJECTED
```

```
APP: res ph fcc liq bcc
 FCC_A1                  LIQUID:L                BCC_A2
   RESTORED
APP: get
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
APP:
APP: @@
APP: @@ ENTER THE DICTRA MONITOR WHERE THE SYSTEM IS SET UP
APP: @@
APP: go d-m
 NO TIME STEP DEFINED
DIC>
DIC> @@
DIC> @@ ENTER GLOBAL CONDITION T
DIC> @@
DIC> @@ LOWER THE TEMPERATURE TO A RATE OF 1 K/s
DIC> @@
DIC> set-cond glob T 0 1900-1*TIME; * N
DIC>
DIC> @@
DIC> @@ ENTER A REGION CALLED smalta
DIC> @@
DIC> enter-region smalta
DIC>
DIC> @@
DIC> @@ ENTER A DOUBLE GEOMETRIC GRID INTO THE REGION
DIC> @@
DIC> enter-grid
REGION NAME : /SMALTA/: smalta
WIDTH OF REGION /1/: 1e-4
TYPE /AUTO/: AUTO
DIC>
DIC>
DIC> @@
DIC> @@ ENTER active PHASES INTO THE REGION
DIC> @@
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: act
REGION NAME : /SMALTA/: smalta
PHASE TYPE /MATRIX/: matrix
PHASE NAME: /NONE/: liq
DIC>
DIC> @@
DIC> @@ ENTER inactive PHASES INTO THE REGION: ONE PHASE ON EACH SIDE OF THE LIQUID
DIC> @@
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: inact
ATTACH TO REGION NAMED /SMALTA/: smalta
ATTACHED TO THE RIGHT OF SMALTA /YES/: no
PHASE NAME: /NONE/: fcc#1
DEPENDENT COMPONENT ? /NI/: fe
 REQUIRED DRIVING FORCE FOR PRECIPITATION: /1E-05/: 1e-5
CONDITION TYPE /CLOSED_SYSTEM/: closed
DIC>
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: inact
ATTACH TO REGION NAMED /SMALTA/: smalta
ATTACHED TO THE RIGHT OF SMALTA /YES/: yes
PHASE NAME: /NONE/: bcc#1
DEPENDENT COMPONENT ? /NI/: fe
 REQUIRED DRIVING FORCE FOR PRECIPITATION: /1E-05/: 1e-5
CONDITION TYPE /CLOSED_SYSTEM/: closed
DIC>
DIC> @@
DIC> @@ ENTER A START COMPOSITION FOR THE LIQUID
DIC> @@
DIC> enter-composition
REGION NAME : /SMALTA/: smalta
PHASE NAME: /LIQUID/: liq
DEPENDENT COMPONENT ? /NI/: fe
COMPOSITION TYPE /MOLE_FRACTION/: w-p
PROFILE FOR /CR/: cr lin 18 18
PROFILE FOR /NI/: ni lin  8  8
DIC>
DIC> @@
DIC> @@ THE BOUNDARY CONDITION IS A CLOSED SYSTEM (THE DEFAULT) AS WE DO NOT SPECIFY
DIC> @@ ANYTHING ELSE.
DIC> @@
DIC>
DIC> @@
DIC> @@ SET THE SIMULATION TIME
DIC> @@
DIC> set-simulation-time
END TIME FOR INTEGRATION /.1/: 200
AUTOMATIC TIMESTEP CONTROL /YES/:
MAX TIMESTEP DURING INTEGRATION /20/:
INITIAL TIMESTEP : /1E-07/:
SMALLEST ACCEPTABLE TIMESTEP : /1E-07/:
DIC>
DIC>
DIC> @@
DIC> @@ CHECK THE INTERFACE POSITION. THIS IS TO MAKE SURE THAT THE
DIC> @@ LIQUID REGION DOES NOT SHRINK TOO MUCH DURING A TIMESTEP.
DIC> @@ IN ADDITION THE TIMESTEP IS CONTROLLED BY THE PHASE INTERFACE
DIC> @@ DISPLACEMENT DURING THE SIMULATION.
DIC> @@
DIC> set-option CHECK_INTERFACE_POSITION AUTO
DIC>
DIC> @@
DIC> @@ SAVE THE SET UP TO A NEW STORE FILE AND EXIT
DIC> @@
DIC> save exb4a Y
```

```
DIC>
DIC> set-inter
 --OK---
DIC>
```

exb4a-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb4a\run.DCM.test"
DIC>
DIC>
DIC> @@ exb4a_run.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR RUNNING EXAMPLE b4a
DIC> @@
DIC>
DIC> @@
DIC> @@ ENTER THE DICTRA MONITOR AND READ THE SET UP FROM FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  0.00000E+00
DIC> read exb4a
 OK
DIC>
DIC> @@
DIC> @@ START THE SIMULATION
DIC> @@
DIC> sim yes
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 Region: SMALTA
 geometric    1.18976     dense at    0.00000       35 points
 geometric   0.840507     dense at   0.100000E-03   36 points
 DEGREE OF IMPLICITY SET TO TRAPEZOIDAL RULE
 INFO: TIMESTEP IS CONTROLLED BY INTERFACE POSITION
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882255
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882255
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
 TIME =  0.10000000E-06 DT =  0.10000000E-06 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882255
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    1  seconds
 TIME =  0.24203913E-05 DT =  0.23203913E-05 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882255
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.70611740E-05 DT =  0.46407827E-05 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882255
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.16342739E-04 DT =  0.92815654E-05 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219291
                        NI = .0754116207882255
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.34905870E-04 DT =  0.18563131E-04 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882255
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.72032132E-04 DT =  0.37126261E-04 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882255
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.14628465E-03 DT =  0.74252523E-04 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882255
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.29478970E-03 DT =  0.14850505E-03 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882255
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.59179979E-03 DT =  0.29701009E-03 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882255
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.11858200E-02 DT =  0.59402018E-03 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219291
                        NI = .0754116207882255
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    1  seconds
 TIME =  0.23738603E-02 DT =  0.11880404E-02 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219291
                        NI = .0754116207882255
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.47499411E-02 DT =  0.23760807E-02 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219291
                        NI = .0754116207882255
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.95021025E-02 DT =  0.47521615E-02 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219291
                        NI = .0754116207882255
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.19006425E-01 DT =  0.95043229E-02 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219291
                        NI = .0754116207882256
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.38015071E-01 DT =  0.19008646E-01 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219291
                        NI = .0754116207882257
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.76032363E-01 DT =  0.38017292E-01 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219291
```

```
                        NI = .0754116207882257
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.15206695     DT =  0.76034583E-01 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992482  FE = .733068011219292
                        NI = .0754116207882255
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.30413611     DT =  0.15206917     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992484  FE = .73306801121929
                        NI = .0754116207882264
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.60827445     DT =  0.30413833     SUM OF SQUARES =   0.0000000


output ignored...



... output resumed

 5.543270322271154E-006        5.544173845217362E-006        5.539530593459761E-006        7.061524512651161E-010        2.280550909456736E-
013        3.034903007197800E-018       TIME =   178.38255     DT =   1.3107200     SUM OF SQUARES =  0.30338114E-17
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.60216105E-07 AND  -0.60216105E-07
 POSITION OF INTERFACE R_FCC_A1 / R_BCC_A2 IS   0.70818495E-05
 U-FRACTION IN SYSTEM:  CR = .191501330835445  FE = .733100579434577
                        NI = .0753980897299784
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  1  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: R_BCC_A2

  CPU time used in timestep                    2  seconds
 1.085376112004534E-005        1.085370974966661E-005        1.084765331327788E-005        3.803631597410233E-007        4.061474780595567E-
011        4.160432483486906E-016        7.055238181208622E-
021       TIME =   181.00399     DT =   2.6214400     SUM OF SQUARES =  0.70255315E-20
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.44136273E-07 AND  -0.44136273E-07
 POSITION OF INTERFACE R_FCC_A1 / R_BCC_A2 IS   0.69661489E-05
 U-FRACTION IN SYSTEM:  CR = .191501330866574  FE = .733100579364889
                        NI = .0753980897685371
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  1  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: R_BCC_A2

  CPU time used in timestep                    1  seconds
 7.979343200932933E-006        7.979494719985317E-006        7.976002782443565E-006        1.001429953461906E-006        1.857936952047457E-
007        1.576836017045381E-012        8.196669796589744E-
017       TIME =   186.24687     DT =   5.2428800     SUM OF SQUARES =  0.78903957E-16
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.17822228E-07 AND  -0.17822228E-07
 POSITION OF INTERFACE R_FCC_A1 / R_BCC_A2 IS   0.68727091E-05
 U-FRACTION IN SYSTEM:  CR = .191501330895143  FE = .733100579277545
                        NI = .0753980898273121
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  1  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: R_BCC_A2

  CPU time used in timestep                    1  seconds
 5.768173406759305E-006        5.768329088328217E-006        5.766672115600760E-006        2.371722673285380E-006        1.575103492713816E-
006        3.673541242359077E-007        4.593062247364313E-011        4.812447212595851E-015        5.757384615334350E-
019       TIME =   196.73263     DT =   10.485760     SUM OF SQUARES =  0.45657184E-18
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.21741715E-07 AND   0.21741715E-07
 POSITION OF INTERFACE R_FCC_A1 / R_BCC_A2 IS   0.71006875E-05
 U-FRACTION IN SYSTEM:  CR = .191501330871388  FE = .733100579631107
                        NI = .0753980894975045
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    2  seconds
 1.329302603290146E-005        1.329324238413945E-005        1.328788777441931E-005        7.789724246879337E-008        1.599690864768761E-
011        4.762076981838742E-018       TIME =   200.00000     DT =   3.2673667     SUM OF SQUARES =  0.45950953E-17
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.13847055E-07 AND   0.13847055E-07
 POSITION OF INTERFACE R_FCC_A1 / R_BCC_A2 IS   0.71459310E-05
 U-FRACTION IN SYSTEM:  CR = .191501330826532  FE = .733100579848133
                        NI = .0753980893253357
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
 MUST SAVE WORKSPACE ON FILE
 WORKSPACE SAVED ON FILE
 RECLAIMING WORKSPACE
 DELETING TIME-RECORD FOR TIME    175.56317
 DELETING TIME-RECORD FOR TIME    175.76112
 DELETING TIME-RECORD FOR TIME    175.76113
 DELETING TIME-RECORD FOR TIME    175.76115
 DELETING TIME-RECORD FOR TIME    175.76119
 DELETING TIME-RECORD FOR TIME    175.76127
 DELETING TIME-RECORD FOR TIME    175.76143
 DELETING TIME-RECORD FOR TIME    175.76175
 DELETING TIME-RECORD FOR TIME    175.76239
 DELETING TIME-RECORD FOR TIME    175.76367
 DELETING TIME-RECORD FOR TIME    175.76623
 DELETING TIME-RECORD FOR TIME    175.77135
 DELETING TIME-RECORD FOR TIME    175.78159
 DELETING TIME-RECORD FOR TIME    175.80207
 DELETING TIME-RECORD FOR TIME    175.84303
 DELETING TIME-RECORD FOR TIME    175.92495
 DELETING TIME-RECORD FOR TIME    176.08879
 DELETING TIME-RECORD FOR TIME    176.41647
 DELETING TIME-RECORD FOR TIME    177.07183
 DELETING TIME-RECORD FOR TIME    178.38255
 DELETING TIME-RECORD FOR TIME    181.00399
 DELETING TIME-RECORD FOR TIME    186.24687

 KEEPING TIME-RECORD FOR TIME    196.73263
 AND FOR TIME                    200.00000
 WORKSPACE RECLAIMED

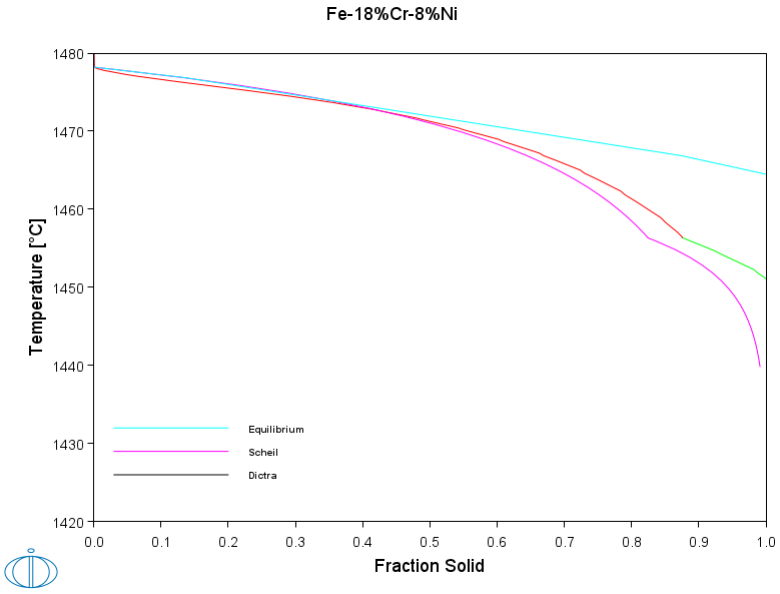
 TIMESTEP AT     200.000000     SELECTED

DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC> @@
DIC> @@ THE SIMULATION IS FINISHED
```

```
DIC> @@
DIC>
DIC> set-inter
 --OK---
DIC>
```

exb4a-plot

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb4a\plot.DCM.test"
DIC>
DIC>
DIC> @@ exb4a_plot.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR GENERATING GRAPHICAL OUTPUT FOR EXAMPLE b4a
DIC> @@
DIC>
DIC> @@
DIC> @@ GO TO THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  2.00000E+02
DIC> read exb4a
 OK
DIC>
DIC> @@
DIC> @@ GO TO THE POST PROCESSOR
DIC> @@
DIC> post
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1: set-title Fe-18%Cr-8%Ni
POST-1:
POST-1: @@
POST-1: @@ PLOT THE FRACTION OF SOLID AND COMPARE WITH A SCHEIL-GULLIVER SIMULATION
POST-1: @@ AND EQUILIBRIUM SOLIDIFICATION (DATA ON FILE exb4.exp)
POST-1: @@
POST-1: enter function fs=1-ivv(liquid);
POST-1: s-d-a x fs
POST-1: s-s-s x n 0 1
POST-1: set-axis-text
AXIS (X, Y OR Z) : x
AUTOMATIC AXIS TEXT  (Y OR N) /N/: n
AXIS TEXT : Fraction Solid
POST-1:
POST-1: s-d-a y t-c
POST-1: s-s-s y n 1420 1480
POST-1:
POST-1: s-p-c interface smalta lower
POST-1:
POST-1: app y exb4a.exp 0; 1
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
WORKING ...working ...
WORKING ...working ...           OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

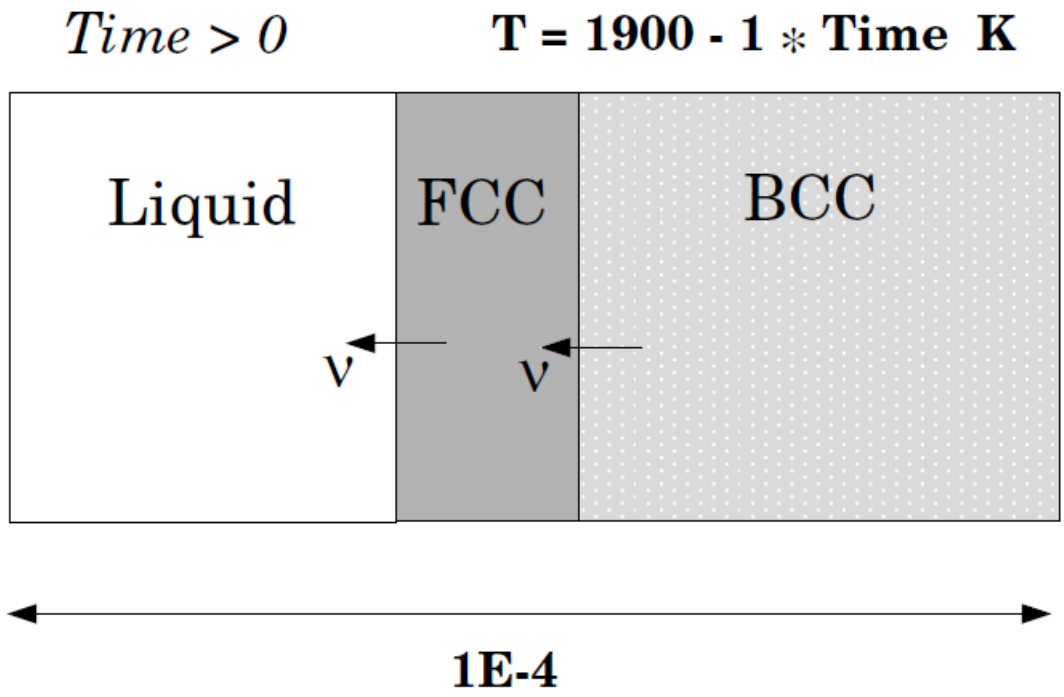



```
POST-1:
POST-1:
POST-1: set-inter
 --OK---
POST-1:
```

Example exb4b

Solidification path of an Fe-18%Cr-8%Ni alloy: Peritectic reaction

This example is the same as exb4a but now a peritectic reaction is assumed, LIQUID + BCC -> FCC. Hence the FCC region should appear in between the LIQUID and the BCC. Comparison is made with both a Scheil-Gulliver simulation and equilibrium solidification conditions, both made with Thermo-Calc.



exb4b-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb4b\setup.DCM.test"
SYS: @@
SYS: @@ Moving boundary problem.
SYS: @@ Solidification path of an Fe-18%Cr-8%Ni alloy: Peritectic reaction
SYS: @@ This example is the same as exb4a but now a peritectic reaction is assumed:
SYS: @@ LIQUID + BCC -> FCC. Hence the FCC region should appear in between the LIQUID
SYS: @@ and the BCC. Comparison is made with both a Scheil-Gulliver simulation and
SYS: @@ equilibrium solidification conditions, both done in Thermo-Calc.
SYS: @@----------------------------------------------------------------------
SYS:
SYS: @@ exb4b_setup.DCM
SYS:
SYS:
SYS: @@
SYS: @@ START BY GOING TO THE DATABASE MODULE
SYS: @@
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                       /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12:
TDB_TCFE12: @@ USE A THERMODYNAMIC DATABASE TO RETRIEVE DATA
TDB_TCFE12: sw fedemo
 Current database: Iron Demo Database v6.0

 VA                       /-  DEFINED
TDB_FEDEMO:
TDB_FEDEMO: @@ DEFINE THE SYSTEM TO WORK WITH
TDB_FEDEMO: def-sys fe ni cr
 FE                       NI                       CR
   DEFINED
TDB_FEDEMO:
TDB_FEDEMO: @@ EXCLUDE THE THERMODYNAMIC DATA FOR THE PHASES THAT ARE NOT NEEDED
TDB_FEDEMO: rej ph /all
 GAS:G                    LIQUID:L                 BCC_A2
 C14_LAVES                CBCC_A12                 CHI_A12
 CUB_A13                  FCC_A1                   HCP_A3
 SIGMA_D8B  REJECTED
TDB_FEDEMO: res ph fcc liq bcc
 FCC_A1                   LIQUID:L                 BCC_A2
   RESTORED
TDB_FEDEMO:
TDB_FEDEMO: @@ RETRIEVE DATA FROM THE DATABASE FILE
TDB_FEDEMO: get
09:31:42,041 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ MOBILITY/DIFFUSIVITY DATA ARE STORED IN A SEPARATE DATABASE FILE.
TDB_FEDEMO: @@ SWITCH TO A MOBILITY DATABASE AND APPEND THE DATA.
TDB_FEDEMO: @@
TDB_FEDEMO: app
 Use one of these databases

 TCFE12  =  Steels/Fe-Alloys  v12.0
 TCFE9   =  Steels/Fe-Alloys  v9.3
 SSUB6   =  SGTE Substances  v6.0
 FEDEMO  =  Iron Demo Database v6.0
 MOB2    =  Alloys Mobility  v2.7
 MOBFE7  =  Steels/Fe-Alloys Mobility  v7.1
 MOBFE4  =  Steels/Fe-Alloys Mobility  v4.0
 MOBFE2  =  Steels/Fe-Alloys Mobility  v2.0
 MFEDEMO =  Fe-Alloys Mobility demo database v5.0
 USER    =  User defined Database

DATABASE NAME /FEDEMO/: mobfe4
 Current database: Steels/Fe-Alloys Mobility  v4.0

 VA  DEFINED
 B2_BCC  REJECTED
APP: def-sys fe ni cr
 FE                       NI                       CR
   DEFINED
APP: rej ph /all
 BCC_A2                   FCC_A1                   HCP_A3
 LIQUID:L  REJECTED
APP: res ph fcc liq bcc
 FCC_A1                   LIQUID:L                 BCC_A2
   RESTORED
APP: get
 ELEMENTS .....
 SPECIES ......
```

```
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
APP:
APP: @@
APP: @@ ENTER THE DICTRA MONITOR WHERE THE SYSTEM IS SET UP
APP: @@
APP: go d-m
 NO TIME STEP DEFINED
DIC>
DIC> @@
DIC> @@ ENTER GLOBAL CONDITION T
DIC> @@
DIC> @@ LOWER THE TEMPERATURE TO A RATE OF 1 K/s
DIC> @@
DIC> set-cond glob T 0 1900-1*TIME; * N
DIC>
DIC> @@
DIC> @@ ENTER A REGION CALLED smalta
DIC> @@
DIC> enter-region smalta
DIC>
DIC> @@
DIC> @@ ENTER A GEOMETRIC GRID INTO THE REGION
DIC> @@
DIC> enter-grid
REGION NAME : /SMALTA/: smalta
WIDTH OF REGION /1/: 1e-4
TYPE /AUTO/: AUTO
DIC>
DIC> @@
DIC> @@ ENTER active PHASES INTO THE REGION
DIC> @@
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: act
REGION NAME : /SMALTA/: smalta
PHASE TYPE /MATRIX/: matrix
PHASE NAME: /NONE/: liq
DIC>
DIC> @@
DIC> @@ ENTER inactive PHASES INTO THE REGION, WITH BOTH PHASES ON THE SAME
DIC> @@ SIDE OF THE LIQUID REGION IN ORDER TO GET A PERITECTIC REACTION.
DIC> @@
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: inact
ATTACH TO REGION NAMED /SMALTA/: smalta
ATTACHED TO THE RIGHT OF SMALTA /YES/: yes
PHASE NAME: /NONE/: fcc#1
DEPENDENT COMPONENT ? /NI/: fe
 REQUIRED DRIVING FORCE FOR PRECIPITATION: /1E-05/: 1e-5
CONDITION TYPE /CLOSED_SYSTEM/: closed
DIC>
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: inact
ATTACH TO REGION NAMED /SMALTA/: smalta
ATTACHED TO THE RIGHT OF SMALTA /YES/: yes
PHASE NAME: /NONE/: bcc#1
DEPENDENT COMPONENT ? /NI/: fe
 REQUIRED DRIVING FORCE FOR PRECIPITATION: /1E-05/: 1e-5
CONDITION TYPE /CLOSED_SYSTEM/: closed
DIC>
DIC> @@
DIC> @@ ENTER THE START COMPOSITION FOR THE LIQUID
DIC> @@
DIC> enter-composition
REGION NAME : /SMALTA/: smalta
PHASE NAME: /LIQUID/: liq
DEPENDENT COMPONENT ? /NI/: fe
COMPOSITION TYPE /MOLE_FRACTION/: w-p
PROFILE FOR /CR/: cr lin 18 18
PROFILE FOR /NI/: ni lin  8  8
DIC>
DIC> @@
DIC> @@ THE BOUNDARY CONDITION IS A CLOSED SYSTEM (DEFAULT) AS WE DO NOT SPECIFY
DIC> @@ ANYTHING ELSE.
DIC> @@
DIC>
DIC> @@
DIC> @@ SET THE SIMULATION TIME
DIC> @@
DIC> set-simulation-time
END TIME FOR INTEGRATION /.1/: 200
AUTOMATIC TIMESTEP CONTROL /YES/:
MAX TIMESTEP DURING INTEGRATION /20/:
INITIAL TIMESTEP : /1E-07/:
SMALLEST ACCEPTABLE TIMESTEP : /1E-07/:
DIC>
DIC>
DIC>
DIC> @@
DIC> @@ CHECK THE INTERFACE POSITION. THIS IS TO MAKE SURE THAT THE LIQUID REGION
DIC> @@ DOES NOT SHRINK TOO MUCH DURING A TIMESTEP. IN ADDITION, THE TIMESTEP IS
DIC> @@ CONTROLLED BY THE PHASE INTERFACE DISPLACEMENT DURING THE SIMULATION.
DIC> @@
DIC> set-option CHECK_INTERFACE_POSITION yes
DIC>
DIC> @@
DIC> @@ SAVE THE SET UP TO A NEW STORE FILE AND EXIT
DIC> @@
DIC> save exb4b Y
DIC>
DIC> set-inter
 --OK---
DIC>
```

exb4b-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb4b\run.DCM.test"
DIC>
DIC> @@ exb4b_run.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR RUNNING EXAMPLE b4b
DIC> @@
DIC>
DIC> @@
DIC> @@ ENTER THE DICTRA MONITOR AND READ THE SET UP FROM FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  0.00000E+00
DIC> read exb4b
 OK
DIC>
DIC> @@
DIC> @@ START THE SIMULATION
DIC> @@
DIC> sim yes
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 Region: SMALTA
 geometric   0.833333     dense at   0.100000E-03   58 points
 DEGREE OF IMPLICITY SET TO TRAPEZOIDAL RULE
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882254
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882254
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
 TIME =  0.10000000E-06 DT =  0.10000000E-06 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882254
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.71732617E-05 DT =  0.70732617E-05 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882254
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    1  seconds
 TIME =  0.21319785E-04 DT =  0.14146523E-04 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882254
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.49612832E-04 DT =  0.28293047E-04 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882254
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.10619893E-03 DT =  0.56586093E-04 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882255
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.21937111E-03 DT =  0.11317219E-03 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882255
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.44571549E-03 DT =  0.22634437E-03 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882255
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.89840423E-03 DT =  0.45268875E-03 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882254
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.18037817E-02 DT =  0.90537750E-03 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882255
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.36145367E-02 DT =  0.18107550E-02 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882255
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    1  seconds
 TIME =  0.72360467E-02 DT =  0.36215100E-02 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882255
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.14479067E-01 DT =  0.72430200E-02 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882254
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.28965107E-01 DT =  0.14486040E-01 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882255
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.57937186E-01 DT =  0.28972080E-01 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882256
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.11588135     DT =  0.57944160E-01 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992482  FE = .733068011219292
                        NI = .0754116207882259
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.23176967     DT =  0.11588832     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219291
                        NI = .0754116207882257
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
```

```
 TIME =  0.46354630     DT =  0.23177664     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992484  FE = .73306801121929
                        NI = .0754116207882257
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.92709958     DT =  0.46355328     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992481  FE = .733068011219295
                        NI = .0754116207882247
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =   1.8542061     DT =  0.92710656     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992471  FE = .733068011219307
                        NI = .0754116207882217
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds


output ignored...



... output resumed


  CPU time used in timestep                    2  seconds
 5.177595140126708E-008        5.178834804410414E-008        5.138191894024953E-008        2.886814239295225E-009        2.723412029259016E-
009        2.348636655291367E-009        1.726157634176269E-009        1.721615066146570E-009        7.501988812431983E-
010        5.059921396570343E-014        1.835468130467389E-
019       TIME =   198.45743     DT =  0.65536000     SUM OF SQUARES =  0.18289841E-18
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.25727400E-08 AND  -0.25727400E-08
 POSITION OF INTERFACE R_FCC_A1 / R_BCC_A2 IS   0.10565288E-04
 U-FRACTION IN SYSTEM:  CR = .191110607673538  FE = .733546389277693
                        NI = .0753430030487688
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  1  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: R_BCC_A2

  CPU time used in timestep                    2  seconds
 1.314391124064929E-007        1.314463804600718E-007        1.316313914019020E-007        1.238637405936573E-007        1.233278546609284E-
007        1.223775491450601E-007        1.201347330734257E-007        1.201382985045189E-007        1.160248294687954E-
007        1.077637198778476E-007        9.238001353883692E-008        9.236277415201030E-008        6.495511499158848E-
008        2.482668259423956E-008        3.240751602488060E-015        3.722489168076573E-
022       TIME =   199.76815     DT =   1.3107200     SUM OF SQUARES =  0.18105038E-21
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.66845913E-08 AND   0.66845913E-08
 POSITION OF INTERFACE R_FCC_A1 / R_BCC_A2 IS   0.10574049E-04
 U-FRACTION IN SYSTEM:  CR = .191110607676421  FE = .733546389277113
                        NI = .075343003046466
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  30  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: R_FCC_A1

  CPU time used in timestep                    3  seconds
 1.659584620629872E-009        1.659742090425886E-009        1.669036589853826E-009        1.334869919961047E-009        1.322386576707223E-
009        1.297312615315943E-009        1.247934639504467E-009        1.247817011528530E-009        1.151997989892740E-
009        9.716792536821956E-010        6.570334161547245E-010        6.572262121131271E-010        2.118608423137509E-
010        2.518642199310578E-016        3.849941299576635E-
022       TIME =   200.00000     DT =  0.23184798     SUM OF SQUARES =  0.37986776E-21
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.30153282E-08 AND  -0.30153282E-08
 POSITION OF INTERFACE R_FCC_A1 / R_BCC_A2 IS   0.10573350E-04
 U-FRACTION IN SYSTEM:  CR = .191110607675968  FE = .733546389278522
                        NI = .0753430030455097
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
 MUST SAVE WORKSPACE ON FILE
 WORKSPACE SAVED ON FILE
 RECLAIMING WORKSPACE
 DELETING TIME-RECORD FOR TIME    193.98893
 DELETING TIME-RECORD FOR TIME    197.14672
 DELETING TIME-RECORD FOR TIME    197.14673
 DELETING TIME-RECORD FOR TIME    197.14675
 DELETING TIME-RECORD FOR TIME    197.14679
 DELETING TIME-RECORD FOR TIME    197.14687
 DELETING TIME-RECORD FOR TIME    197.14703
 DELETING TIME-RECORD FOR TIME    197.14735
 DELETING TIME-RECORD FOR TIME    197.14799
 DELETING TIME-RECORD FOR TIME    197.14927
 DELETING TIME-RECORD FOR TIME    197.15183
 DELETING TIME-RECORD FOR TIME    197.15695
 DELETING TIME-RECORD FOR TIME    197.16719
 DELETING TIME-RECORD FOR TIME    197.18767
 DELETING TIME-RECORD FOR TIME    197.22863
 DELETING TIME-RECORD FOR TIME    197.31055
 DELETING TIME-RECORD FOR TIME    197.47439
 DELETING TIME-RECORD FOR TIME    197.80207
 DELETING TIME-RECORD FOR TIME    198.45743

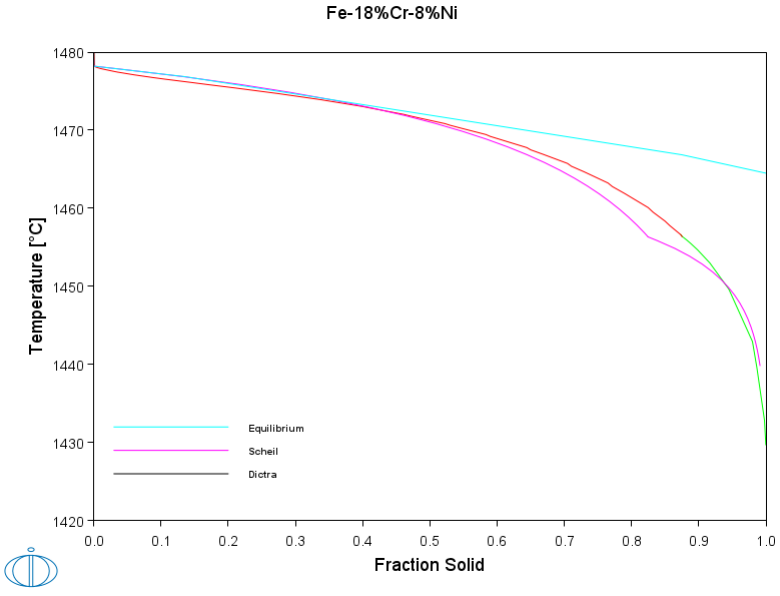
 KEEPING TIME-RECORD FOR TIME    199.76815
 AND FOR TIME                    200.00000
 WORKSPACE RECLAIMED

 TIMESTEP AT     200.000000     SELECTED

DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC> @@
DIC> @@ THE SIMULATION IS FINISHED
DIC> @@
DIC>
DIC> set-inter
 --OK---
DIC>
```

exb4b-plot

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb4b\plot.DCM.test"
DIC>
DIC>
DIC> @@ exb4b_plot.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR GENERATING GRAPHICAL OUTPUT FOR EXAMPLE b4b
DIC> @@
DIC>
DIC> @@
DIC> @@ GO TO THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  2.00000E+02
DIC> read exb4b
 OK
DIC>
DIC> @@
DIC> @@ GO TO THE POST PROCESSOR
DIC> @@
DIC> post
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1: set-title Fe-18%Cr-8%Ni
POST-1:
POST-1: @@
POST-1: @@ PLOT THE FRACTION OF SOLID AND COMPARE WITH A SCHEIL-GULLIVER
POST-1: @@ SIMULATION AND EQUILIBRIUM SOLIDIFICATION (DATA ON FILE exb4.exp)
POST-1: @@
POST-1: enter func fs=1-ivv(liquid);
POST-1: s-d-a x fs
POST-1: s-s-s x n 0 1
POST-1: s-ax-te x n Fraction Solid
POST-1:
POST-1: s-d-a y t-c
POST-1: s-s-s y n 1420 1480
POST-1:
POST-1: s-p-c interf smalta lower
POST-1:
POST-1: app y exb4b.exp 0; 1
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
WORKING ...working ...
WORKING ...working ...           OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

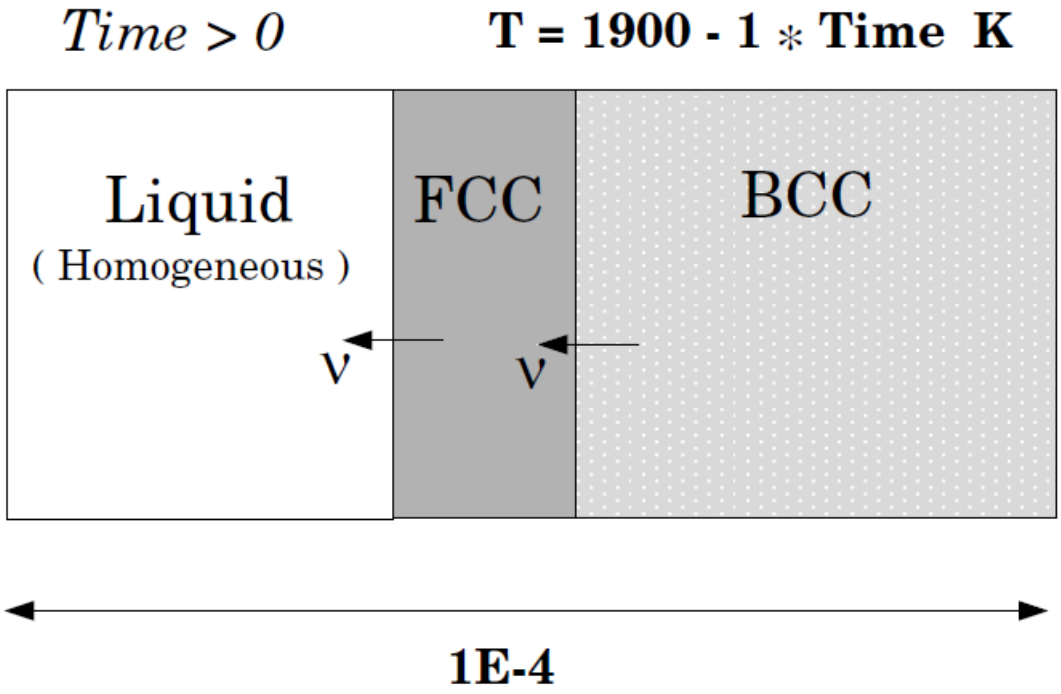



```
POST-1:
POST-1:
POST-1:
POST-1: set-inter
 --OK---
POST-1:
```

Example exb4c

Solidification path of an Fe-18%Cr-8%Ni alloy: Peritectic reaction, homogeneous liquid

This example is the same as exb4b but now the diffusivity data is amended for the LIQUID and a very high value for the diffusivity is used in order to simulate a case where we assume that the composition in the LIQUID is always homogeneous. This case should be considered less realistic than exb4b. Comparison is made with both a Scheil-Gulliver simulation and equilibrium solidification conditions, both made with Thermo-Calc.



exb4c-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb4c\setup.DCM.test"
SYS: @@
SYS: @@ Moving boundary problem.
SYS: @@ Solidification path of an Fe-18%Cr-8%Ni alloy
SYS: @@ This example is the same as exb4b but now the diffusivity data is amended
SYS: @@ for the LIQUID and a high value for the diffusivity is used to simulate a
SYS: @@ case where it is assumed that the composition in the LIQUID is always
SYS: @@ homogeneous. This example is less realistic than exb4b.
SYS: @@ Comparison is made with both a Scheil-Gulliver simulation and equilibrium
SYS: @@ solidification conditions, both done in Thermo-Calc.
SYS: @@----------------------------------------------------------------------
SYS:
SYS: @@ exb4c_setup.DCM
SYS:
SYS: @@
SYS: @@ START BY GOING TO THE DATABASE MODULE
SYS: @@
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                     /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12:
TDB_TCFE12: @@ USE A THERMODYNAMIC DATABASE TO RETRIEVE DATA
TDB_TCFE12: sw tcfe9
 Current database: Steels/Fe-Alloys  v9.3

 VA                     /-  DEFINED
 L12_FCC                B2_BCC                 DICTRA_FCC_A1
   REJECTED
TDB_TCFE9:
TDB_TCFE9: @@ DEFINE THE SYSTEM TO WORK WITH
TDB_TCFE9: def-sys fe ni cr
 FE                     NI                     CR
   DEFINED
TDB_TCFE9:
TDB_TCFE9: @@ EXCLUDE THE THERMODYNAMIC DATA FOR THE PHASES THAT ARE NOT NEEDED
TDB_TCFE9: rej ph /all
 LIQUID:L               BCC_A2                 FCC_A1
 HCP_A3                 CBCC_A12               CUB_A13
 SIGMA                  CHI_A12                LAVES_PHASE_C14
 CR3SI                  NBNI3                  NI3TI
 CRZN17                 BETA1                  GAMMA
 AL5FE4                 CENI2                  CENI5
   REJECTED
TDB_TCFE9: res ph fcc liq bcc
 FCC_A1                 LIQUID:L               BCC_A2
   RESTORED
TDB_TCFE9:
TDB_TCFE9: @@ RETRIEVE DATA FROM THE DATABASE FILE
TDB_TCFE9: get
09:38:09,142 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_TCFE9:
TDB_TCFE9: @@
TDB_TCFE9: @@ MOBILITY/DIFFUSIVITY DATA ARE STORED IN A SEPARATE DATABASE FILE.
TDB_TCFE9: @@ SWITCH TO A MOBILITY DATABASE AND APPEND THE DATA.
TDB_TCFE9: @@
TDB_TCFE9: app
 Use one of these databases

 TCFE12  =  Steels/Fe-Alloys  v12.0
 TCFE9   =  Steels/Fe-Alloys  v9.3
 SSUB6   =  SGTE Substances  v6.0
 FEDEMO  =  Iron Demo Database v6.0
 MOB2    =  Alloys Mobility  v2.7
 MOBFE7  =  Steels/Fe-Alloys Mobility  v7.1
 MOBFE4  =  Steels/Fe-Alloys Mobility  v4.0
 MOBFE2  =  Steels/Fe-Alloys Mobility  v2.0
 MFEDEMO =  Fe-Alloys Mobility demo database v5.0
 USER    =  User defined Database

DATABASE NAME /TCFE9/: mobfe4
 Current database: Steels/Fe-Alloys Mobility  v4.0

 VA  DEFINED
 B2_BCC  REJECTED
APP: def-sys fe ni cr
 FE                     NI                     CR
   DEFINED
APP: rej ph /all
 BCC_A2                 FCC_A1                 HCP_A3
 LIQUID:L  REJECTED
```

```
APP: res ph fcc liq bcc
 FCC_A1                  LIQUID:L                BCC_A2
   RESTORED
APP: get
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
APP:
APP: @@
APP: @@ ENTER THE DICTRA MONITOR WHERE THE SYSTEM IS SET UP
APP: @@
APP: go d-m
 NO TIME STEP DEFINED
DIC>
DIC> @@
DIC> @@ LIST THE MOBILITIES IN THE LIQUID
DIC> @@
DIC> list-mobility-data ,,liquid
 Sorry, LIST-DATA disabled for this database
DIC>
DIC>
DIC> @@
DIC> @@ AMEND THE DIFFUSIVITY DATA IN THE LIQUID
DIC> @@
DIC> @@ CHANGE TO A DIFFUSIVITY THAT IS 1000 TIMES HIGHER THAN THE
DIC> @@ VALUE IN THE MOBILITY DATABASE. THIS SHOULD BE ENOUGH IN ORDER TO
DIC> @@ ASSUME THAT THE COMPOSITION IN THE LIQUID IS AT ALL TIMES HOMOGENEOUS.
DIC> @@
DIC> amend_mobility_data
PARAMETER:
 *** ERROR, PLEASE RE-ENTER EACH PART SEPARATELY
IDENTIFIER: dq
PHASE NAME: liquid&cr
CONSTITUENT: cr
INTERACTING CONSTITUENT:
  DQ(LIQUID&CR#1,CR;0) =  Sorry, database encrypted
Do you want to change the number of ranges /NO/: yes
 Reenter ranges
 DQ(LIQUID&CR#1,CR;0) =
LOW TEMPERATURE LIMIT /298.15/: 298.15
FUNCTION: +R*T*LN(1E-06);
HIGH TEMPERATURE LIMIT /6000/: 6000
ANY MORE RANGES /N/: no


 *** WARNING, NO MAGNETIC CONTRIBUTION DEFINED

09:38:13,059 [Thread-0] INFO  Database: Preparing system for use: MOBFE4_MODIFIED_176363149262716
DIC>
DIC> amend_mobility_data
PARAMETER: dq(liquid&cr,fe;0)
  DQ(LIQUID&CR#1,FE;0) =  Sorry, database encrypted
Do you want to change the number of ranges /NO/: y
 Reenter ranges
 DQ(LIQUID&CR#1,FE;0) =
LOW TEMPERATURE LIMIT /298.15/: 298.15 +R*T*LN(1E-06); 6000 n


 *** WARNING, NO MAGNETIC CONTRIBUTION DEFINED

DIC>
DIC> am-mob dq(liquid&cr,ni;0)
  DQ(LIQUID&CR#1,NI;0) =  Sorry, database encrypted
Do you want to change the number of ranges /NO/: y
 Reenter ranges
 DQ(LIQUID&CR#1,NI;0) =
LOW TEMPERATURE LIMIT /298.15/: 298.15 +R*T*LN(1E-06); 6000 n


 *** WARNING, NO MAGNETIC CONTRIBUTION DEFINED

DIC>
DIC> am-mob dq(liquid&ni,cr;0)
  DQ(LIQUID&NI#1,CR;0) =  Sorry, database encrypted
Do you want to change the number of ranges /NO/: y
 Reenter ranges
 DQ(LIQUID&NI#1,CR;0) =
LOW TEMPERATURE LIMIT /298.15/: 298.15 +R*T*LN(1E-06); 6000 n


 *** WARNING, NO MAGNETIC CONTRIBUTION DEFINED

DIC>
DIC> am-mob dq(liquid&ni,fe;0)
  DQ(LIQUID&NI#1,FE;0) =  Sorry, database encrypted
Do you want to change the number of ranges /NO/: y
 Reenter ranges
 DQ(LIQUID&NI#1,FE;0) =
LOW TEMPERATURE LIMIT /298.15/: 298.15 +R*T*LN(1E-06); 6000 n


 *** WARNING, NO MAGNETIC CONTRIBUTION DEFINED

DIC>
DIC> am-mob dq(liquid&ni,ni;0)
  DQ(LIQUID&NI#1,NI;0) =  Sorry, database encrypted
Do you want to change the number of ranges /NO/: y
 Reenter ranges
 DQ(LIQUID&NI#1,NI;0) =
LOW TEMPERATURE LIMIT /298.15/: 298.15 +R*T*LN(1E-06); 6000 n


 *** WARNING, NO MAGNETIC CONTRIBUTION DEFINED

DIC>
DIC> am-mob dq(liquid&fe,cr;0)
  DQ(LIQUID&FE#1,CR;0) =  Sorry, database encrypted
```

```
Do you want to change the number of ranges /NO/: y
 Reenter ranges
 DQ(LIQUID&FE#1,CR;0) =
LOW TEMPERATURE LIMIT /298.15/: 298.15 +R*T*LN(1E-06); 6000 n


 *** WARNING, NO MAGNETIC CONTRIBUTION DEFINED

DIC>
DIC> am-mob dq(liquid&fe,fe;0)
  DQ(LIQUID&FE#1,FE;0) =  Sorry, database encrypted
Do you want to change the number of ranges /NO/: y
 Reenter ranges
 DQ(LIQUID&FE#1,FE;0) =
LOW TEMPERATURE LIMIT /298.15/: 298.15 +R*T*LN(1E-06); 6000 n


 *** WARNING, NO MAGNETIC CONTRIBUTION DEFINED

DIC>
DIC> am-mob dq(liquid&fe,ni;0)
  DQ(LIQUID&FE#1,NI;0) =  Sorry, database encrypted
Do you want to change the number of ranges /NO/: y
 Reenter ranges
 DQ(LIQUID&FE#1,NI;0) =
LOW TEMPERATURE LIMIT /298.15/: 298.15 +R*T*LN(1E-06); 6000 n


 *** WARNING, NO MAGNETIC CONTRIBUTION DEFINED

DIC>
DIC> list-mobility-data ,,liquid
 Sorry, LIST-DATA disabled for this database
DIC>
DIC> @@
DIC> @@ ENTER THE GLOBAL CONDITION T
DIC> @@
DIC> @@ LOWER THE TEMPERATURE TO A RATE OF 1 K/s
DIC> set-cond glob T 0 1900-1*TIME; * N
DIC>
DIC> @@
DIC> @@ ENTER A REGION CALLED smalta
DIC> @@
DIC> enter-region smalta
DIC>
DIC> @@
DIC> @@ ENTER A GEOMETRIC GRID INTO THE REGION
DIC> @@
DIC> enter-grid
REGION NAME : /SMALTA/: smalta
WIDTH OF REGION /1/: 1e-4
TYPE /AUTO/: AUTO
DIC>
DIC> @@
DIC> @@ ENTER active PHASES INTO THE REGION
DIC> @@
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: act
REGION NAME : /SMALTA/: smalta
PHASE TYPE /MATRIX/: matrix
PHASE NAME: /NONE/: liq
DIC>
DIC> @@
DIC> @@ ENTER inactive PHASES INTO THE REGION, BOTH PHASES ON THE SAME SIDE
DIC> @@ OF THE LIQUID REGION IN ORDER TO GET A PERITECTIC REACTION.
DIC> @@
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: inact
ATTACH TO REGION NAMED /SMALTA/: smalta
ATTACHED TO THE RIGHT OF SMALTA /YES/: yes
PHASE NAME: /NONE/: fcc#1
DEPENDENT COMPONENT ? /NI/: fe
 REQUIRED DRIVING FORCE FOR PRECIPITATION: /1E-05/: 1e-5
CONDITION TYPE /CLOSED_SYSTEM/: closed
DIC>
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: inact
ATTACH TO REGION NAMED /SMALTA/: smalta
ATTACHED TO THE RIGHT OF SMALTA /YES/: yes
PHASE NAME: /NONE/: bcc#1
DEPENDENT COMPONENT ? /NI/: fe
 REQUIRED DRIVING FORCE FOR PRECIPITATION: /1E-05/: 1e-5
CONDITION TYPE /CLOSED_SYSTEM/: closed
DIC>
DIC> @@
DIC> @@ ENTER THE START COMPOSITION FOR THE LIQUID
DIC> @@
DIC> enter-composition
REGION NAME : /SMALTA/: smalta
PHASE NAME: /LIQUID/: liq
DEPENDENT COMPONENT ? /NI/: fe
COMPOSITION TYPE /MOLE_FRACTION/: w-p
PROFILE FOR /CR/: cr lin 18 18
PROFILE FOR /NI/: ni lin  8  8
09:38:14,800 [Thread-0] INFO  Phase: Preparing phase for use: LIQUID
DIC>
DIC> @@
DIC> @@ THE BOUNDARY CONDITION IS A CLOSED SYSTEM (DEFAULT) AS WE DO NOT SPECIFY
DIC> @@ ANYTHING ELSE
DIC> @@
DIC>
DIC> @@
DIC> @@ SET THE SIMULATION TIME
DIC> @@
DIC> set-simulation-time
END TIME FOR INTEGRATION /.1/: 200
AUTOMATIC TIMESTEP CONTROL /YES/: yes
MAX TIMESTEP DURING INTEGRATION /20/: 1
INITIAL TIMESTEP : /1E-07/:
SMALLEST ACCEPTABLE TIMESTEP : /1E-07/:
DIC>
```

```
DIC>
DIC>
DIC>
DIC> @@
DIC> @@ CHECK THE INTERFACE POSITION. THIS IS TO MAKE SURE THAT THE LIQUID
DIC> @@ REGION DOES NOT SHRINK TOO MUCH DURING A TIMESTEP.  IN ADDITION THE TIMESTEP
DIC> @@ IS CONTROLLED BY THE PHASE INTERFACE DISPLACEMENT DURING THE SIMULATION.
DIC> @@
DIC> set-option CHECK_INTERFACE_POSITION yes
DIC>
DIC> @@
DIC> @@ SAVE THE SET UP TO A NEW STORE FILE AND EXIT
DIC> @@
DIC> save exb4c Y
DIC>
DIC> set-inter
 --OK---
DIC>
```

exb4c-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb4c\run.DCM.test"
DIC>
DIC> @@ exb4c_run.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR RUNNING EXAMPLE b4b
DIC> @@
DIC>
DIC> @@
DIC> @@ ENTER THE DICTRA MONITOR AND READ THE SET UP FROM FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  0.00000E+00
DIC> read exb4c
 OK
DIC>
DIC> @@
DIC> @@ START THE SIMULATION
DIC> @@
DIC> sim yes
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 Region: SMALTA
 geometric   0.833333     dense at   0.100000E-03   58 points
 DEGREE OF IMPLICITY SET TO TRAPEZOIDAL RULE
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882254
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882254
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
09:39:10,765 [Thread-0] INFO  Phase: Preparing phase for use: BCC_A2
09:39:11,347 [Thread-0] INFO  Phase: Preparing phase for use: FCC_A1
 TIME =  0.10000000E-06 DT =  0.10000000E-06 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882255
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    4  seconds
 TIME =  0.30000000E-06 DT =  0.20000000E-06 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882254
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.70000000E-06 DT =  0.40000000E-06 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882255
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.15000000E-05 DT =  0.80000000E-06 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882255
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    1  seconds
 TIME =  0.31000000E-05 DT =  0.16000000E-05 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882255
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.63000000E-05 DT =  0.32000000E-05 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882255
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.12700000E-04 DT =  0.64000000E-05 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882255
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.25500000E-04 DT =  0.12800000E-04 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882255
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.51100000E-04 DT =  0.25600000E-04 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882255
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.10230000E-03 DT =  0.51200000E-04 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219291
                        NI = .0754116207882255
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    1  seconds
 TIME =  0.20470000E-03 DT =  0.10240000E-03 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882254
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.40950000E-03 DT =  0.20480000E-03 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992484  FE = .73306801121929
                        NI = .0754116207882254
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.81910000E-03 DT =  0.40960000E-03 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992484  FE = .733068011219291
                        NI = .0754116207882253
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.16383000E-02 DT =  0.81920000E-03 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992482  FE = .733068011219292
                        NI = .0754116207882253
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.32767000E-02 DT =  0.16384000E-02 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992479  FE = .733068011219296
                        NI = .0754116207882255
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.65535000E-02 DT =  0.32768000E-02 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992493  FE = .733068011219281
                        NI = .0754116207882252
```

```
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.13107100E-01 DT =  0.65536000E-02 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992518  FE = .733068011219258
                        NI = .0754116207882234
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.26214300E-01 DT =  0.13107200E-01 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992496  FE = .733068011219269
                        NI = .0754116207882352
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.52428700E-01 DT =  0.26214400E-01 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .191520367992497  FE = .73306801121928
                        NI = .0754116207882225


output ignored...



... output resumed

 POSITION OF INTERFACE R_FCC_A1 / R_BCC_A2 IS   0.10985989E-04
 U-FRACTION IN SYSTEM:  CR = .19120745992105  FE = .733435671007446
                        NI = .0753568690715042
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  33  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: R_FCC_A1

  CPU time used in timestep                    3  seconds
 3.662496060506204E-006        3.663887259434118E-006        3.662496773842332E-006        3.661947855247234E-006        3.662478156048757E-
006        5.874524710197174E-009        1.390385691759069E-009        7.017879002710013E-010        1.831690760773700E-
011        3.039856498066479E-015        1.008624732872284E-015        1.064567410178760E-015        1.154534962983674E-
014        3.385425568308159E-014        1.872444194926808E-013        1.839914630876230E-014        1.815106723348849E-
013        6.557508514980651E-017       TIME =   200.00000     DT =  0.88765179E-01 SUM OF SQUARES =  0.63528526E-30
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.50965388E-07 AND  -0.50965388E-07
 POSITION OF INTERFACE SMALTA / R_FCC_A1 IS   0.38517190E-06
 CELL # 1 VELOCITY AT INTERFACE # 3 IS  -0.47139479E-08 AND  -0.47139479E-08
 POSITION OF INTERFACE R_FCC_A1 / R_BCC_A2 IS   0.10985571E-04
 U-FRACTION IN SYSTEM:  CR = .191207123928971  FE = .733435943225055
                        NI = .0753569328459733
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
 MUST SAVE WORKSPACE ON FILE
 WORKSPACE SAVED ON FILE
 RECLAIMING WORKSPACE
 DELETING TIME-RECORD FOR TIME    170.37756
 DELETING TIME-RECORD FOR TIME    170.48351
 DELETING TIME-RECORD FOR TIME    170.48351
 DELETING TIME-RECORD FOR TIME    170.48351
 DELETING TIME-RECORD FOR TIME    170.48351
 DELETING TIME-RECORD FOR TIME    170.48351
 DELETING TIME-RECORD FOR TIME    170.48352
 DELETING TIME-RECORD FOR TIME    170.48352
 DELETING TIME-RECORD FOR TIME    170.48353
 DELETING TIME-RECORD FOR TIME    170.48354
 DELETING TIME-RECORD FOR TIME    170.48356
 DELETING TIME-RECORD FOR TIME    170.48362
 DELETING TIME-RECORD FOR TIME    170.48372
 DELETING TIME-RECORD FOR TIME    170.48392
 DELETING TIME-RECORD FOR TIME    170.48433
 DELETING TIME-RECORD FOR TIME    170.48515
 DELETING TIME-RECORD FOR TIME    170.48679
 DELETING TIME-RECORD FOR TIME    170.49007
 DELETING TIME-RECORD FOR TIME    170.49662
 DELETING TIME-RECORD FOR TIME    170.50973
 DELETING TIME-RECORD FOR TIME    170.53594
 DELETING TIME-RECORD FOR TIME    170.58837
 DELETING TIME-RECORD FOR TIME    170.69323
 DELETING TIME-RECORD FOR TIME    170.90294
 DELETING TIME-RECORD FOR TIME    171.32237
 DELETING TIME-RECORD FOR TIME    172.16123
 DELETING TIME-RECORD FOR TIME    173.16123
 DELETING TIME-RECORD FOR TIME    174.16123
 DELETING TIME-RECORD FOR TIME    175.16123
 DELETING TIME-RECORD FOR TIME    176.16123
 DELETING TIME-RECORD FOR TIME    177.16123
 DELETING TIME-RECORD FOR TIME    178.16123
 DELETING TIME-RECORD FOR TIME    179.16123
 DELETING TIME-RECORD FOR TIME    180.16123
 DELETING TIME-RECORD FOR TIME    181.16123
 DELETING TIME-RECORD FOR TIME    182.16123
 DELETING TIME-RECORD FOR TIME    183.16123
 DELETING TIME-RECORD FOR TIME    184.16123
 DELETING TIME-RECORD FOR TIME    185.16123
 DELETING TIME-RECORD FOR TIME    186.16123
 DELETING TIME-RECORD FOR TIME    187.16123
 DELETING TIME-RECORD FOR TIME    188.16123
 DELETING TIME-RECORD FOR TIME    188.41123
 DELETING TIME-RECORD FOR TIME    188.91123
 DELETING TIME-RECORD FOR TIME    189.91123
 DELETING TIME-RECORD FOR TIME    190.91123
 DELETING TIME-RECORD FOR TIME    191.91123
 DELETING TIME-RECORD FOR TIME    192.91123
 DELETING TIME-RECORD FOR TIME    193.91123
 DELETING TIME-RECORD FOR TIME    194.91123
 DELETING TIME-RECORD FOR TIME    195.91123
 DELETING TIME-RECORD FOR TIME    196.91123
 DELETING TIME-RECORD FOR TIME    197.91123
 DELETING TIME-RECORD FOR TIME    198.91123

 KEEPING TIME-RECORD FOR TIME    199.91123
 AND FOR TIME                    200.00000
 WORKSPACE RECLAIMED

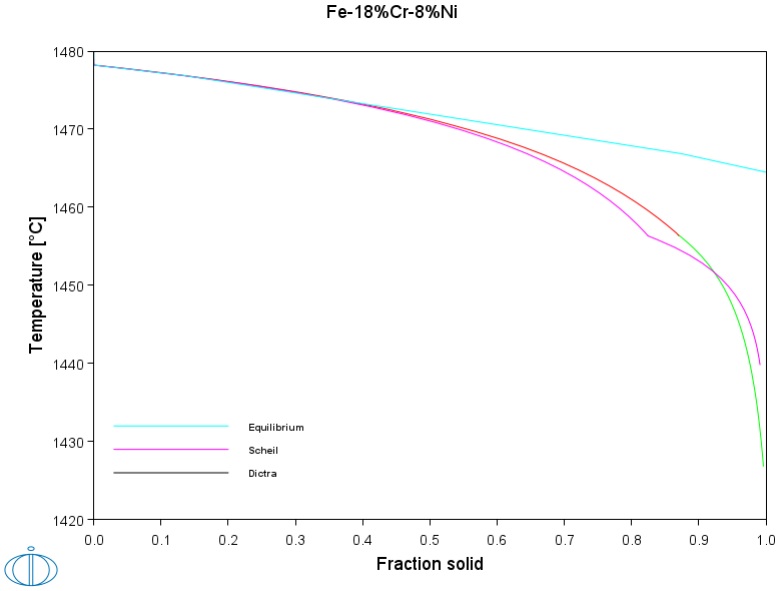
 TIMESTEP AT     200.000000     SELECTED

DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
```

```
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC> @@
DIC> @@ THE SIMULATION IS FINISHED
DIC> @@
DIC>
DIC> set-inter
 --OK---
DIC>
```

exb4c-plot

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb4c\plot.DCM.test"
DIC>
DIC>
DIC> @@ exb4c_plot.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR GENERATING GRAPHICAL OUTPUT FOR EXAMPLE b4c
DIC> @@
DIC>
DIC> @@
DIC> @@ GO TO THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  2.00000E+02
DIC> read exb4c
 OK
DIC>
DIC> @@
DIC> @@ GO TO THE POST PROCESSOR
DIC> @@
DIC> post
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1: set-title Fe-18%Cr-8%Ni
POST-1:
POST-1: @@
POST-1: @@ PLOT THE FRACTION OF SOLID AND COMPARE WITH A SCHEIL-GULLIVER
POST-1: @@ SIMULATION AND EQUILIBRIUM SOLIDIFICATION (DATA ON FILE exb4.exp).
POST-1: @@ IN THIS CASE WE CAN SEE THAT ALL THREE LINES INITIALLY FALL
POST-1: @@ ON THE SAME LINE.
POST-1: @@
POST-1: enter func fs=1-ivv(liquid);
POST-1: s-d-a x fs
POST-1: s-s-s x n 0 1
POST-1: s-ax-te x n Fraction solid
POST-1:
POST-1: s-d-a y t-c
POST-1: s-s-s y n 1420 1480
POST-1:
POST-1: s-p-c interf smalta lower
POST-1:
POST-1: app y exb4c.exp 0; 1
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
WORKING ...
WORKING ...           OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

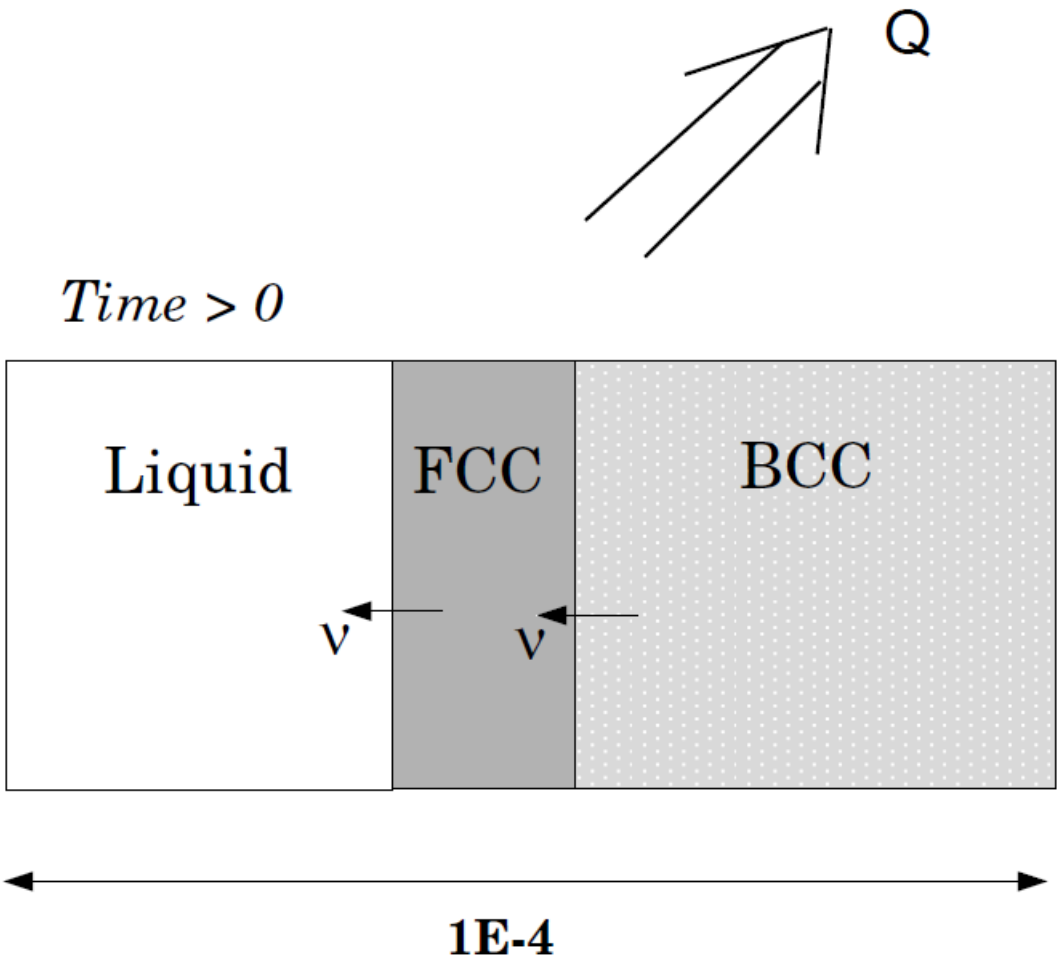



```
POST-1:
POST-1:
POST-1:
POST-1: set-inter
 --OK---
POST-1:
```

Example exb4d

Solidification path of an Fe-18%Cr-8%Ni alloy: Peritectic reaction, heat-flux controls the temperature

This example is the same as exb4b but instead of controlling the temperature the amount heat extracted is given. Comparison is made with both a Scheil-Gulliver simulation and equilibrium solidification conditions, both made with Thermo-Calc.



exb4d-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb4d\setup.DCM.test"
SYS: @@
SYS: @@ Moving boundary problem.
SYS: @@ Solidification path of an Fe-18%Cr-8%Ni alloy
SYS: @@ This example is the same as exb4b but instead of controlling the temperature
SYS: @@ the amount of heat extracted is given. Comparison is made with both a
SYS: @@ Scheil-Gulliver simulation and equilibrium solidification conditions,
SYS: @@ both done in Thermo-Calc.
SYS: @@----------------------------------------------------------------------
SYS:
SYS: @@ exb4d_setup.DCM
SYS:
SYS: @@
SYS: @@ START BY GOING TO THE DATABASE MODULE
SYS: @@
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                       /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12:
TDB_TCFE12: @@ USE A THERMODYNAMIC DATABASE TO RETRIEVE DATA
TDB_TCFE12: sw fedemo
 Current database: Iron Demo Database v6.0

 VA                       /-  DEFINED
TDB_FEDEMO:
TDB_FEDEMO: @@ DEFINE THE SYSTEM TO WORK WITH
TDB_FEDEMO: def-sys fe ni cr
 FE                       NI                       CR
   DEFINED
TDB_FEDEMO:
TDB_FEDEMO: @@ EXCLUDE THE THERMODYNAMIC DATA FOR THE PHASES THAT ARE NOT NEEDED
TDB_FEDEMO: rej ph /all
 GAS:G                    LIQUID:L                 BCC_A2
 C14_LAVES                CBCC_A12                 CHI_A12
 CUB_A13                  FCC_A1                   HCP_A3
 SIGMA_D8B  REJECTED
TDB_FEDEMO: res ph fcc liq bcc
 FCC_A1                   LIQUID:L                 BCC_A2
   RESTORED
TDB_FEDEMO:
TDB_FEDEMO: @@ RETRIEVE DATA FROM THE DATABASE FILE
TDB_FEDEMO: get
09:45:32,778 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ MOBILITY/DIFFUSIVITY DATA ARE STORED IN A SEPARATE DATABASE FILE.
TDB_FEDEMO: @@ SWITCH TO THE MOBILITY DATABASE AND APPEND THE DATA
TDB_FEDEMO: @@
TDB_FEDEMO: app
 Use one of these databases

 TCFE12  =  Steels/Fe-Alloys  v12.0
 TCFE9   =  Steels/Fe-Alloys  v9.3
 SSUB6   =  SGTE Substances  v6.0
 FEDEMO  =  Iron Demo Database v6.0
 MOB2    =  Alloys Mobility  v2.7
 MOBFE7  =  Steels/Fe-Alloys Mobility  v7.1
 MOBFE4  =  Steels/Fe-Alloys Mobility  v4.0
 MOBFE2  =  Steels/Fe-Alloys Mobility  v2.0
 MFEDEMO =  Fe-Alloys Mobility demo database v5.0
 USER    =  User defined Database

DATABASE NAME /FEDEMO/: mobfe2
 Current database: Steels/Fe-Alloys Mobility  v2.0
   TCS Steel Mobility Database Version 2.0 from 2011-12-09.

 VA  DEFINED

 *** WARNING: This database cannot be used with GES6, temporarily reverting to G
 ES5

APP: def-sys fe ni cr
 FE                       NI                       CR
   DEFINED
APP: rej ph /all
 BCC_A2                   FCC_A1                   HCP_A3
 LIQUID:L  REJECTED
APP: res ph fcc liq bcc
 FCC_A1                   LIQUID:L                 BCC_A2
   RESTORED
```

```
APP: get
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
APP:
APP: @@
APP: @@ ENTER THE DICTRA MONITOR WHERE THE SYSTEM IS SET UP
APP: @@
APP: go d-m
 NO TIME STEP DEFINED
DIC>
DIC> @@
DIC> @@ EXTRACT HEAT 91.19 J/mole/s
DIC> @@
DIC> set-cond glob Q 0 91.19; * N
DIC>
DIC> @@
DIC> @@ ENTER AN INITIAL TEMPERATURE
DIC> @@
DIC> set-initial-temp 1900
DIC>
DIC> @@
DIC> @@ ENTER A REGION CALLED smalta
DIC> @@
DIC> enter-region smalta
DIC>
DIC> @@
DIC> @@ ENTER A GEOMETRIC GRID INTO THE REGION
DIC> @@
DIC> enter-grid
REGION NAME : /SMALTA/: smalta
WIDTH OF REGION /1/: 1e-4
TYPE /AUTO/: AUTO
DIC>
DIC>
DIC> @@
DIC> @@ ENTER active PHASES INTO THE REGION
DIC> @@
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: act
REGION NAME : /SMALTA/: smalta
PHASE TYPE /MATRIX/: matrix
PHASE NAME: /NONE/: liq
DIC>
DIC> @@
DIC> @@ ENTER inactive PHASES INTO THE REGION, BOTH PHASES ON THE
DIC> @@ SAME SIDE OF THE LIQUID REGION TO GET A PERITECTIC REACTION.
DIC> @@
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: inact
ATTACH TO REGION NAMED /SMALTA/: smalta
ATTACHED TO THE RIGHT OF SMALTA /YES/: yes
PHASE NAME: /NONE/: fcc#1
DEPENDENT COMPONENT ? /NI/: fe
 REQUIRED DRIVING FORCE FOR PRECIPITATION: /1E-05/: 1e-3
CONDITION TYPE /CLOSED_SYSTEM/: closed
DIC>
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: inact
ATTACH TO REGION NAMED /SMALTA/: smalta
ATTACHED TO THE RIGHT OF SMALTA /YES/: yes
PHASE NAME: /NONE/: bcc#1
DEPENDENT COMPONENT ? /NI/: fe
 REQUIRED DRIVING FORCE FOR PRECIPITATION: /1E-05/: 1e-3
CONDITION TYPE /CLOSED_SYSTEM/: closed
DIC>
DIC> @@
DIC> @@ ENTER A START COMPOSITION FOR THE LIQUID
DIC> @@
DIC> enter-composition
REGION NAME : /SMALTA/: smalta
PHASE NAME: /LIQUID/: liq
DEPENDENT COMPONENT ? /NI/: fe
COMPOSITION TYPE /MOLE_FRACTION/: w-p
PROFILE FOR /CR/: cr lin 18 18
PROFILE FOR /NI/: ni lin  8  8
DIC>
DIC> @@
DIC> @@ THE BOUNDARY CONDITION IS A CLOSED SYSTEM (DEFAULT) AS WE DO NOT SPECIFY
DIC> @@ ANYTHING ELSE
DIC> @@
DIC>
DIC> @@
DIC> @@ SET THE SIMULATION TIME
DIC> @@
DIC> set-simulation-time
END TIME FOR INTEGRATION /.1/: 200
AUTOMATIC TIMESTEP CONTROL /YES/:
MAX TIMESTEP DURING INTEGRATION /20/:
INITIAL TIMESTEP : /1E-07/:
SMALLEST ACCEPTABLE TIMESTEP : /1E-07/:
DIC>
DIC>
DIC>
DIC> @@
DIC> @@ CHECK THE INTERFACE POSITION. THIS IS TO MAKE SURE THAT THE LIQUID REGION
DIC> @@ DOES NOT SHRINK TOO MUCH DURING A TIMESTEP. IN ADDITION THE TIMESTEP IS
DIC> @@ CONTROLLED BY THE PHASE INTERFACE DISPLACEMENT DURING THE SIMULATION.
DIC> @@
DIC> set-option CHECK_INTERFACE_POSITION yes
DIC> set-option ALLOW_AUTOMATIC_SWITCHING_OF_VARYING_ELE no
DIC>
DIC> @@
DIC> @@ SAVE THE SET UP TO A NEW STORE FILE AND EXIT
```

```
DIC> @@
DIC> save exb4d Y
DIC>
DIC> set-inter
 --OK---
DIC>
```

exb4d-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb4d\run.DCM.test"
DIC>
DIC> @@ exb4d_run.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR RUNNING EXAMPLE b4b
DIC> @@
DIC>
DIC> @@
DIC> @@ ENTER THE DICTRA MONITOR AND READ THE SET UP FROM FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  0.00000E+00
DIC> read exb4d
 OK
DIC>
DIC> @@
DIC> @@ START THE SIMULATION
DIC> @@
DIC> sim
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 Region: SMALTA
 geometric   0.833333     dense at   0.100000E-03   58 points
 DEGREE OF IMPLICITY SET TO TRAPEZOIDAL RULE
 TEMPERATURE:   1900.0000     ENTHALPY:   73940.238
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882254
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
 TEMPERATURE:   1900.0000     ENTHALPY:   73940.238
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882254
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
 3.863918610063472E-003        3.864691456625800E-003        3.836438015512440E-012        3.779855469070435E-021       TIME =  0.10000000E-
06 DT =  0.10000000E-06 SUM OF SQUARES =  0.37798555E-20
 TEMPERATURE:   1900.0000     ENTHALPY:   73940.238
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882254
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 3.862931742460856E-003        3.863704392801343E-003        3.852485041161569E-012        3.839899033642034E-021       TIME =  0.32558285E-
04 DT =  0.32458285E-04 SUM OF SQUARES =  0.38398990E-20
 TEMPERATURE:   1899.9999     ENTHALPY:   73940.235
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882254
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 1.543459994304474E-004        1.543768898716917E-004        6.272825248046769E-015        6.272825248046769E-015        1.748662816395658E-
012        2.033049489852038E-026       TIME =  0.97474855E-04 DT =  0.64916570E-04 SUM OF SQUARES =  0.20330495E-25
 TEMPERATURE:   1899.9998     ENTHALPY:   73940.229
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882254
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 1.541471559964326E-004        1.541780265386606E-004        6.117175752838604E-015        6.117175752838604E-015        1.746048955043138E-
012        7.808133759302838E-027       TIME =  0.22730799E-03 DT =  0.12983314E-03 SUM OF SQUARES =  0.78081338E-26
 TEMPERATURE:   1899.9995     ENTHALPY:   73940.217
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882254
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 1.537498535323091E-004        1.537806842725726E-004        6.054228890287506E-015        6.054228890287506E-015        1.744983991813252E-
012        4.031734655644627E-028       TIME =  0.48697427E-03 DT =  0.25966628E-03 SUM OF SQUARES =  0.40317347E-27
 TEMPERATURE:   1899.9990     ENTHALPY:   73940.194
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882254
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 1.529567862365470E-004        1.529875373698845E-004        6.112027788702609E-015        6.112027788702609E-015        1.745963698251880E-
012        6.323380288970213E-027       TIME =  0.10063068E-02 DT =  0.51933256E-03 SUM OF SQUARES =  0.63233803E-26
 TEMPERATURE:   1899.9980     ENTHALPY:   73940.146
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882254
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 1.513768021657984E-004        1.514073940879291E-004        6.043942282925615E-015        6.043942282925615E-015        1.744811919408466E-
012        3.194088859274850E-026       TIME =  0.20449719E-02 DT =  0.10386651E-02 SUM OF SQUARES =  0.31940889E-25
 TEMPERATURE:   1899.9959     ENTHALPY:   73940.051
 U-FRACTION IN SYSTEM:  CR = .191520367992483  FE = .733068011219292
                        NI = .0754116207882254
 TOTAL SIZE OF SYSTEM:  1E-04 [m]


output ignored...



... output resumed

 6.526947291966718E-016        2.176914347918803E-012        6.758339541147391E-016        4.862972565338431E-014        6.758299021566657E-
016        1.331491327197846E-014        6.758278754576276E-016        2.176914347918803E-012        6.770119896407681E-
016        4.863686018216541E-014        6.770119896256407E-016        1.331295203507202E-014        6.770119896406882E-016


     ERROR RETURN FROM NS01A BECAUSE    7 CALLS OF CALFUN FAILED TO IMPROVE THE RESIDUALS
 *** ERROR  1890 IN DCNS01: ERROR RETURN FROM NS01A
  ACCEPTING RESIDUAL  6.474221809112478E-016
 TIME =   196.62822     DT =  0.50039062     SUM OF SQUARES =  0.64742218E-15
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.10693836E-06 AND   0.10693836E-06
 POSITION OF INTERFACE R_FCC_A1 / R_BCC_A2 IS   0.56177110E-05
 TEMPERATURE:   1704.3501     ENTHALPY:   55952.004
 U-FRACTION IN SYSTEM:  CR = .191404547713131  FE = .733207675247709
                        NI = .0753877770391602
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  2  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: R_FCC_A1

  CPU time used in timestep                    4  seconds
 2.085619190648250E-002        2.085607222032711E-002        2.085621533545253E-002        2.085576666994037E-002        1.838624076190998E-
004        2.777448029025951E-008        1.172154718885017E-012        1.176872420307869E-
016       TIME =   197.62900     DT =   1.0007812     SUM OF SQUARES =  0.64492777E-18
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.96915158E-07 AND   0.96915158E-07
```

```
 POSITION OF INTERFACE R_FCC_A1 / R_BCC_A2 IS   0.57147018E-05
 TEMPERATURE:   1702.1838     ENTHALPY:   55860.743
 U-FRACTION IN SYSTEM:  CR = .191404547710647  FE = .733207675250861
                        NI = .0753877770384929
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  4  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: R_FCC_A1

  CPU time used in timestep                  1  seconds
 9.289180495426896E-002        9.289134677966003E-002        9.289187984954131E-002        9.289090699396182E-002        1.311355950720215E-
003        1.942478159053459E-006        1.783512836526358E-009        1.458971972315604E-014        7.521312597589378E-
016        7.733559749119407E-013        7.306922173050556E-016        2.633684296895411E-012        3.156993077491077E-
015        1.765608124367762E-013        3.114127328623319E-015        7.790822239448126E-013        3.114127328633347E-
015        2.633684296895411E-012        3.124233446951364E-015        1.765608124367762E-013        3.124233446951364E-
015        7.791020958241830E-013        3.124233446599819E-015        2.633684296895411E-012        3.124250942602367E-015


     ERROR RETURN FROM NS01A BECAUSE    7 CALLS OF CALFUN FAILED TO IMPROVE THE RESIDUALS
  RESCALING
 0.390500590918939        0.390499539696817        0.390500744405486        0.390498743964520        6.889379771077427E-
003        3.533957984476008E-005        1.544573087161034E-007        1.668987402221781E-010        4.957783160626112E-
013        3.682620229834167E-017       TIME =   199.63056     DT =   2.0015625     SUM OF SQUARES =  0.41039585E-18
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.17551620E-06 AND   0.17551620E-06
 POSITION OF INTERFACE R_FCC_A1 / R_BCC_A2 IS   0.60660085E-05
 TEMPERATURE:   1693.5904     ENTHALPY:   55500.051
 U-FRACTION IN SYSTEM:  CR = .191404547700898  FE = .73320767526384
                        NI = .0753877770352613
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  27  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: R_FCC_A1

  CPU time used in timestep                  5  seconds
 1.905099861687314E-003        1.905077963207769E-003        1.905104398436018E-003        1.904970649637467E-003        2.711057408494554E-
007        2.043643386336800E-011        4.573896082428711E-016        1.642536649722262E-015        4.026736315958231E-
014        8.936143695945022E-015        2.288228284524920E-012        8.432486421868068E-
025       TIME =   200.00000     DT =  0.36944098     SUM OF SQUARES =  0.54955452E-24
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.13283678E-06 AND   0.13283678E-06
 POSITION OF INTERFACE R_FCC_A1 / R_BCC_A2 IS   0.61150838E-05
 TEMPERATURE:   1692.7947     ENTHALPY:   55466.361
 U-FRACTION IN SYSTEM:  CR = .191404547696881  FE = .733207675261175
                        NI = .0753877770419439
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
 MUST SAVE WORKSPACE ON FILE
 WORKSPACE SAVED ON FILE
 RECLAIMING WORKSPACE
 DELETING TIME-RECORD FOR TIME    195.06449
 DELETING TIME-RECORD FOR TIME    195.68998
 DELETING TIME-RECORD FOR TIME    195.75253
 DELETING TIME-RECORD FOR TIME    195.87763
 DELETING TIME-RECORD FOR TIME    196.12782
 DELETING TIME-RECORD FOR TIME    196.62822
 DELETING TIME-RECORD FOR TIME    197.62900

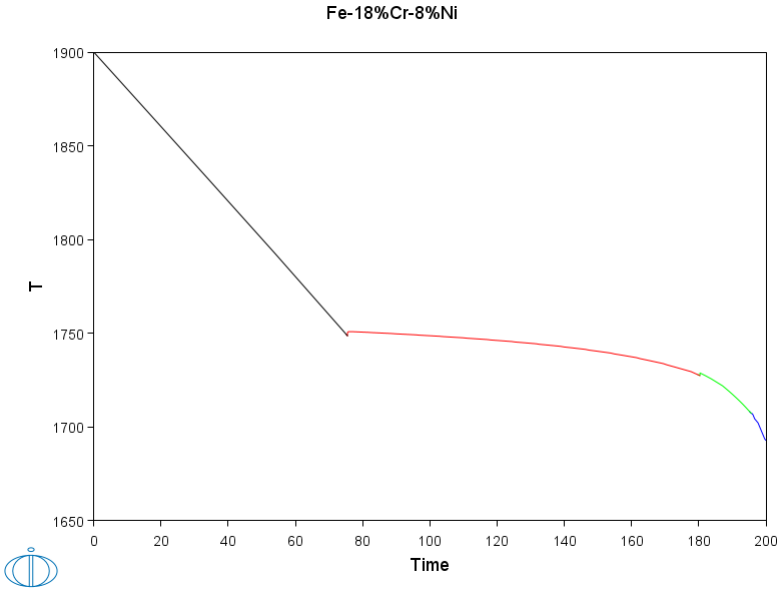
 KEEPING TIME-RECORD FOR TIME    199.63056
 AND FOR TIME                    200.00000
 WORKSPACE RECLAIMED

 TIMESTEP AT     200.000000     SELECTED

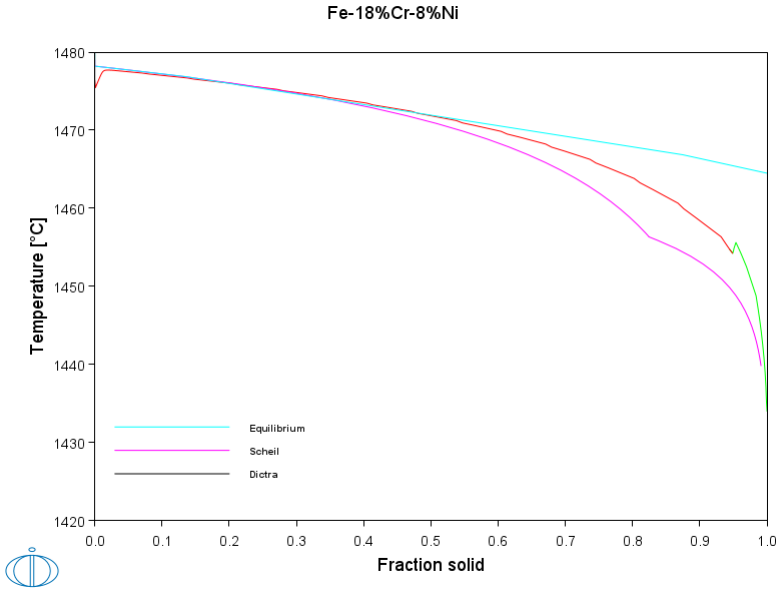
DIC>
DIC>
DIC> -1E-6
 NO SUCH COMMAND, USE HELP
 *** ERROR   666 IN DICMON: NO SUCH COMMAND
   ERROR                 666  RESET
 MACRO WAS TERMINATED DUE TO ERROR
DIC>
```

exb4d-plot

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb4d\plot.DCM.test"
DIC>
DIC>
DIC> @@ exb4d_plot.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR GENERATING GRAPHICAL OUTPUT FOR EXAMPLE b4b
DIC> @@
DIC>
DIC> @@
DIC> @@ GO TO THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  2.00000E+02
DIC> read exb4d
 OK
DIC>
DIC> @@
DIC> @@ GO TO THE POST PROCESSOR
DIC> @@
DIC> post
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1: set-title Fe-18%Cr-8%Ni
POST-1:
POST-1: @@
POST-1: @@ PLOT THE FRACTION OF SOLID AND COMPARE WITH SCHEIL-GULLIVER
POST-1: @@ SIMULATION AND EQUILIBRIUM SOLIDIFICATION (DATA ON FILE exb4.exp)
POST-1: @@
POST-1: s-d-a x time
  INFO: Time is set as independent variable
POST-1: s-d-a y T
POST-1: s-p-c inter first
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
WORKING ...working ...
WORKING ...working ...           OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```




```
POST-1:
POST-1:Hit RETURN to continue
POST-1: enter func fs=1-ivv(liquid);
POST-1: s-d-a x fs
POST-1: s-s-s x n 0 1
POST-1: s-ax-te x n Fraction solid
POST-1:
POST-1: s-d-a y t-c
POST-1: s-s-s y n 1420 1480
POST-1:
POST-1: s-p-c interf smalta lower
POST-1:
POST-1: app y exb4d.exp 0; 1
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
WORKING ...working ...
WORKING ...working ...           OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

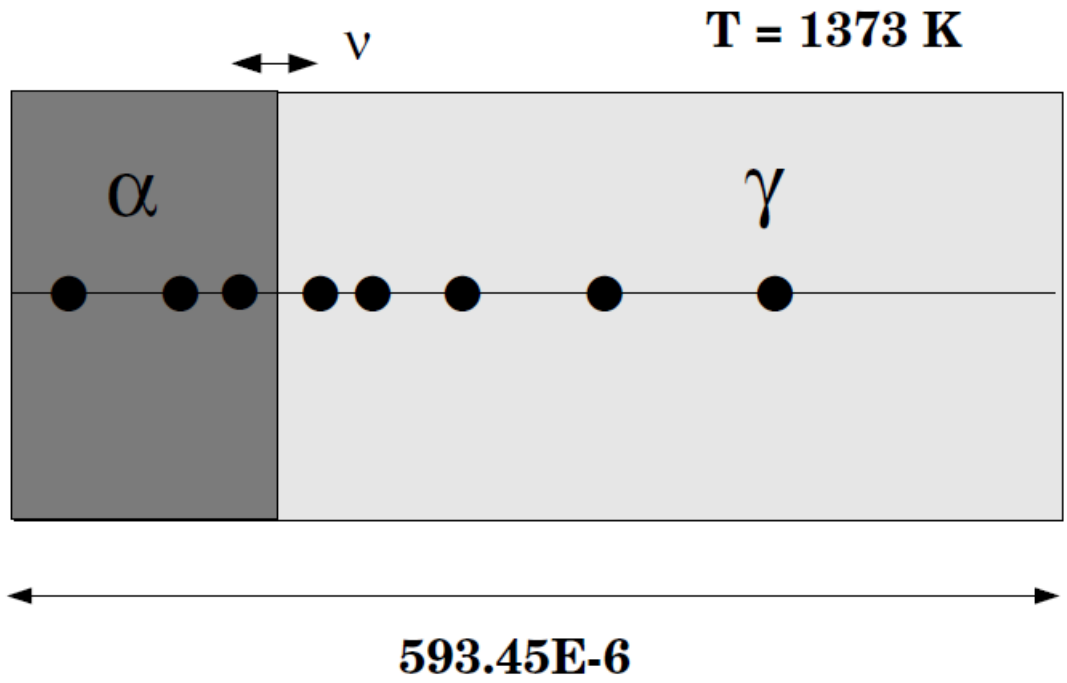



```
POST-1:
POST-1:
POST-1:
POST-1: set-inter
 --OK---
POST-1:
```

Example exb5

γ/α/γ diffusion couple of Fe-Ni-Cr alloys

This example demonstrates the evaluation of a ternary Fe-Cr-Ni diffusion couple. A thin slice of α phase (38%Cr, 0%Ni) is clamped between two thicker slices of γ phase (27%Cr, 20%Ni). The assembly is subsequently heat treated at 1373K. This setup corresponds to diffusion couple A in M. Kajihara, C.-B. Lim and M. Kikuchi: ISIJ International 33 (1993), pp. 498-507. See also M. Kajihara and M. Kikichi: Acta Metall.Mater. 41 (1993), pp.2045-2059.



exb5-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb5\setup.DCM.test"
SYS: @@
SYS: @@ Moving boundary problem.
SYS: @@ Ternary diffusion couple of Fe-Ni-Cr alloys
SYS: @@ This example demonstrates the evaluation of a ternary Fe-Cr-Ni diffusion
SYS: @@ couple. A thin slice of alpha phase (38%Cr, 0%Ni) is clamped between
SYS: @@ two thicker slices of gamma phase (27%Cr, 20%Ni). The assembly is
SYS: @@ subsequently heat treated at 1373 K. This example corresponds to diffusion
SYS: @@ couple A in M. Kajihara, C.-B. Lim and M. Kikuchi: ISIJ International
SYS: @@ 33 (1993), pp. 498-507. See also M. Kajihara and M. Kikichi: Acta Metall.Mater.
SYS: @@ 41 (1993), pp.2045-2059.
SYS: @@----------------------------------------------------------------------
SYS:
SYS: @@ exb5_setup.DCM
SYS:
SYS: @@
SYS: @@ GO TO A DATABASE AND READ THE THERMODYNAMIC AND KINETIC DATA
SYS: @@
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                       /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12: sw fedemo
 Current database: Iron Demo Database v6.0

 VA                       /-  DEFINED
TDB_FEDEMO: def-sys cr fe ni
 CR                       FE                       NI
   DEFINED
TDB_FEDEMO: rej-ph /all
 GAS:G                    LIQUID:L                 BCC_A2
 C14_LAVES                CBCC_A12                 CHI_A12
 CUB_A13                  FCC_A1                   HCP_A3
 SIGMA_D8B  REJECTED
TDB_FEDEMO: res-ph bcc,fcc
 BCC_A2                   FCC_A1  RESTORED
TDB_FEDEMO: get
09:51:29,398 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_FEDEMO:
TDB_FEDEMO: app
 Use one of these databases

 TCFE12  =  Steels/Fe-Alloys  v12.0
 TCFE9   =  Steels/Fe-Alloys  v9.3
 SSUB6   =  SGTE Substances  v6.0
 FEDEMO  =  Iron Demo Database v6.0
 MOB2    =  Alloys Mobility  v2.7
 MOBFE7  =  Steels/Fe-Alloys Mobility  v7.1
 MOBFE4  =  Steels/Fe-Alloys Mobility  v4.0
 MOBFE2  =  Steels/Fe-Alloys Mobility  v2.0
 MFEDEMO =  Fe-Alloys Mobility demo database v5.0
 USER    =  User defined Database

DATABASE NAME /FEDEMO/: mfedemo
 Current database: Fe-Alloys Mobility demo database v5.0

 VA  DEFINED
APP: def-sys cr fe ni
 CR                       FE                       NI
   DEFINED
APP: rej-ph /all
 BCC_A2                   FCC_A1                   LIQUID:L
   REJECTED
APP: res-ph bcc,fcc
 BCC_A2                   FCC_A1  RESTORED
APP: get
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
APP:
APP: @@
APP: @@ GO TO THE DICTRA MODULE TO SET UP THE SIMULATION
APP: @@
APP: go d-m
 NO TIME STEP DEFINED
DIC>
```

```
DIC> @@
DIC> @@ SET THE GLOBAL CONDITIONS
DIC> @@
DIC> set-cond glob T 0 1373; * N
DIC>
DIC> @@
DIC> @@ ENTER TWO REGIONS, ONE FOR EACH PHASE
DIC> @@
DIC> enter-region alpha
DIC> enter-region gamma
ATTACH TO REGION NAMED /ALPHA/:
ATTACHED TO THE RIGHT OF ALPHA /YES/:
DIC> @@
DIC> @@ ENTER THE GRID SIZE AND SPACINGS
DIC> @@
DIC> enter-grid alpha  93.45E-6 AUTO
DIC> enter-grid gamma 500.0E-6 AUTO
DIC>
DIC> @@
DIC> @@ SPECIFY WHICH PHASE GOES INTO WHICH REGION
DIC> @@
DIC> enter-phase act alpha  matrix bcc
DIC> enter-phase act gamma matrix fcc
DIC>
DIC> @@
DIC> @@ ENTER THE INITIAL COMPOSITIONS IN THE PHASES
DIC> @@ IT IS IMPORTANT NOT TO PUT 0%NI IN PHASE BCC,
DIC> @@ ENTER SOME SMALL VALUE INSTEAD
DIC> @@
DIC> enter-composition
REGION NAME : /ALPHA/: alpha
PHASE NAME: /BCC_A2/: bcc
DEPENDENT COMPONENT ? /NI/: fe
COMPOSITION TYPE /MOLE_FRACTION/: w-f
PROFILE FOR /CR/: cr lin  .38 .38
PROFILE FOR /NI/: ni lin  1e-5 1e-5
DIC>
DIC> enter-composition
REGION NAME : /GAMMA/: gamma
PHASE NAME: /FCC_A1/: fcc
DEPENDENT COMPONENT ? /NI/: fe
COMPOSITION TYPE /MOLE_FRACTION/: w-f
PROFILE FOR /CR/: cr lin .27 .27
PROFILE FOR /NI/: ni lin .28 .28
DIC>
DIC> @@
DIC> @@ SPECIFY THE SIMULATION TIME
DIC> @@
DIC> set-simulation-time
END TIME FOR INTEGRATION /.1/: 36E5
AUTOMATIC TIMESTEP CONTROL /YES/:
MAX TIMESTEP DURING INTEGRATION /360000/:
INITIAL TIMESTEP : /1E-07/:
SMALLEST ACCEPTABLE TIMESTEP : /1E-07/:
DIC>
DIC>
DIC> SAVE exb5 Y
DIC>
DIC> set-inter
 --OK---
DIC>
```

exb5-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb5\run.DCM.test"
DIC>
DIC>
DIC> @@ exb5_run.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR RUNNING EXAMPLE b5
DIC> @@
DIC>
DIC> @@
DIC> @@ ENTER THE DICTRA MONITOR AND READ THE SET UP FROM FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  0.00000E+00
DIC> read exb5
 OK
DIC>
DIC> @@
DIC> @@ START THE SIMULATION
DIC> @@
DIC> simulate
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 Region: ALPHA
 geometric   0.833333     dense at   0.934500E-04   58 points
 Region: GAMMA
 geometric    1.20000     dense at    0.00000       57 points
 DEGREE OF IMPLICITY SET TO TRAPEZOIDAL RULE
  Trying old scheme                      4
 GENERATING STARTING VALUES FOR CELL #  1 INTERFACE #  2
 DETERMINING INITIAL EQUILIBRIUM VALUES
CALCULATING STARTING VALUES:       9   EQUILIBRIUM CALCULATIONS             *** ERROR  1611 IN QTHISS: TOO MANY ITERATIONS
 Give the command INFO TROUBLE for help
 DONE     6 OUT OF     9                                                    *** ERROR  1611 IN QTHISS: TOO MANY ITERATIONS
 Give the command INFO TROUBLE for help
 DONE     9 OUT OF     9                                                     try                     1  failed
  try                     2  failed
  try                     3  failed
 DETERMINED ACTIVITIES  ACR(NI) 2.00457405352E-04
  UNABLE TO OBTAIN GOOD STARTING VALUE USING THE OLD SCHEME
  Trying new scheme
 GENERATING STARTING VALUES FOR CELL #  1 INTERFACE #  2
 DETERMINING INITIAL EQUILIBRIUM VALUES
CALCULATING STARTING VALUES:      18   EQUILIBRIUM CALCULATIONS             DONE       1 OUT OF      18
04
 U-FRACTION IN SYSTEM:  CR = .305280432605602  FE = .471672082221692
                        NI = .223047485172706
 TOTAL SIZE OF SYSTEM:  5.9345E-04 [m]
 U-FRACTION IN SYSTEM:  CR = .305280432605602  FE = .471672082221692
                        NI = .223047485172706
 TOTAL SIZE OF SYSTEM:  5.9345E-04 [m]
 0.188105170261261        0.188121771941940        0.188103832481157        2.779256912641678E-002        1.575873276725931E-
002        4.124896339306979E-004        5.143494508822299E-006        1.261017697429432E-007        1.146914635563084E-
013        4.569468148236086E-018       TIME =  0.10000000E-06 DT =  0.10000000E-06 SUM OF SQUARES =  0.36275554E-17
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.60953435     AND  -0.60953435
 POSITION OF INTERFACE ALPHA / GAMMA IS   0.93389047E-04
 U-FRACTION IN SYSTEM:  CR = .305280432987362  FE = .471672082631556
                        NI = .223047484381082
 TOTAL SIZE OF SYSTEM:  5.9345E-04 [m]
  CPU time used in timestep                    0  seconds
 1.779115261825630E-002        1.779392776600443E-002        1.779119834418420E-002        1.171890049662968E-004        2.748372297173524E-
006        2.566237882147770E-009        4.187390465705088E-011        2.391880057472405E-011        1.751722898145469E-
010        2.214253811978612E-011        2.214705984352612E-011        2.221152750725942E-011        1.378934454006804E-
010        2.207016118385424E-011        2.205772303523283E-011        2.203286514228735E-011        1.431307667841569E-
010        2.199433512505058E-011        2.191738542649979E-011        2.176389334332356E-011        1.428858240875449E-
010        2.145856875370743E-011        2.085455566267156E-011        1.967299285885644E-011        1.409172320328755E-
010        1.741542504685778E-011        1.332101882153871E-011        6.798640299110062E-012        1.294183760643604E-
010        2.916715438702114E-013        2.029106667799615E-017       TIME =  0.10010000E-03 DT =  0.10000000E-
03 SUM OF SQUARES =  0.21761994E-17
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.12330140E-06 AND   0.12330140E-06
 POSITION OF INTERFACE ALPHA / GAMMA IS   0.93389059E-04
 U-FRACTION IN SYSTEM:  CR = .305280432986384  FE = .471672082632922


output ignored...



... output resumed

 TOTAL SIZE OF SYSTEM:  5.9345E-04 [m]
  3  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: GAMMA

  CPU time used in timestep                    1  seconds
 3.539125802032234E-006        3.543659658201383E-006        3.532577278999217E-006        9.534683939078569E-009        7.957515052919483E-
012        2.728196745347149E-017       TIME =   2171568.0     DT =    360000.00     SUM OF SQUARES =  0.28871801E-18
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.77000552E-11 AND  -0.77000552E-11
 POSITION OF INTERFACE ALPHA / GAMMA IS   0.94156438E-04
 U-FRACTION IN SYSTEM:  CR = .305280433881236  FE = .471672081895649
                        NI = .223047484223115
 TOTAL SIZE OF SYSTEM:  5.9345E-04 [m]
  5  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: GAMMA

  CPU time used in timestep                    2  seconds
 1.910913055911638E-006        1.913835739725634E-006        1.906176349958440E-006        9.785587177056605E-009        1.003840702286194E-
009        5.909964798564086E-014        4.174120598153043E-
021       TIME =   2531568.0     DT =    360000.00     SUM OF SQUARES =  0.65968456E-22
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.66472069E-11 AND  -0.66472069E-11
 POSITION OF INTERFACE ALPHA / GAMMA IS   0.91763444E-04
 U-FRACTION IN SYSTEM:  CR = .305280433878176  FE = .471672081912897
                        NI = .223047484208926
 TOTAL SIZE OF SYSTEM:  5.9345E-04 [m]
  4  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: GAMMA

  CPU time used in timestep                    1  seconds
 7.763352915100632E-007        7.779573673555813E-007        7.733565297287081E-007        4.526933721971292E-009        8.782730891506061E-
010        1.309666700496760E-014        5.775057878519565E-
022       TIME =   2891568.0     DT =    360000.00     SUM OF SQUARES =  0.44562247E-23
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.59518229E-11 AND  -0.59518229E-11
 POSITION OF INTERFACE ALPHA / GAMMA IS   0.89620787E-04
 U-FRACTION IN SYSTEM:  CR = .305280433882621  FE = .471672081906791
```

```
                        NI = .223047484210588
 TOTAL SIZE OF SYSTEM:  5.9345E-04 [m]
  5  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: GAMMA

  CPU time used in timestep                    1  seconds
 3.935309888418612E-007        3.945717906831514E-007        3.914381531552864E-007        2.539202899605864E-009        7.956616734816313E-
010        1.322489446442925E-014        3.602395902059583E-
022       TIME =   3251568.0     DT =   360000.00     SUM OF SQUARES =  0.67210309E-23
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.54346504E-11 AND  -0.54346504E-11
 POSITION OF INTERFACE ALPHA / GAMMA IS   0.87664313E-04
 U-FRACTION IN SYSTEM:  CR = .305280433881722  FE = .471672081907878
                        NI = .223047484210401
 TOTAL SIZE OF SYSTEM:  5.9345E-04 [m]
  3  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: GAMMA

  CPU time used in timestep                    2  seconds
 9.202763943316840E-008        9.248958667797537E-008        9.100785475982176E-008        2.192811281867058E-009        1.186326034958367E-
009        7.520254053842260E-011        1.716230829578630E-
016       TIME =   3600000.0     DT =   348432.01     SUM OF SQUARES =  0.12708047E-16
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.50038068E-11 AND  -0.50038068E-11
 POSITION OF INTERFACE ALPHA / GAMMA IS   0.85920827E-04
 U-FRACTION IN SYSTEM:  CR = .305280433889326  FE = .471672081890306
                        NI = .223047484220368
 TOTAL SIZE OF SYSTEM:  5.9345E-04 [m]
 MUST SAVE WORKSPACE ON FILE
 WORKSPACE SAVED ON FILE
 RECLAIMING WORKSPACE
 DELETING TIME-RECORD FOR TIME    0.0000000
 DELETING TIME-RECORD FOR TIME    0.10000000E-06
 DELETING TIME-RECORD FOR TIME    0.10010000E-03
 DELETING TIME-RECORD FOR TIME    0.30010000E-03
 DELETING TIME-RECORD FOR TIME    0.70010000E-03
 DELETING TIME-RECORD FOR TIME    0.15001000E-02
 DELETING TIME-RECORD FOR TIME    0.31001000E-02
 DELETING TIME-RECORD FOR TIME    0.63001000E-02
 DELETING TIME-RECORD FOR TIME    0.12700100E-01
 DELETING TIME-RECORD FOR TIME    0.25500100E-01
 DELETING TIME-RECORD FOR TIME    0.51100100E-01
 DELETING TIME-RECORD FOR TIME    0.10230010
 DELETING TIME-RECORD FOR TIME    0.20470010
 DELETING TIME-RECORD FOR TIME    0.37017658
 DELETING TIME-RECORD FOR TIME    0.70112954
 DELETING TIME-RECORD FOR TIME     1.3630355
 DELETING TIME-RECORD FOR TIME     2.6372138
 DELETING TIME-RECORD FOR TIME     5.1855704
 DELETING TIME-RECORD FOR TIME     10.282284
 DELETING TIME-RECORD FOR TIME     15.055814
 DELETING TIME-RECORD FOR TIME     24.602875
 DELETING TIME-RECORD FOR TIME     31.094831
 DELETING TIME-RECORD FOR TIME     44.078744
 DELETING TIME-RECORD FOR TIME     60.484882
 DELETING TIME-RECORD FOR TIME     84.239087
 DELETING TIME-RECORD FOR TIME     131.74750
 DELETING TIME-RECORD FOR TIME     226.76431
 DELETING TIME-RECORD FOR TIME     416.79795
 DELETING TIME-RECORD FOR TIME     796.86523
 DELETING TIME-RECORD FOR TIME     1556.9998
 DELETING TIME-RECORD FOR TIME     3008.0232
 DELETING TIME-RECORD FOR TIME     5910.0702
 DELETING TIME-RECORD FOR TIME     11714.164
 DELETING TIME-RECORD FOR TIME     23322.352
 DELETING TIME-RECORD FOR TIME     46538.728
 DELETING TIME-RECORD FOR TIME     92971.479
 DELETING TIME-RECORD FOR TIME     185836.98
 DELETING TIME-RECORD FOR TIME     371567.99
 DELETING TIME-RECORD FOR TIME     731567.99
 DELETING TIME-RECORD FOR TIME     1091568.0
 DELETING TIME-RECORD FOR TIME     1451568.0
 DELETING TIME-RECORD FOR TIME     1811568.0
 DELETING TIME-RECORD FOR TIME     2171568.0
 DELETING TIME-RECORD FOR TIME     2531568.0
 DELETING TIME-RECORD FOR TIME     2891568.0

 KEEPING TIME-RECORD FOR TIME    3251568.0
 AND FOR TIME                    3600000.0
 WORKSPACE RECLAIMED

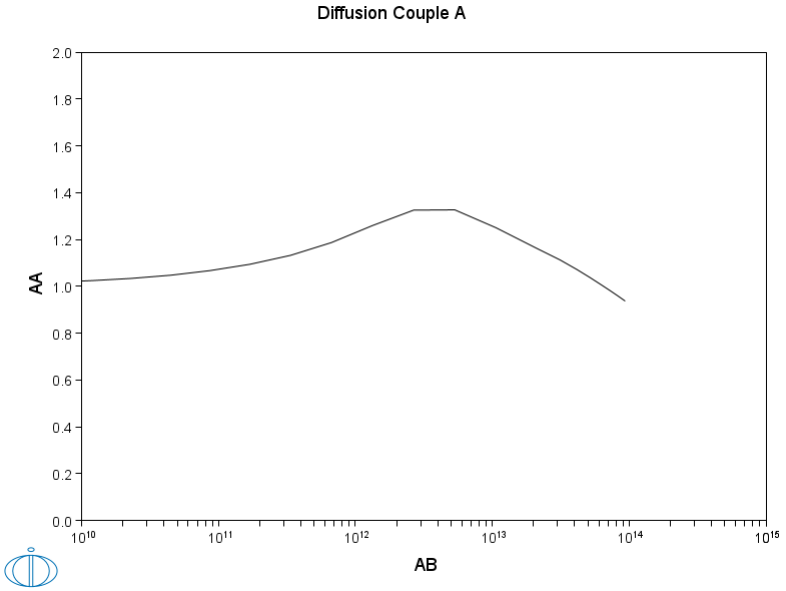
 TIMESTEP AT     3600000.00     SELECTED

DIC>
DIC> set-inter
 --OK---
DIC>
```

exb5-plot

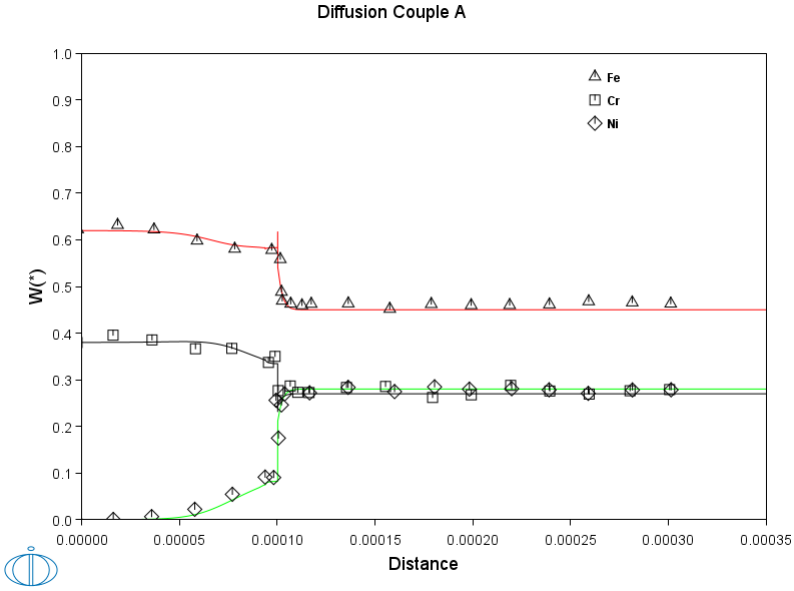
```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb5\plot.DCM.test"
DIC>
DIC>
DIC> @@ exb5_plot.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR GENERATING GRAPHICAL OUTPUT FOR EXAMPLE b5
DIC> @@
DIC>
DIC> @@
DIC> @@ GO TO THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  3.60000E+06
DIC> read exb5
 OK
DIC>
DIC> @@
DIC> @@ ENTER THE POST PROCESSOR, PLOT SOME QUANTITIES AND COMPARE WITH EXPERIMENTS
DIC> @@
DIC> post
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1: set-title Diffusion Couple A
POST-1:
POST-1: @@
POST-1: @@ WE ARE INTERESTED IN THE POSITION OF THE UPPER INTERFACE OF REGION ALPHA
POST-1: @@
POST-1: s-p-c interf alpha upper
POST-1:
POST-1: @@
POST-1: @@ l0 IS THE INITIAL THICKNESS USED FOR NORMALIZATION
POST-1: @@
POST-1: enter func l0=186.9e-6;
POST-1: enter func aa=2*poi(alpha,u)/l0;
POST-1: enter func ab=time/l0**2;
POST-1: s-i-v time
POST-1:
POST-1: s-d-a x ab
POST-1: s-s-s x n 1e10 1e15
POST-1: s-ax-ty x log
POST-1:
POST-1: s-d-a y aa
POST-1: s-s-s y n 0 2
POST-1:
POST-1: app y exb5.exp
PROLOGUE NUMBER: /0/: 0
DATASET NUMBER(s): /-1/: 7
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y

           OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

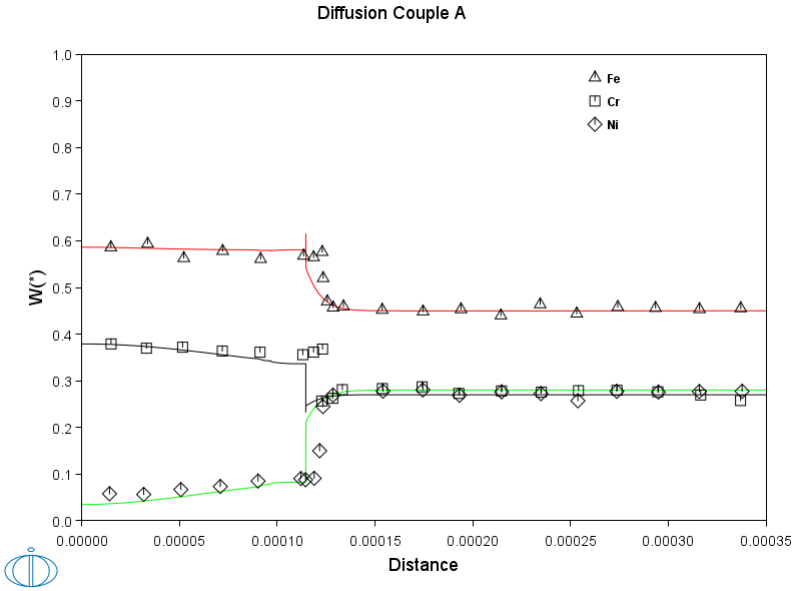



```
POST-1:
POST-1:
POST-1:
POST-1:Hit RETURN to continue
POST-1:
POST-1: @@
POST-1: @@ PLOT THE CONCENTRATION PROFILES FOR DIFFERENT ANNEALING TIMES
POST-1: @@
POST-1: s-d-a x dist glo
  INFO: Distance is set as independent variable
POST-1: s-ax-ty x lin
POST-1: s-s-s x n 0 350e-6
POST-1:
POST-1: s-d-a y w(*)
POST-1: s-s-s y n 0 1
POST-1:
POST-1: s-p-c time 3600
```

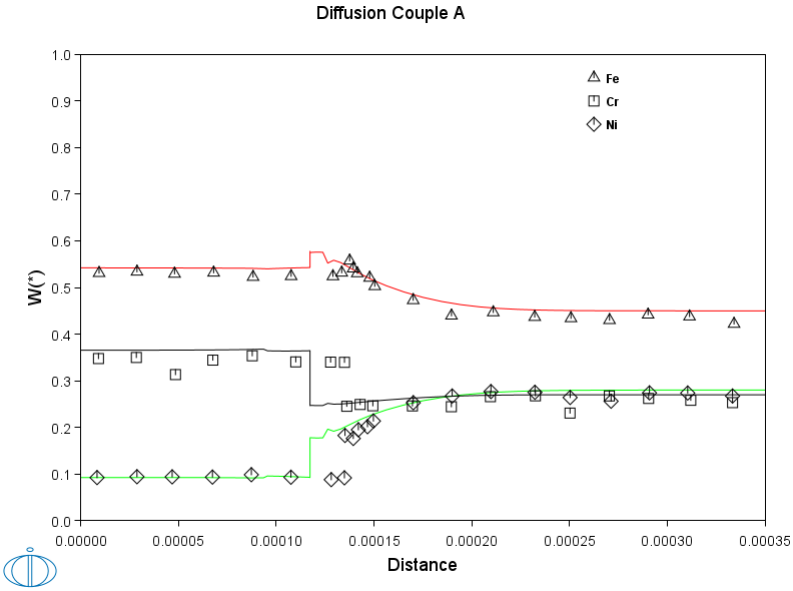
```
POST-1:
POST-1: app y exb5.exp 0; 1
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```



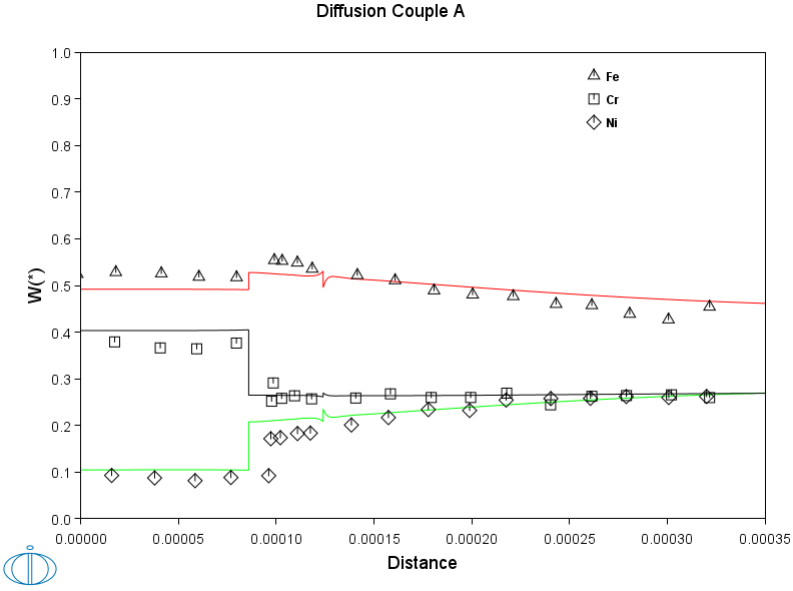

```
POST-1:
POST-1:
POST-1:
POST-1:
POST-1:Hit RETURN to continue
POST-1:
POST-1: s-p-c time 36000
POST-1: app y exb5.exp 0; 2
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```



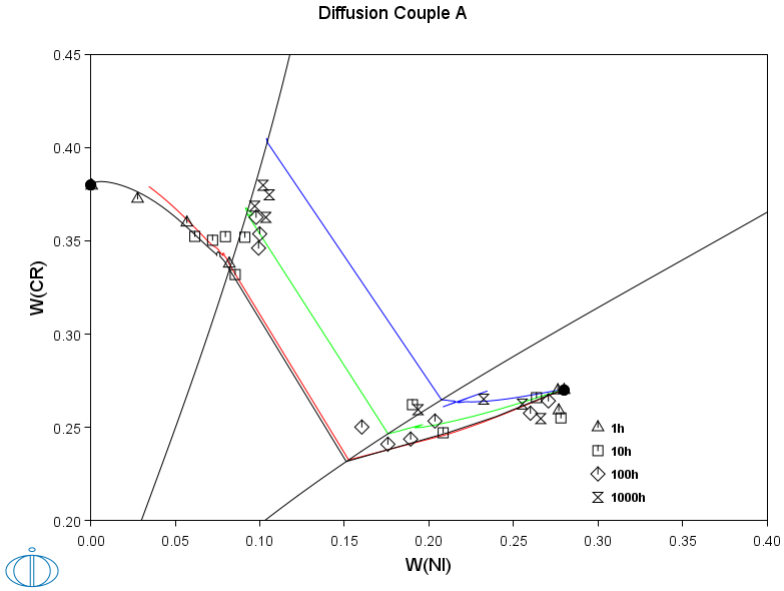

```
POST-1:
POST-1:
POST-1:
POST-1:Hit RETURN to continue
POST-1:
POST-1: s-p-c time 360000
POST-1: app y exb5.exp 0; 3
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```




```
POST-1:
POST-1:
POST-1:
POST-1:
POST-1:Hit RETURN to continue
POST-1:
POST-1: s-p-c time 3600000
POST-1: app y exb5.exp 0; 4
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```




```
POST-1:
POST-1:
POST-1:
POST-1:Hit RETURN to continue
POST-1:
POST-1: @@
POST-1: @@ FINALLY PLOT DIFFERENT DIFFUSION PATHS.
POST-1: @@
POST-1: s-d-a x w(ni)
POST-1: s-s-s x n .00 .40
POST-1:
POST-1: s-d-a y w(cr)
POST-1: s-s-s y n .20 .45
POST-1:
POST-1: s-i-v dist glob
POST-1:
POST-1: s-p-c time 3600,36000,360000,3600000
POST-1:
POST-1: app y exb5.exp 0; 5 6
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```




```
POST-1:
POST-1:
POST-1:
POST-1: set-inter
 --OK---
POST-1:
```

exb6-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb6\setup.DCM.test"
SYS: @@
SYS: @@ Moving boundary problem.
SYS: @@ Microsegregation of phosphorus
SYS: @@ This example illustrates the effect of microsegregation
SYS: @@ of phosphorus during peritectic solidification in steel.
SYS: @@------------------------------------------------------------------
SYS:
SYS: @@
SYS: @@ START BY GOING TO THE DATABASE MODULE
SYS: @@
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                     /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12:
TDB_TCFE12: @@ USE A TCFE DATABASE FOR THERMODYNAMIC DATA
TDB_TCFE12: sw tcfe9
 Current database: Steels/Fe-Alloys  v9.3

 VA                     /-  DEFINED
 L12_FCC                B2_BCC                 DICTRA_FCC_A1
   REJECTED
TDB_TCFE9:
TDB_TCFE9: @@ DEFINE THE SYSTEM TO WORK WITH
TDB_TCFE9: def-sys fe c si mn p
 FE                     C                      SI
 MN                     P  DEFINED
TDB_TCFE9:
TDB_TCFE9: @@ EXCLUDE THE THERMODYNAMIC DATA FOR THE PHASES THAT ARE NOT NEEDED
TDB_TCFE9: rej ph /all
 GAS:G                  LIQUID:L               BCC_A2
 FCC_A1                 HCP_A3                 CBCC_A12
 CUB_A13                DIAMOND_FCC_A4         RED_P
 WHITE_P                GRAPHITE               CEMENTITE
 M23C6                  M7C3                   M5C2
 KSI_CARBIDE            FE4N_LP1               FECN_CHI
 LAVES_PHASE_C14        M3SI                   MN9SI2
 MN11SI19               MN6SI                  G_PHASE
 CR3SI                  FE2SI                  FESI2_H
 FESI2_L                MSI                    M5SI3
 AL4C3                  FE8SI2C                SIC
 MN5SIC                 CUZN_EPSILON           AL5FE4
 MP_B31                 CU3P_D021              M2P_C22
 M3P_D0E                MN3P_D0E               FENBP
 FESI4P4                SIP                    SIP2
   REJECTED
TDB_TCFE9: res ph fcc liq bcc
 FCC_A1                 LIQUID:L               BCC_A2
   RESTORED
TDB_TCFE9:
TDB_TCFE9: @@ RETRIEVE DATA FROM THE DATABASE FILE
TDB_TCFE9: get
09:55:26,574 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_TCFE9:
TDB_TCFE9: @@
TDB_TCFE9: @@ MOBILITY/DIFFUSIVITY DATA ARE STORED IN A SEPARATE DATABASE FILE.
TDB_TCFE9: @@ SWITCH TO A MOBILITY DATABASE AND APPEND THE DATA.
TDB_TCFE9: @@
TDB_TCFE9: app
 Use one of these databases

 TCFE12  =  Steels/Fe-Alloys  v12.0
 TCFE9   =  Steels/Fe-Alloys  v9.3
 SSUB6   =  SGTE Substances  v6.0
 FEDEMO  =  Iron Demo Database v6.0
 MOB2    =  Alloys Mobility  v2.7
 MOBFE7  =  Steels/Fe-Alloys Mobility  v7.1
 MOBFE4  =  Steels/Fe-Alloys Mobility  v4.0
 MOBFE2  =  Steels/Fe-Alloys Mobility  v2.0
 MFEDEMO =  Fe-Alloys Mobility demo database v5.0
 USER    =  User defined Database

DATABASE NAME /TCFE9/: mobfe4
 Current database: Steels/Fe-Alloys Mobility  v4.0

 VA  DEFINED
 B2_BCC  REJECTED
APP: def-sys fe c si mn p
 FE                     C                      SI
 MN                     P  DEFINED
APP: rej ph /all
```

```
 BCC_A2                  CEMENTITE               FCC_A1
 FE4N_LP1                HCP_A3                  LIQUID:L
   REJECTED
APP: res ph fcc liq bcc
 FCC_A1                  LIQUID:L                BCC_A2
   RESTORED
APP: get
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

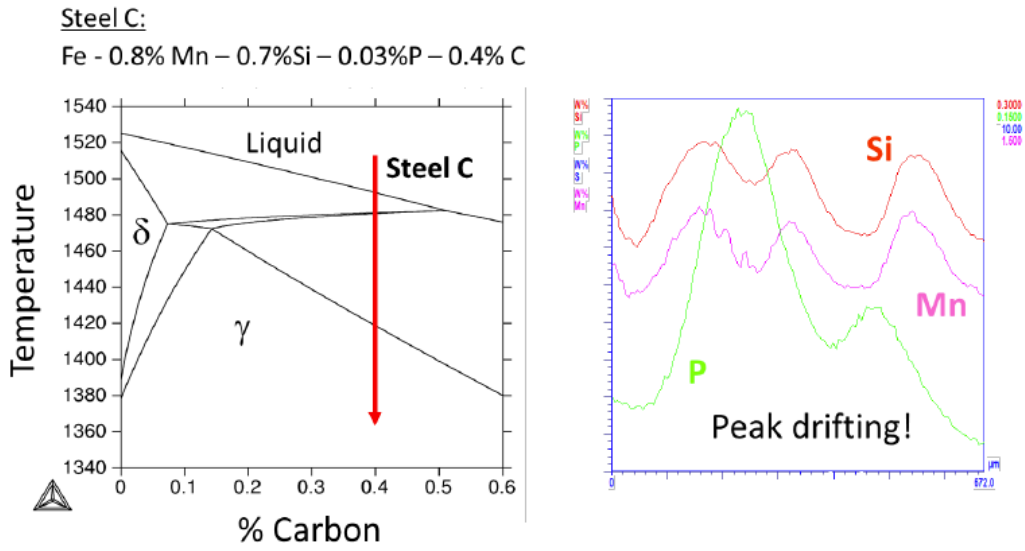
 -OK-
APP:
APP: @@
APP: @@ ENTER THE DICTRA MONITOR WHERE THE SYSTEM IS SET UP
APP: @@
APP: go d-m
 NO TIME STEP DEFINED
DIC>
DIC> @@
DIC> @@ ENTER THE GLOBAL CONDITION T
DIC> @@
DIC> @@ LOWER THE TEMPERATURE TO A RATE OF 0.2 K/s
DIC> @@
DIC> set-cond glob T 0 1780-0.2*TIME; * N
DIC>
DIC> @@
DIC> @@ ENTER A REGION CALLED smalta
DIC> @@
DIC> enter-region smalta
DIC>
DIC> @@
DIC> @@ ENTER A DOUBLE GEOMETRIC GRID INTO THE REGION
DIC> @@
DIC> enter-grid
REGION NAME : /SMALTA/: smalta
WIDTH OF REGION /1/: 1e-4
TYPE /AUTO/: AUTO
DIC>
DIC> @@
DIC> @@ ENTER active PHASES INTO THE REGION
DIC> @@
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: act
REGION NAME : /SMALTA/: smalta
PHASE TYPE /MATRIX/: matrix
PHASE NAME: /NONE/: liq
DIC>
DIC> @@
DIC> @@ ENTER inactive PHASES INTO THE REGION, BOTH PHASES ON THE SAME SIDE
DIC> @@ OF THE LIQUID REGION TO GET A PERITECTIC REACTION.
DIC> @@
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: inact
ATTACH TO REGION NAMED /SMALTA/: smalta
ATTACHED TO THE RIGHT OF SMALTA /YES/: no
PHASE NAME: /NONE/: fcc#1
DEPENDENT COMPONENT ? /SI/: fe
 REQUIRED DRIVING FORCE FOR PRECIPITATION: /1E-05/: 1e-5
CONDITION TYPE /CLOSED_SYSTEM/: closed
DIC>
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: inact
ATTACH TO REGION NAMED /SMALTA/: smalta
ATTACHED TO THE RIGHT OF SMALTA /YES/: no
PHASE NAME: /NONE/: bcc#1
DEPENDENT COMPONENT ? /SI/: fe
 REQUIRED DRIVING FORCE FOR PRECIPITATION: /1E-05/: 1e-5
CONDITION TYPE /CLOSED_SYSTEM/: closed
DIC>
DIC> @@
DIC> @@ ENTER A START COMPOSITION FOR THE LIQUID
DIC> @@
DIC> enter-composition
REGION NAME : /SMALTA/: smalta
PHASE NAME: /LIQUID/: liq
DEPENDENT COMPONENT ? /SI/: fe
COMPOSITION TYPE /MOLE_FRACTION/: w-p
PROFILE FOR /C/: c lin 0.4 0.4
PROFILE FOR /MN/: si lin 0.7 0.7
PROFILE FOR /P/: mn lin 0.8 0.8
PROFILE FOR /SI/: p lin 0.03 0.03
DIC>
DIC> @@
DIC> @@ THE BOUNDARY CONDITION IS A CLOSED SYSTEM (DEFAULT) AS WE DO NOT SPECIFY
DIC> @@ ANYTHING ELSE
DIC> @@
DIC>
DIC> @@
DIC> @@ SET THE SIMULATION TIME
DIC> @@
DIC> set-simulation-time
END TIME FOR INTEGRATION /.1/: 3000
AUTOMATIC TIMESTEP CONTROL /YES/: yes
MAX TIMESTEP DURING INTEGRATION /300/: 15
INITIAL TIMESTEP : /1E-07/:
SMALLEST ACCEPTABLE TIMESTEP : /1E-07/:
DIC>
DIC>
DIC>
DIC>
DIC> @@ CHECK THE INTERFACE POSITION. THIS IS TO MAKE SURE THAT THE LIQUID REGION
DIC> @@ DOES NOT SHRINK TOO MUCH DURING A TIMESTEP. IN ADDITION THE TIMESTEP IS
DIC> @@ CONTROLLED BY THE PHASE INTERFACE DISPLACEMENT DURING THE SIMULATION.
DIC> @@
DIC> set-option CHECK_INTERFACE_POSITION yes
DIC>
```

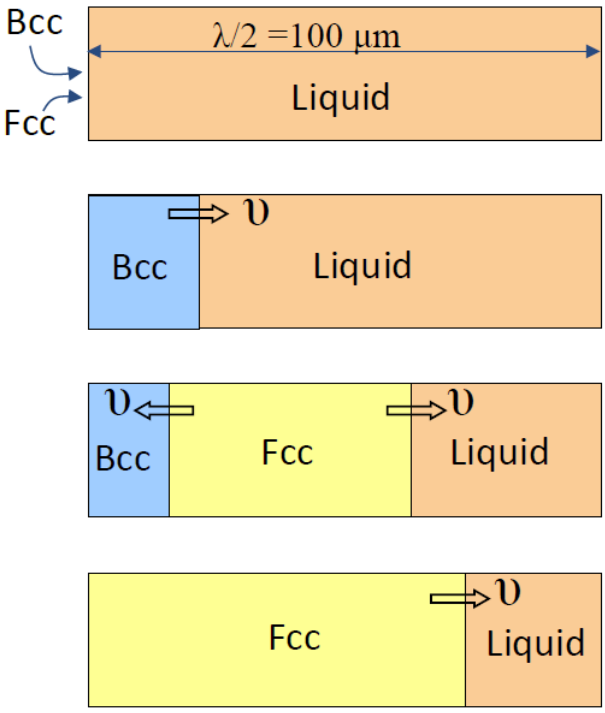
```
DIC> @@
DIC> @@ SAVE THE SET UP TO A NEW STORE FILE AND EXIT
DIC> @@
DIC> save exb6 Y
DIC>
DIC> set-inter
 --OK---
DIC>
```

Example exb6

Micro-segregation of phosphorus

This example illustrates the effect of microsegregation of phosphorus during peritectic solidification in steel.





exb6-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb6\run.DCM.test"
DIC>
DIC>
DIC> @@ exb6_run.DCM
DIC>
DIC> @@
DIC> @@ READ THE SET UP FROM FILE AND START THE SIMULATION
DIC> @@
DIC>
DIC> go d-m
 TIME STEP AT TIME  0.00000E+00
DIC> read exb6
 OK
DIC> sim
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 Region: SMALTA
 geometric    1.20000     dense at    0.00000       57 points
 DEGREE OF IMPLICITY SET TO TRAPEZOIDAL RULE
 U-FRACTION IN SYSTEM:  C = .0185375871047351  FE = .97748186120908
                        MN = .00810568126669965  P = 5.39133528237327E-04
                        SI = .0138733239959838
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
 U-FRACTION IN SYSTEM:  C = .0185375871047351  FE = .97748186120908
                        MN = .00810568126669965  P = 5.39133528237327E-04
                        SI = .0138733239959838
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
 TIME =  0.10000000E-06 DT =  0.10000000E-06 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0185375871047351  FE = .97748186120908
                        MN = .00810568126669965  P = 5.39133528237327E-04
                        SI = .0138733239959838
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    1  seconds
 TIME =  0.54150245E-05 DT =  0.53150245E-05 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .018537587104735  FE = .97748186120908
                        MN = .00810568126669965  P = 5.39133528237327E-04
                        SI = .0138733239959838
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.16045073E-04 DT =  0.10630049E-04 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .018537587104735  FE = .97748186120908
                        MN = .00810568126669966  P = 5.39133528237327E-04
                        SI = .0138733239959838
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    1  seconds
 TIME =  0.37305171E-04 DT =  0.21260098E-04 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .018537587104735  FE = .97748186120908
                        MN = .00810568126669966  P = 5.39133528237327E-04
                        SI = .0138733239959838
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.79825367E-04 DT =  0.42520196E-04 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .018537587104735  FE = .97748186120908
                        MN = .00810568126669966  P = 5.39133528237327E-04
                        SI = .0138733239959838
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    1  seconds
 TIME =  0.16486576E-03 DT =  0.85040391E-04 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .018537587104735  FE = .97748186120908
                        MN = .00810568126669966  P = 5.39133528237327E-04
                        SI = .0138733239959838
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.33494654E-03 DT =  0.17008078E-03 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .018537587104735  FE = .97748186120908
                        MN = .00810568126669965  P = 5.39133528237327E-04
                        SI = .0138733239959838
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.67510811E-03 DT =  0.34016157E-03 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .018537587104735  FE = .97748186120908
                        MN = .00810568126669966  P = 5.39133528237327E-04
                        SI = .0138733239959838
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    1  seconds
 TIME =  0.13554312E-02 DT =  0.68032313E-03 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .018537587104735  FE = .97748186120908
                        MN = .00810568126669966  P = 5.39133528237327E-04
                        SI = .0138733239959838
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.27160775E-02 DT =  0.13606463E-02 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .018537587104735  FE = .97748186120908
                        MN = .00810568126669966  P = 5.39133528237327E-04
                        SI = .0138733239959838
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    1  seconds
 TIME =  0.54373700E-02 DT =  0.27212925E-02 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .018537587104735  FE = .97748186120908
                        MN = .00810568126669965  P = 5.39133528237327E-04
                        SI = .0138733239959838
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.10879955E-01 DT =  0.54425850E-02 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .018537587104735  FE = .97748186120908
                        MN = .00810568126669965  P = 5.39133528237327E-04
                        SI = .0138733239959838
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.21765125E-01 DT =  0.10885170E-01 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .018537587104735  FE = .97748186120908
                        MN = .00810568126669966  P = 5.39133528237326E-04
                        SI = .0138733239959838
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.43535465E-01 DT =  0.21770340E-01 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .018537587104735  FE = .97748186120908
                        MN = .00810568126669965  P = 5.39133528237326E-04
                        SI = .0138733239959838
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
```

```
 TIME =  0.87076146E-01 DT =  0.43540680E-01 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .018537587104735  FE = .97748186120908
                        MN = .00810568126669966  P = 5.39133528237325E-04
                        SI = .0138733239959838
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    1  seconds
 TIME =  0.17415751     DT =  0.87081361E-01 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0185375871047349  FE = .97748186120908
                        MN = .00810568126669969  P = 5.39133528237323E-04
                        SI = .0138733239959839
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.34832023     DT =  0.17416272     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0185375871047348  FE = .97748186120908
                        MN = .00810568126669952  P = 5.39133528237323E-04
                        SI = .0138733239959838
 TOTAL SIZE OF SYSTEM:  1E-04 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.69664567     DT =  0.34832544     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0185375871047347  FE = .97748186120908
                        MN = .00810568126669964  P = 5.3913352823732E-04


output ignored...


... output resumed

 DELETING TIME-RECORD FOR TIME    1700.1489
 DELETING TIME-RECORD FOR TIME    1715.1489
 DELETING TIME-RECORD FOR TIME    1730.1489
 DELETING TIME-RECORD FOR TIME    1745.1489
 DELETING TIME-RECORD FOR TIME    1760.1489
 DELETING TIME-RECORD FOR TIME    1775.1489
 DELETING TIME-RECORD FOR TIME    1790.1489
 DELETING TIME-RECORD FOR TIME    1805.1489
 DELETING TIME-RECORD FOR TIME    1820.1489
 DELETING TIME-RECORD FOR TIME    1835.1489
 DELETING TIME-RECORD FOR TIME    1850.1489
 DELETING TIME-RECORD FOR TIME    1865.1489
 DELETING TIME-RECORD FOR TIME    1880.1489
 DELETING TIME-RECORD FOR TIME    1895.1489
 DELETING TIME-RECORD FOR TIME    1910.1489
 DELETING TIME-RECORD FOR TIME    1925.1489
 DELETING TIME-RECORD FOR TIME    1940.1489
 DELETING TIME-RECORD FOR TIME    1955.1489
 DELETING TIME-RECORD FOR TIME    1970.1489
 DELETING TIME-RECORD FOR TIME    1985.1489
 DELETING TIME-RECORD FOR TIME    2000.1489
 DELETING TIME-RECORD FOR TIME    2015.1489
 DELETING TIME-RECORD FOR TIME    2030.1489
 DELETING TIME-RECORD FOR TIME    2045.1489
 DELETING TIME-RECORD FOR TIME    2060.1489
 DELETING TIME-RECORD FOR TIME    2075.1489
 DELETING TIME-RECORD FOR TIME    2090.1489
 DELETING TIME-RECORD FOR TIME    2105.1489
 DELETING TIME-RECORD FOR TIME    2120.1489
 DELETING TIME-RECORD FOR TIME    2135.1489
 DELETING TIME-RECORD FOR TIME    2150.1489
 DELETING TIME-RECORD FOR TIME    2165.1489
 DELETING TIME-RECORD FOR TIME    2180.1489
 DELETING TIME-RECORD FOR TIME    2195.1489
 DELETING TIME-RECORD FOR TIME    2210.1489
 DELETING TIME-RECORD FOR TIME    2225.1489
 DELETING TIME-RECORD FOR TIME    2240.1489
 DELETING TIME-RECORD FOR TIME    2255.1489
 DELETING TIME-RECORD FOR TIME    2270.1489
 DELETING TIME-RECORD FOR TIME    2285.1489
 DELETING TIME-RECORD FOR TIME    2300.1489
 DELETING TIME-RECORD FOR TIME    2315.1489
 DELETING TIME-RECORD FOR TIME    2330.1489
 DELETING TIME-RECORD FOR TIME    2345.1489
 DELETING TIME-RECORD FOR TIME    2360.1489
 DELETING TIME-RECORD FOR TIME    2375.1489
 DELETING TIME-RECORD FOR TIME    2390.1489
 DELETING TIME-RECORD FOR TIME    2405.1489
 DELETING TIME-RECORD FOR TIME    2420.1489
 DELETING TIME-RECORD FOR TIME    2435.1489
 DELETING TIME-RECORD FOR TIME    2450.1489
 DELETING TIME-RECORD FOR TIME    2465.1489
 DELETING TIME-RECORD FOR TIME    2480.1489
 DELETING TIME-RECORD FOR TIME    2495.1489
 DELETING TIME-RECORD FOR TIME    2510.1489
 DELETING TIME-RECORD FOR TIME    2525.1489
 DELETING TIME-RECORD FOR TIME    2540.1489
 DELETING TIME-RECORD FOR TIME    2555.1489
 DELETING TIME-RECORD FOR TIME    2570.1489
 DELETING TIME-RECORD FOR TIME    2585.1489
 DELETING TIME-RECORD FOR TIME    2600.1489
 DELETING TIME-RECORD FOR TIME    2615.1489
 DELETING TIME-RECORD FOR TIME    2630.1489
 DELETING TIME-RECORD FOR TIME    2645.1489
 DELETING TIME-RECORD FOR TIME    2660.1489
 DELETING TIME-RECORD FOR TIME    2675.1489
 DELETING TIME-RECORD FOR TIME    2690.1489
 DELETING TIME-RECORD FOR TIME    2705.1489
 DELETING TIME-RECORD FOR TIME    2720.1489
 DELETING TIME-RECORD FOR TIME    2735.1489
 DELETING TIME-RECORD FOR TIME    2750.1489
 DELETING TIME-RECORD FOR TIME    2765.1489
 DELETING TIME-RECORD FOR TIME    2780.1489
 DELETING TIME-RECORD FOR TIME    2795.1489
 DELETING TIME-RECORD FOR TIME    2810.1489
 DELETING TIME-RECORD FOR TIME    2825.1489
 DELETING TIME-RECORD FOR TIME    2840.1489
 DELETING TIME-RECORD FOR TIME    2855.1489
 DELETING TIME-RECORD FOR TIME    2870.1489
 DELETING TIME-RECORD FOR TIME    2885.1489
 DELETING TIME-RECORD FOR TIME    2900.1489
 DELETING TIME-RECORD FOR TIME    2915.1489
 DELETING TIME-RECORD FOR TIME    2930.1489
 DELETING TIME-RECORD FOR TIME    2945.1489
 DELETING TIME-RECORD FOR TIME    2960.1489
 DELETING TIME-RECORD FOR TIME    2975.1489
```

```
 KEEPING TIME-RECORD FOR TIME    2990.1489
 AND FOR TIME                    3000.0000
 WORKSPACE RECLAIMED

 TIMESTEP AT     3000.00000     SELECTED

DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
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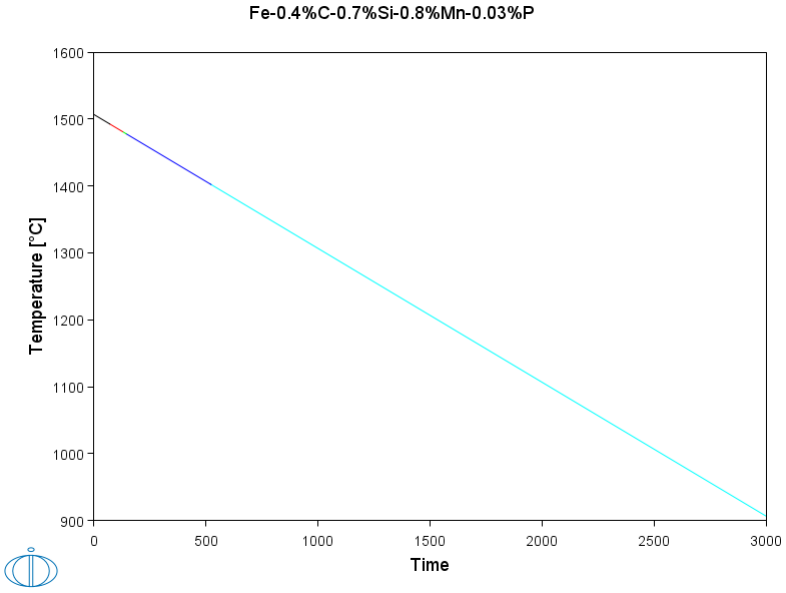
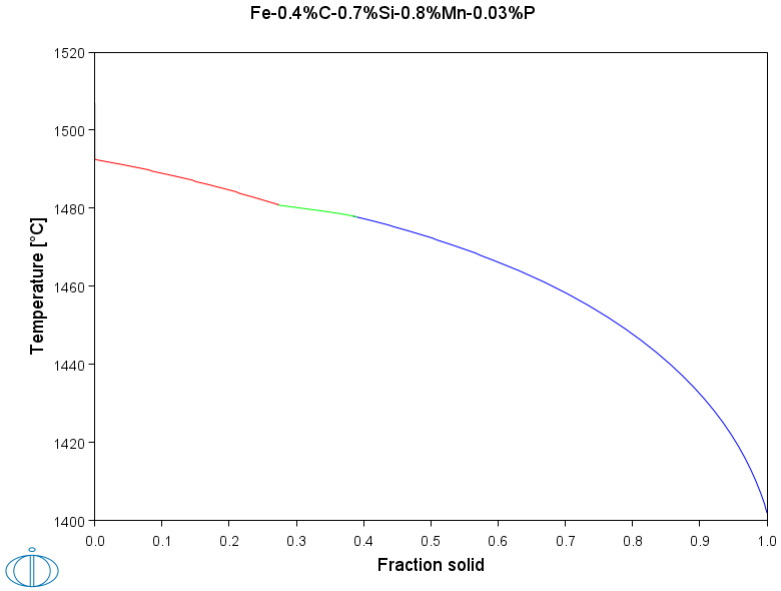
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC>
DIC> set-inter
 --OK---
DIC>
```

exb6-plot

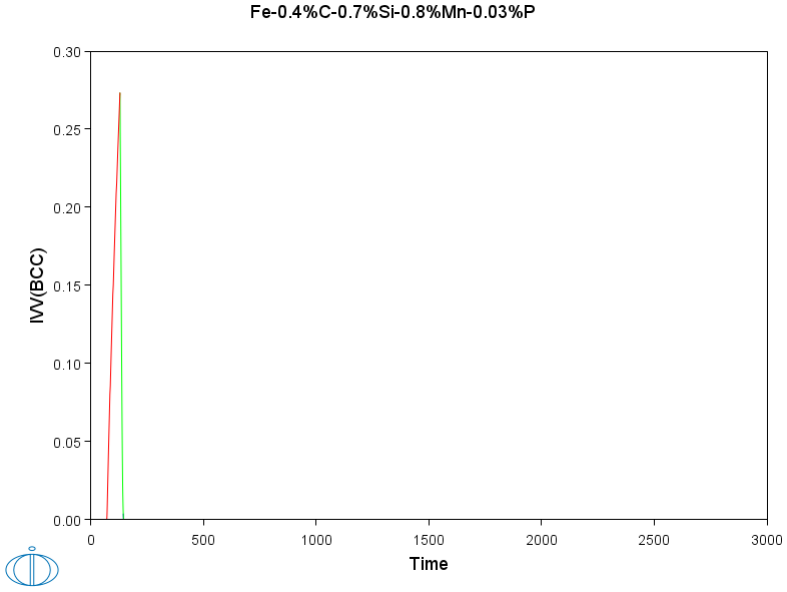
```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb6\plot.DCM.test"
DIC>
DIC>
DIC>
DIC> @@
DIC> @@ GO TO THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  3.00000E+03
DIC> read exb6
 OK
DIC>
DIC> @@
DIC> @@ GO TO THE POST PROCESSOR
DIC> @@
DIC> post
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1: set-title Fe-0.4%C-0.7%Si-0.8%Mn-0.03%P
POST-1:
POST-1: s-d-a y t-c
POST-1: s-d-a x time
  INFO: Time is set as independent variable
POST-1: s-p-c interf first
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
WORKING ...working ...
WORKING ...working ...           OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```



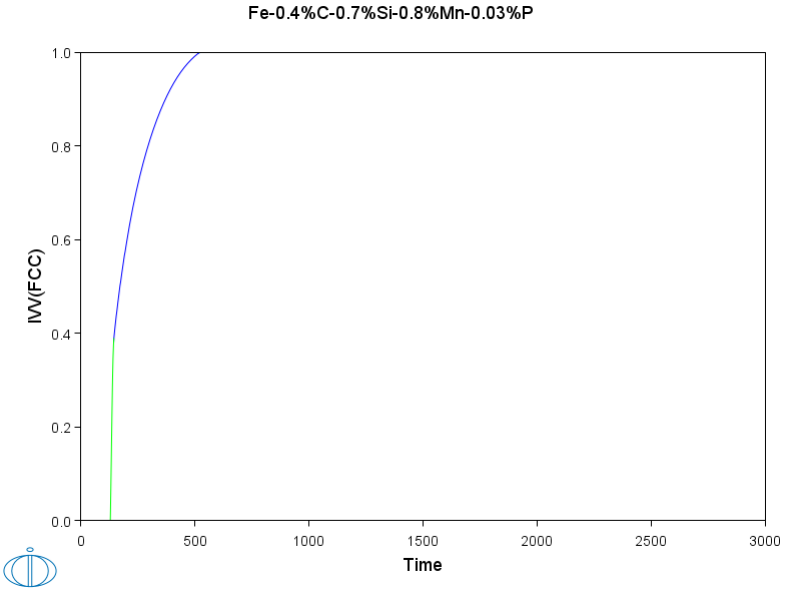

```
POST-1:
POST-1:Hit RETURN to continue
POST-1:
POST-1: @@
POST-1: @@ PLOT THE FRACTION OF SOLID
POST-1: @@
POST-1: enter func fs=1-ivv(liq);
POST-1: s-d-a x fs
POST-1: s-s-s x n 0 1
POST-1: s-ax-te x n Fraction solid
POST-1:
POST-1: s-d-a y t-c
POST-1:
POST-1:
POST-1: s-p-c interf smalta lower
POST-1:
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
WORKING ...working ...
WORKING ...working ...           OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```



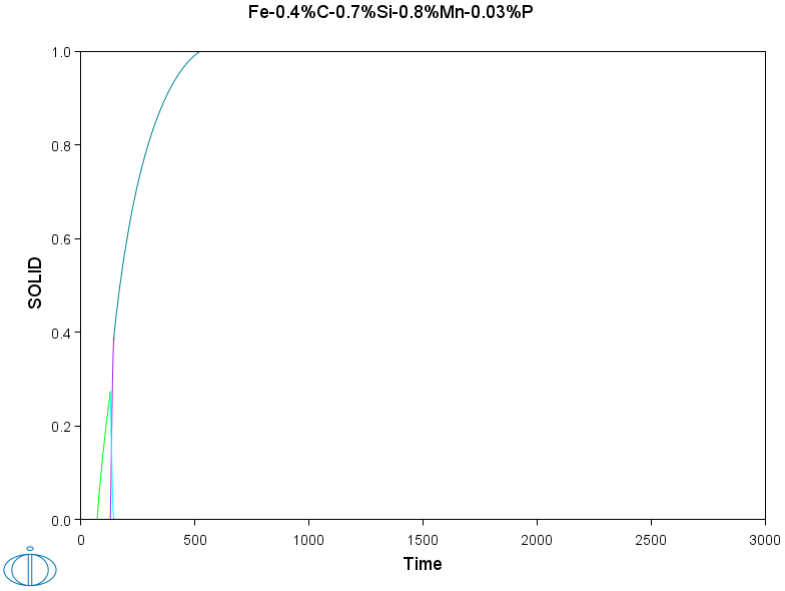

```
POST-1:
POST-1:Hit RETURN to continue
POST-1: s-d-a y ivv(bcc)
POST-1: s-d-a x time
  INFO: Time is set as independent variable
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
WORKING ...working ...
WORKING ...working ...           OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```



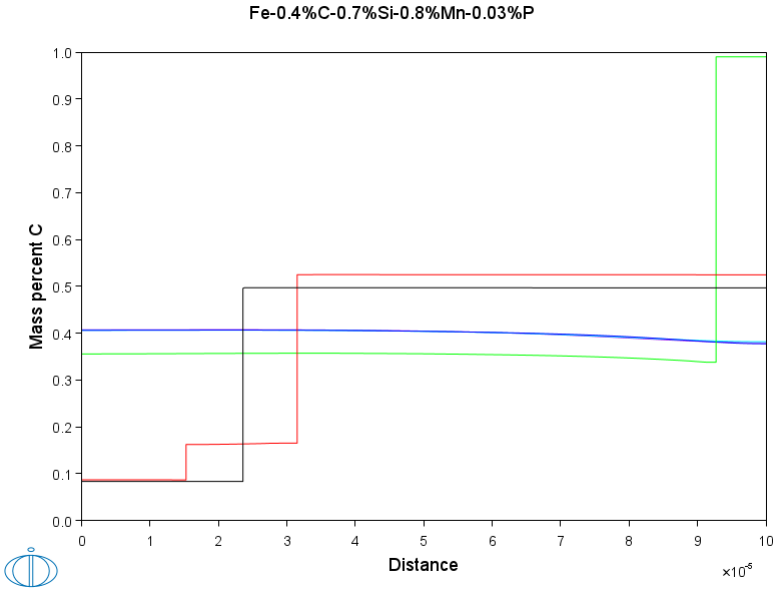

```
POST-1:
POST-1:Hit RETURN to continue
POST-1:
POST-1: s-d-a y ivv(fcc)
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
WORKING ...working ...
WORKING ...working ...           OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```



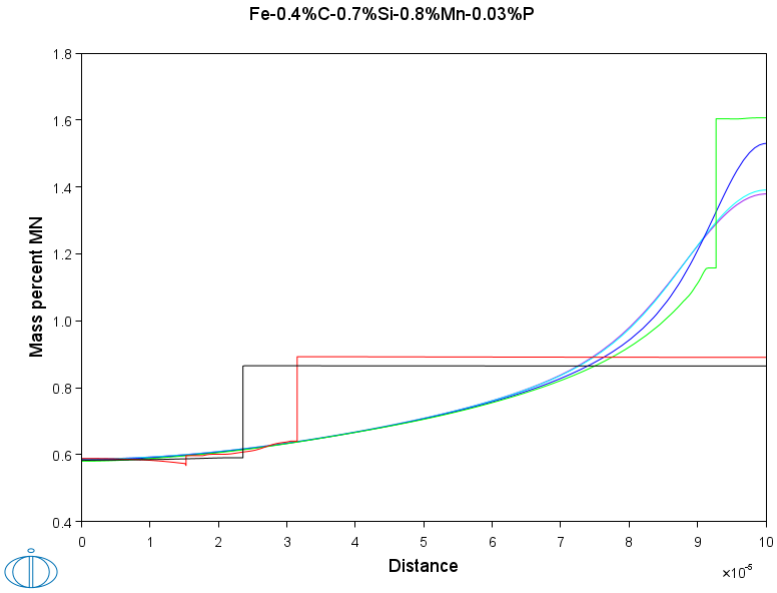

```
POST-1:
POST-1:Hit RETURN to continue
POST-1: ent table solid
Variable(s) ivv(bcc) ivv(fcc)
POST-1:
POST-1: s-d-a y solid
COLUMN NUMBER /*/:
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
WORKING ...working ...
WORKING ...working ...           OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```



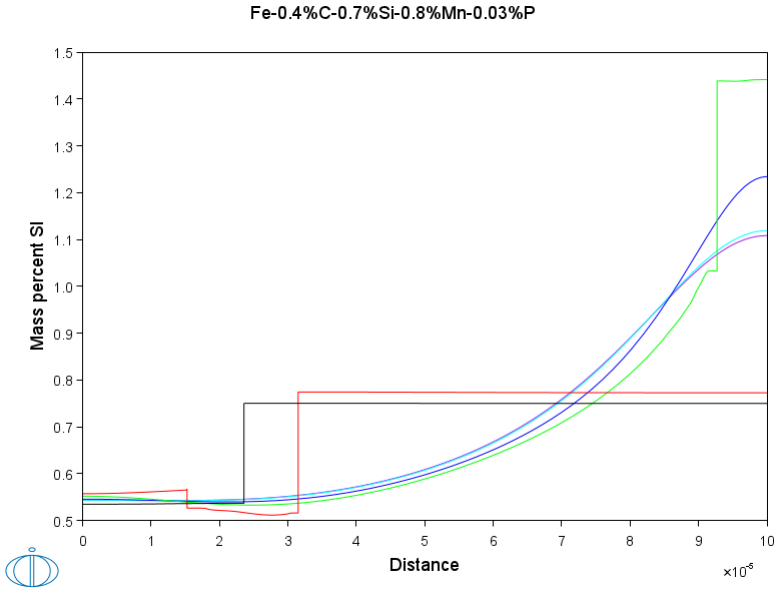

```
POST-1:
POST-1:Hit RETURN to continue
POST-1: s-d-a y w-p c
POST-1: s-d-a x dis gl
  INFO: Distance is set as independent variable
POST-1: s-p-c time 120,135,400,700,1500,3000
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
WORKING ...working ...OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```



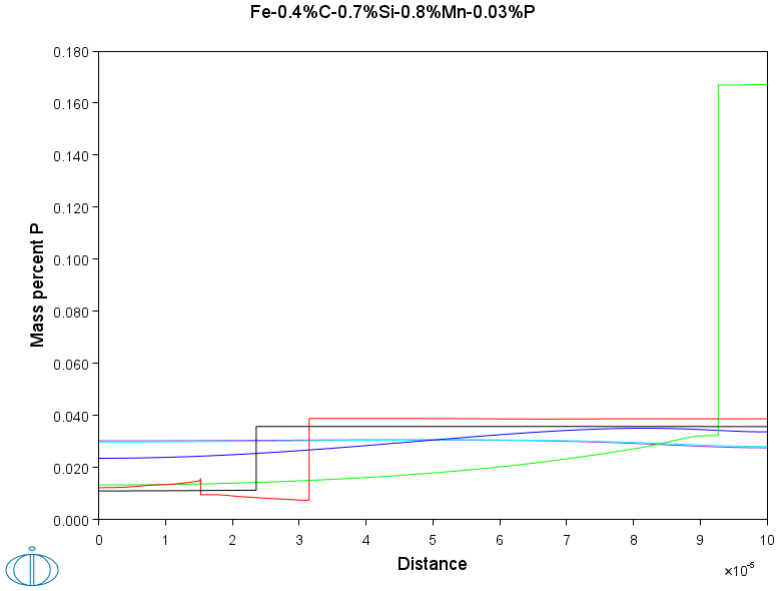

```
POST-1:
POST-1:Hit RETURN to continue
POST-1: s-d-a y w-p mn
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
WORKING ...working ...OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```



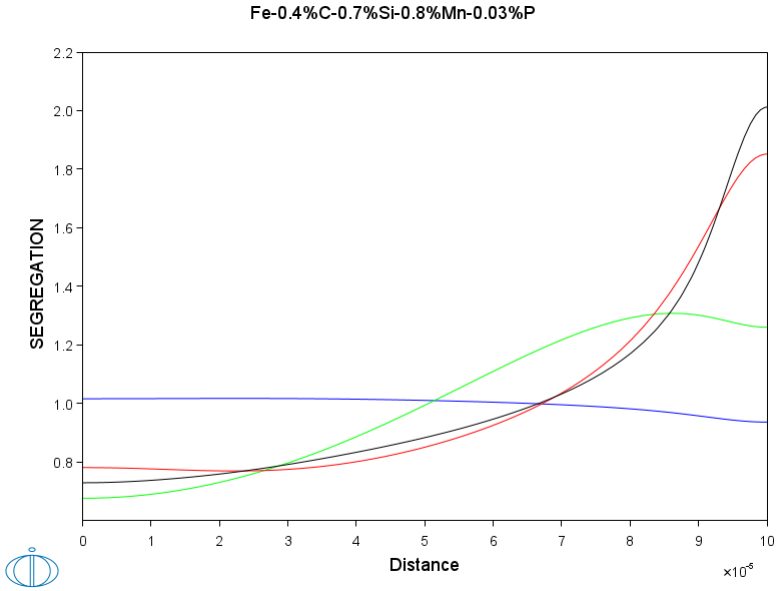

```
POST-1:
POST-1:Hit RETURN to continue
POST-1: s-d-a y w-p si
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
WORKING ...working ...OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```



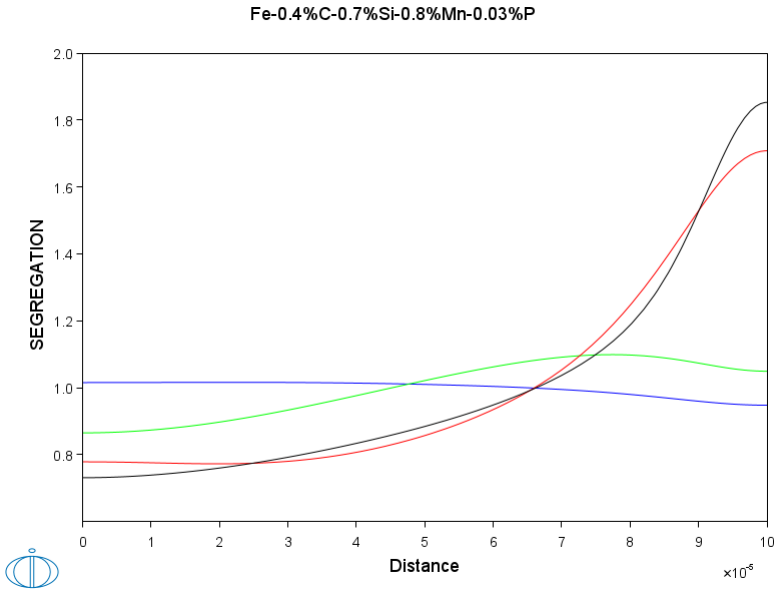

```
POST-1:
POST-1:Hit RETURN to continue
POST-1: s-d-a y w-p p
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
WORKING ...working ...OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```



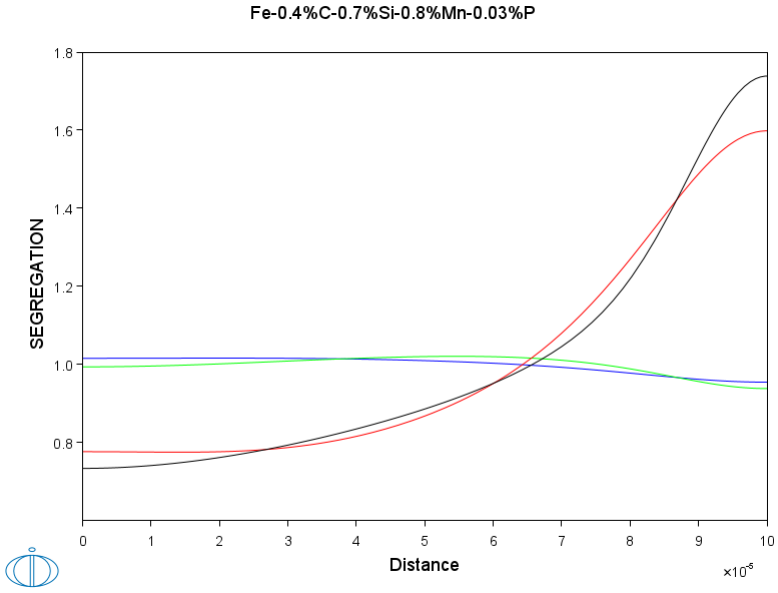

```
POST-1:
POST-1:Hit RETURN to continue
POST-1:
POST-1: ent function mnn
FUNCTION: w(mn)/0.008
&
POST-1: ent function sin
FUNCTION: w(si)/0.007
&
POST-1: ent function pn
FUNCTION: w(p)/0.0003
&
POST-1: ent function cn
FUNCTION: w(c)/0.004
&
POST-1: ent tabel segregation
Variable(s) mnn sin pn cn
POST-1:
POST-1:
POST-1: s-d-a y segregation
COLUMN NUMBER /*/:
POST-1:
POST-1:
POST-1: s-p-c time 610
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```



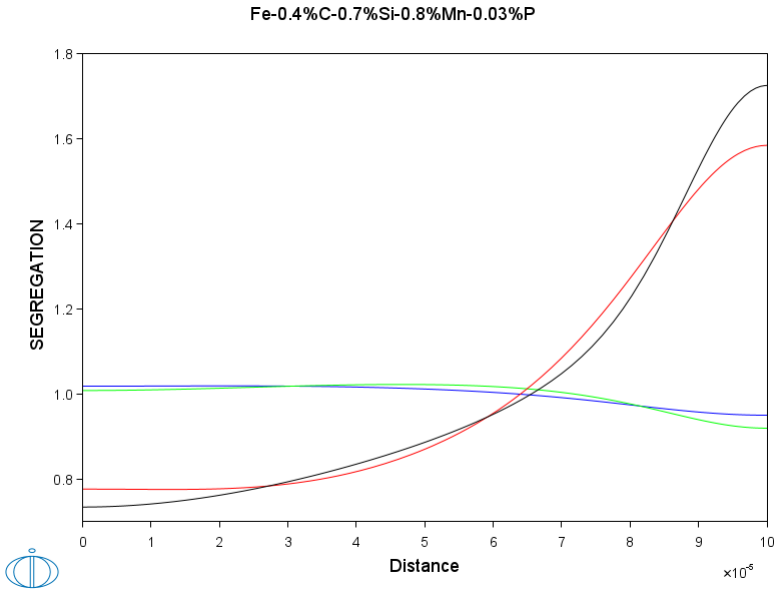

```
POST-1:
POST-1:Hit RETURN to continue
POST-1:
POST-1: s-p-c time 800
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```




```
POST-1:
POST-1:Hit RETURN to continue
POST-1:
POST-1: s-p-c time 1500
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```




```
POST-1:
POST-1:Hit RETURN to continue
POST-1:
POST-1: s-p-c time 3000
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

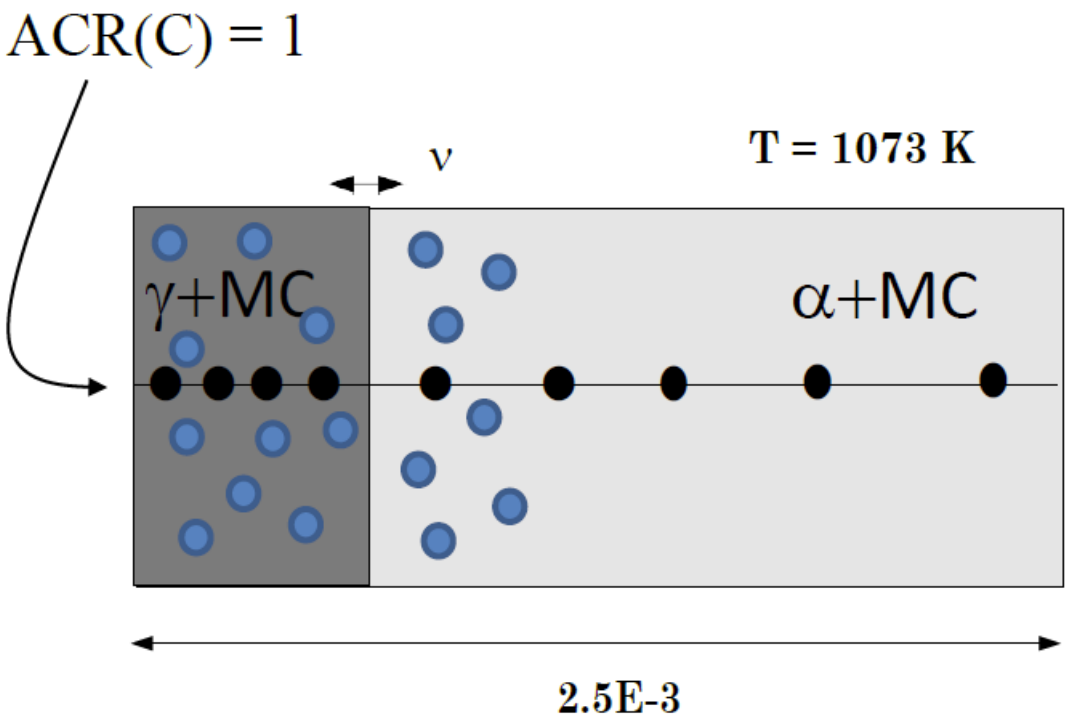



```
POST-1:
POST-1:Hit RETURN to continue
POST-1: set-inter
 --OK---
POST-1:
```

Example exb7

Moving boundary problem with multiple phases on each side of the boundary

This example shows how to enter dispersed phases on either side of a phase interface. The particular case shows how the kinetics of a ferrite to austenite transformation is affected by simultaneous precipitation of niobium carbide. The transformation is caused by carburization.



exb7-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb7\setup.DCM"
SYS: @@ This example modifies the database interactively, which is not
SYS: @@ yet supported by GES6. Therefore, we enforce the use of GES5.
SYS: set-ges-version 5
SYS:
SYS: @@
SYS: @@ Moving boundary problem.
SYS: @@ Moving boundary problem with multiple phases on each side
SYS: @@ This example shows how to enter dispersed phases on either side
SYS: @@ of a phase interface. The particular case shows how
SYS: @@ the kinetics of a ferrite to austenite transformation is
SYS: @@ affected by simultaneous precipitation of niobium carbide.
SYS: @@ The transformation is caused by carburization.
SYS: @@----------------------------------------------------------------------
SYS:
SYS: @@
SYS: @@ RETRIEVE DATA FROM THE DATABASE
SYS: @@
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                       /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12:
TDB_TCFE12: @@
TDB_TCFE12: @@ USE A TCFE DATABASE FOR THERMODYNAMIC DATA
TDB_TCFE12: @@
TDB_TCFE12: sw tcfe9
 Current database: Steels/Fe-Alloys  v9.3

 VA                       /-  DEFINED
 L12_FCC                  B2_BCC                   DICTRA_FCC_A1
   REJECTED
TDB_TCFE9:
TDB_TCFE9: @@
TDB_TCFE9: @@ DEFINE THE SYSTEM TO WORK WITH
TDB_TCFE9: @@
TDB_TCFE9: def-species fe c nb
 FE                       C                        NB
   DEFINED
TDB_TCFE9:
TDB_TCFE9: @@
TDB_TCFE9: @@ EXCLUDE THE THERMODYNAMIC DATA FOR THE PHASES THAT ARE NOT NEEDED
TDB_TCFE9: @@
TDB_TCFE9: rej ph * all
 GAS:G                    LIQUID:L                 BCC_A2
 FCC_A1                   HCP_A3                   CBCC_A12
 CUB_A13                  DIAMOND_FCC_A4           GRAPHITE
 CEMENTITE                M23C6                    M7C3
 M6C                      M5C2                     KSI_CARBIDE
 Z_PHASE                  FE4N_LP1                 FECN_CHI
 SIGMA                    MU_PHASE                 LAVES_PHASE_C14
 G_PHASE                  CR3SI                    NBNI3
 AL5FE4  REJECTED
TDB_TCFE9: res ph fcc bcc grap
 FCC_A1                   BCC_A2                   GRAPHITE
   RESTORED
TDB_TCFE9:
TDB_TCFE9: @@
TDB_TCFE9: @@ RETRIEVE DATA FROM THE DATABASE FILE
TDB_TCFE9: @@
TDB_TCFE9: get
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 Creating a new composition set FCC_A1#2
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_TCFE9:
TDB_TCFE9: @@
TDB_TCFE9: @@ NOW APPEND A SSUB DATABASE FROM WHICH WE READ THE THERMODYNAMIC
TDB_TCFE9: @@ DESCRIPTION OF NIOBIUM CARBIDE
TDB_TCFE9: @@
TDB_TCFE9:
TDB_TCFE9: app SSUB6
 Current database: SGTE Substances  v6.0

 VA  DEFINED
APP: def-sys  fe c nb
 FE                       C                        NB
   DEFINED
APP: rej ph *
 GAS:G                    C0_749NB1_S              C0_877NB1_S
 C0_98NB1_S               C_S                      C_L
 DIAMOND                  C1FE3_S                  C1NB1_S
 C1NB2_S                  C60_S                    FE_S
 FE_S2                    FE_S3                    FE_L
```

```
 FE2NB1_S                NB_S                    NB_L
   REJECTED
APP: rest ph c1nb1_s
 C1NB1_S  RESTORED
APP: get
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
APP:
APP:
APP: @@
APP: @@ MOBILITY/DIFFUSIVITY DATA ARE STORED IN A SEPARATE DATABASE FILE.
APP: @@ SWITCH TO A MOBILITY DATABASE TO RETRIEVE THE DATA
APP: @@
APP: app mobfe4
 Current database: Steels/Fe-Alloys Mobility  v4.0

 VA  DEFINED
 B2_BCC  REJECTED
APP: def-sys fe c nb
 FE                      C                       NB
   DEFINED
APP: rej ph * all
 BCC_A2                  CEMENTITE               FCC_A1
 FE4N_LP1                HCP_A3                  LIQUID:L
   REJECTED
APP: res ph fcc bcc
 FCC_A1                  BCC_A2  RESTORED
APP: get
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
APP:
APP: @@
APP: @@ ENTER THE DICTRA MONITOR WHERE THE SYSTEM IS SET UP
APP: @@
APP: go d-m
 NO TIME STEP DEFINED
 *** ENTERING GRAPHITE AS A DIFFUSION NONE PHASE
 *** ENTERING C1NB1_S AS A DIFFUSION NONE PHASE
DIC>
DIC> @@
DIC> @@ ENTER THE GLOBAL CONDITION T
DIC> @@
DIC> set-cond glob T 0 1073.15; * N
DIC>
DIC> @@
DIC> @@ ENTER REGIONS ferr AND aus
DIC> @@
DIC> enter-region
REGION NAME : ferr
DIC>
DIC> ent-reg
REGION NAME : aus
ATTACH TO REGION NAMED /FERR/: ferr
ATTACHED TO THE RIGHT OF FERR /YES/: n
DIC>
DIC> @@
DIC> @@ ENTER GRIDS INTO REGIONS
DIC> @@
DIC> enter-grid
REGION NAME : /AUS/: ferr
WIDTH OF REGION /1/: 2.499999e-3
TYPE /AUTO/: AUTO
DIC>
DIC>
DIC> enter-grid
REGION NAME : /AUS/: aus
WIDTH OF REGION /1/: 1e-9
TYPE /AUTO/: AUTO
DIC>
DIC>
DIC> @@
DIC> @@ ENTER active PHASES INTO REGIONS
DIC> @@
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: active
REGION NAME : /AUS/: ferr
PHASE TYPE /MATRIX/: matrix
PHASE NAME: /NONE/: bcc
DIC>
DIC>
DIC> en-ph
ACTIVE OR INACTIVE PHASE /ACTIVE/: act
REGION NAME : /AUS/: ferr
PHASE TYPE /MATRIX/: sph
PHASE NAME: /NONE/: c1nb1_s
 INFO: EQUILIBRIUM COMPOSITION AND FRACTION OF SPHEROID PHASES USED AS DEFAULT
DIC>
DIC>
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: active
REGION NAME : /AUS/: aus
PHASE TYPE /MATRIX/: matrix
PHASE NAME: /NONE/: fcc#1
DIC>
DIC>
DIC> en-ph
ACTIVE OR INACTIVE PHASE /ACTIVE/: act
REGION NAME : /AUS/: aus
```

```
PHASE TYPE /MATRIX/: sph
PHASE NAME: /NONE/: c1nb1_s
 INFO: EQUILIBRIUM COMPOSITION AND FRACTION OF SPHEROID PHASES USED AS DEFAULT
DIC>
DIC> @@
DIC> @@ ENTER THE INITIAL COMPOSITIONS OF THE PHASES
DIC> @@
DIC> enter-composition
REGION NAME : /AUS/: ferr
PHASE NAME: /BCC_A2/: bcc
DEPENDENT COMPONENT ? /NB/: fe
COMPOSITION TYPE /MOLE_FRACTION/: w-p
PROFILE FOR /C/: C
TYPE /LINEAR/: lin
VALUE OF FIRST POINT : 1e-3
VALUE OF LAST POINT : /1E-3/: 1e-3
PROFILE FOR /NB/: nb
TYPE /LINEAR/: lin
VALUE OF FIRST POINT : 0.28
VALUE OF LAST POINT : /0.28/: 0.28
DIC>
DIC> en-co
REGION NAME : /AUS/: ferr
PHASE NAME: /BCC_A2/: c1nb1_s
USE EQUILIBRIUM VALUE /Y/: y
DIC>
DIC> enter-composition
REGION NAME : /AUS/: aus
PHASE NAME: /FCC_A1#1/: fcc#1
DEPENDENT COMPONENT ? /NB/: fe
COMPOSITION TYPE /MOLE_FRACTION/: w-p
PROFILE FOR /C/: C
TYPE /LINEAR/: lin
VALUE OF FIRST POINT : 0.89
VALUE OF LAST POINT : /0.89/: 0.89
PROFILE FOR /NB/: nb
TYPE /LINEAR/: lin
VALUE OF FIRST POINT : 0.28
VALUE OF LAST POINT : /0.28/: 0.28
DIC>
DIC> en-co
REGION NAME : /AUS/: aus
PHASE NAME: /FCC_A1#1/: c1nb1_s
USE EQUILIBRIUM VALUE /Y/: y
DIC>
DIC>
DIC> @@
DIC> @@ SET THE SIMULATION TIME
DIC> @@
DIC> set-simulation-time
END TIME FOR INTEGRATION /.1/: 32400
AUTOMATIC TIMESTEP CONTROL /YES/: y
MAX TIMESTEP DURING INTEGRATION /3240/: 3240
INITIAL TIMESTEP : /1E-07/: 1e-8
SMALLEST ACCEPTABLE TIMESTEP : /1E-08/: 1e-15
DIC>
DIC>
DIC>
DIC>
DIC> @@
DIC> @@ SET THE REFERENCE PHASE OF CARBON AS GRAPHITE
DIC> @@
DIC> s-ref
Component: c
Reference state: grap
Temperature /*/: *
Pressure /100000/: 1e5
DIC>
DIC> @@
DIC> @@ SET THE BOUNDARY CONDITION.
DIC> @@ THE CARBON ACTIVITY IS THE ONE ON THE BOUNDARY
DIC> @@
DIC> s-cond
GLOBAL OR BOUNDARY CONDITION /GLOBAL/: bound
BOUNDARY /LOWER/: low
CONDITION TYPE /CLOSED_SYSTEM/: mix
Dependent substitutional element:FE
Dependent interstitial element:VA
TYPE OF CONDITION FOR COMPONENT C /ZERO_FLUX/: act
LOW TIME LIMIT /0/: 0
ACR(C)(TIME)= 1.0;
HIGH TIME LIMIT /*/: *
ANY MORE RANGES /N/: N
TYPE OF CONDITION FOR COMPONENT NB /ZERO_FLUX/: zero
DIC>
DIC> @@
DIC> @@ ENABLE THE HOMOGENIZATION MODEL
DIC> @@
DIC> ho y y
 INFO: HOMOGENIZATION MODEL ENABLED
DIC>
DIC>
DIC>
DIC>
DIC> @@
DIC> @@ SAVE THE SET UP TO A NEW STORE FILE AND EXIT
DIC> @@
DIC> save exb7 Y
DIC>
DIC>
DIC> set-inter
 --OK---
DIC>
```

exb7-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb7\run.DCM"
DIC> @@
DIC> @@ READ THE SET UP FROM FILE AND START THE SIMULATION
DIC> @@
DIC>
DIC> go d-m
 TIME STEP AT TIME  0.00000E+00
 *** ENTERING GRAPHITE AS A DIFFUSION NONE PHASE
 *** ENTERING C1NB1_S AS A DIFFUSION NONE PHASE
DIC> read exb7
 OK
DIC> sim yes
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 Region: AUS
 geometric    1.00414     dense at    0.00000       25 points
 geometric   0.995873     dense at   0.100000E-08   26 points
 Region: FERR
 geometric    1.02000     dense at    0.00000       50 points
 DEGREE OF IMPLICITY SET TO EULER BACKWARD
 INFO: not solving in latticefixed frame of reference
 STARTING SIMULATION USING HOMOGENIZATION MODEL
 ------------------------------------------------
 WARNING: ELEMENT C
 IS BOTH INTERSTITIAL AND SUBSTITUTIONAL
 AND RESULTS MUST BE INTERPRETED WITH CARE
 INFO: PHASE WITH LIMITED SOLUBILITY OF ELEMENT(S) EXIST
 A FALLBACK PHASE ZZDICTRA_GHOST WILL BE DEFINED
 ALONG WITH THE FOLLOWING PARAMETERS:
 G(ZZDICTRA_GHOST,C;0)-H298(GRAPHITE,C;0)
 G(ZZDICTRA_GHOST,FE;0)-H298(BCC_A2,FE;0)
 G(ZZDICTRA_GHOST,NB;0)-H298(BCC_A2,NB;0)
 L(ZZDICTRA_GHOST,C,FE;0)
 L(ZZDICTRA_GHOST,C,NB;0)
 L(ZZDICTRA_GHOST,FE,NB;0)
 INFO: FCC_A1#2 is stable but not entered in the simulation
  WARNING:C1NB1_S HAS NO VOLUME FRACTION, CREATING ONE
  WARNING:C1NB1_S HAS NO VOLUME FRACTION, CREATING ONE
Starting time-step t0=   0.0000000     dt=  0.10000000E-07
 Error                    408
Starting time-step t0=  0.97656250E-11 dt=  0.97656250E-11
Starting time-step t0=  0.19531250E-10 dt=  0.19531250E-10
Starting time-step t0=  0.39062500E-10 dt=  0.39062500E-10
Starting time-step t0=  0.78125000E-10 dt=  0.78125000E-10
Starting time-step t0=  0.15625000E-09 dt=  0.15625000E-09
Starting time-step t0=  0.31250000E-09 dt=  0.31250000E-09
Starting time-step t0=  0.62500000E-09 dt=  0.31250000E-09
Starting time-step t0=  0.93750000E-09 dt=  0.31250000E-09
Starting time-step t0=  0.12500000E-08 dt=  0.31250000E-09
Starting time-step t0=  0.15625000E-08 dt=  0.62500000E-09
Starting time-step t0=  0.21875000E-08 dt=  0.62500000E-09
Starting time-step t0=  0.28125000E-08 dt=  0.62500000E-09
Starting time-step t0=  0.34375000E-08 dt=  0.12500000E-08
Starting time-step t0=  0.46875000E-08 dt=  0.12500000E-08
Starting time-step t0=  0.59375000E-08 dt=  0.25000000E-08
Starting time-step t0=  0.84375000E-08 dt=  0.50000000E-08
Starting time-step t0=  0.13437500E-07 dt=  0.10000000E-07
Starting time-step t0=  0.23437500E-07 dt=  0.10000000E-07
Starting time-step t0=  0.33437500E-07 dt=  0.10000000E-07
Starting time-step t0=  0.43437500E-07 dt=  0.10000000E-07
Starting time-step t0=  0.53437500E-07 dt=  0.20000000E-07
Starting time-step t0=  0.73437500E-07 dt=  0.20000000E-07
Starting time-step t0=  0.93437500E-07 dt=  0.20000000E-07
Starting time-step t0=  0.11343750E-06 dt=  0.40000000E-07
Starting time-step t0=  0.15343750E-06 dt=  0.40000000E-07
Starting time-step t0=  0.19343750E-06 dt=  0.80000000E-07
Starting time-step t0=  0.27343750E-06 dt=  0.80000000E-07
Starting time-step t0=  0.35343750E-06 dt=  0.16000000E-06
Starting time-step t0=  0.51343750E-06 dt=  0.32000000E-06
Starting time-step t0=  0.83343750E-06 dt=  0.64000000E-06
Starting time-step t0=  0.14734375E-05 dt=  0.12800000E-05
Starting time-step t0=  0.27534375E-05 dt=  0.25600000E-05
Starting time-step t0=  0.53134375E-05 dt=  0.51200000E-05
Starting time-step t0=  0.10433438E-04 dt=  0.10240000E-04
Starting time-step t0=  0.20673438E-04 dt=  0.20480000E-04
Starting time-step t0=  0.41153438E-04 dt=  0.40960000E-04
Starting time-step t0=  0.82113438E-04 dt=  0.81920000E-04
Starting time-step t0=  0.16403344E-03 dt=  0.16384000E-03
Starting time-step t0=  0.32787344E-03 dt=  0.32768000E-03
Starting time-step t0=  0.65555344E-03 dt=  0.65536000E-03
Starting time-step t0=  0.13109134E-02 dt=  0.13107200E-02
Starting time-step t0=  0.26216334E-02 dt=  0.26214400E-02
Starting time-step t0=  0.52430734E-02 dt=  0.52428800E-02
Starting time-step t0=  0.10485953E-01 dt=  0.10485760E-01
Starting time-step t0=  0.20971713E-01 dt=  0.20971520E-01
Starting time-step t0=  0.41943233E-01 dt=  0.41943040E-01
Starting time-step t0=  0.83886273E-01 dt=  0.41943040E-01
Starting time-step t0=  0.12582931     dt=  0.41943040E-01
Starting time-step t0=  0.16777235     dt=  0.83886080E-01
Starting time-step t0=  0.18874387     dt=  0.20971520E-01
 Error                    408
 Error                    408
Starting time-step t0=  0.18939923     dt=  0.65536000E-03
Starting time-step t0=  0.19005459     dt=  0.65536000E-03
Starting time-step t0=  0.19070995     dt=  0.65536000E-03
Starting time-step t0=  0.19136531     dt=  0.65536000E-03
Starting time-step t0=  0.19202067     dt=  0.65536000E-03
Starting time-step t0=  0.19267603     dt=  0.65536000E-03
Starting time-step t0=  0.19333139     dt=  0.65536000E-03
Starting time-step t0=  0.19398675     dt=  0.65536000E-03
Starting time-step t0=  0.19464211     dt=  0.65536000E-03
Starting time-step t0=  0.19529747     dt=  0.65536000E-03
Starting time-step t0=  0.19595283     dt=  0.13107200E-02
Starting time-step t0=  0.19726355     dt=  0.13107200E-02
Starting time-step t0=  0.19857427     dt=  0.13107200E-02
Starting time-step t0=  0.19988499     dt=  0.13107200E-02
Starting time-step t0=  0.20119571     dt=  0.13107200E-02
Starting time-step t0=  0.20250643     dt=  0.26214400E-02
Starting time-step t0=  0.20512787     dt=  0.26214400E-02
Starting time-step t0=  0.20774931     dt=  0.52428800E-02
Starting time-step t0=  0.21299219     dt=  0.52428800E-02
```

```
Starting time-step t0=  0.21823507     dt=  0.52428800E-02
Starting time-step t0=  0.22347795     dt=  0.10485760E-01
Starting time-step t0=  0.23396371     dt=  0.10485760E-01
Starting time-step t0=  0.24444947     dt=  0.10485760E-01
Starting time-step t0=  0.25493523     dt=  0.10485760E-01
Starting time-step t0=  0.26542099     dt=  0.10485760E-01
Starting time-step t0=  0.27590675     dt=  0.20971520E-01
Starting time-step t0=  0.29687827     dt=  0.20971520E-01
Starting time-step t0=  0.31784979     dt=  0.20971520E-01
Starting time-step t0=  0.33882131     dt=  0.20971520E-01
Starting time-step t0=  0.35979283     dt=  0.20971520E-01
Starting time-step t0=  0.38076435     dt=  0.20971520E-01
Starting time-step t0=  0.40173587     dt=  0.20971520E-01
Starting time-step t0=  0.42270739     dt=  0.20971520E-01
Starting time-step t0=  0.44367891     dt=  0.20971520E-01
Starting time-step t0=  0.46465043     dt=  0.20971520E-01
Starting time-step t0=  0.48562195     dt=  0.20971520E-01
Starting time-step t0=  0.50659347     dt=  0.41943040E-01
Starting time-step t0=  0.54853651     dt=  0.41943040E-01
Starting time-step t0=  0.59047955     dt=  0.41943040E-01
Starting time-step t0=  0.63242259     dt=  0.83886080E-01
Starting time-step t0=  0.71630867     dt=  0.83886080E-01
Starting time-step t0=  0.80019475     dt=  0.83886080E-01
Starting time-step t0=  0.88408083     dt=  0.83886080E-01
Starting time-step t0=  0.96796691     dt=  0.83886080E-01


output ignored...


... output resumed

 DELETING TIME-RECORD FOR TIME    25262.422
 DELETING TIME-RECORD FOR TIME    25305.372
 DELETING TIME-RECORD FOR TIME    25391.271
 DELETING TIME-RECORD FOR TIME    25434.221
 DELETING TIME-RECORD FOR TIME    25520.120
 DELETING TIME-RECORD FOR TIME    25606.019
 DELETING TIME-RECORD FOR TIME    25691.919
 DELETING TIME-RECORD FOR TIME    25756.343
 DELETING TIME-RECORD FOR TIME    25820.768
 DELETING TIME-RECORD FOR TIME    25863.718
 DELETING TIME-RECORD FOR TIME    25906.667
 DELETING TIME-RECORD FOR TIME    25949.617
 DELETING TIME-RECORD FOR TIME    25992.567
 DELETING TIME-RECORD FOR TIME    26035.516
 DELETING TIME-RECORD FOR TIME    26078.466
 DELETING TIME-RECORD FOR TIME    26121.416
 DELETING TIME-RECORD FOR TIME    26164.365
 DELETING TIME-RECORD FOR TIME    26207.315
 DELETING TIME-RECORD FOR TIME    26250.265
 DELETING TIME-RECORD FOR TIME    26293.214
 DELETING TIME-RECORD FOR TIME    26336.164
 DELETING TIME-RECORD FOR TIME    26379.114
 DELETING TIME-RECORD FOR TIME    26422.063
 DELETING TIME-RECORD FOR TIME    26465.013
 DELETING TIME-RECORD FOR TIME    26507.963
 DELETING TIME-RECORD FOR TIME    26550.912
 DELETING TIME-RECORD FOR TIME    26636.812
 DELETING TIME-RECORD FOR TIME    26722.711
 DELETING TIME-RECORD FOR TIME    26765.661
 DELETING TIME-RECORD FOR TIME    26851.560
 DELETING TIME-RECORD FOR TIME    26937.459
 DELETING TIME-RECORD FOR TIME    26980.409
 DELETING TIME-RECORD FOR TIME    27023.359
 DELETING TIME-RECORD FOR TIME    27066.308
 DELETING TIME-RECORD FOR TIME    27109.258
 DELETING TIME-RECORD FOR TIME    27152.208
 DELETING TIME-RECORD FOR TIME    27195.157
 DELETING TIME-RECORD FOR TIME    27238.107
 DELETING TIME-RECORD FOR TIME    27281.057
 DELETING TIME-RECORD FOR TIME    27324.006
 DELETING TIME-RECORD FOR TIME    27366.956
 DELETING TIME-RECORD FOR TIME    27409.906
 DELETING TIME-RECORD FOR TIME    27452.855
 DELETING TIME-RECORD FOR TIME    27495.805
 DELETING TIME-RECORD FOR TIME    27538.755
 DELETING TIME-RECORD FOR TIME    27581.704
 DELETING TIME-RECORD FOR TIME    27624.654
 DELETING TIME-RECORD FOR TIME    27667.604
 DELETING TIME-RECORD FOR TIME    27710.553
 DELETING TIME-RECORD FOR TIME    27753.503
 DELETING TIME-RECORD FOR TIME    27817.928
 DELETING TIME-RECORD FOR TIME    27860.877
 DELETING TIME-RECORD FOR TIME    27903.827
 DELETING TIME-RECORD FOR TIME    27989.726
 DELETING TIME-RECORD FOR TIME    28075.626
 DELETING TIME-RECORD FOR TIME    28161.525
 DELETING TIME-RECORD FOR TIME    28204.475
 DELETING TIME-RECORD FOR TIME    28247.424
 DELETING TIME-RECORD FOR TIME    28333.324
 DELETING TIME-RECORD FOR TIME    28419.223
 DELETING TIME-RECORD FOR TIME    28505.122
 DELETING TIME-RECORD FOR TIME    28591.022
 DELETING TIME-RECORD FOR TIME    28676.921
 DELETING TIME-RECORD FOR TIME    28719.871
 DELETING TIME-RECORD FOR TIME    28762.820
 DELETING TIME-RECORD FOR TIME    28805.770
 DELETING TIME-RECORD FOR TIME    28848.720
 DELETING TIME-RECORD FOR TIME    28891.669
 DELETING TIME-RECORD FOR TIME    28934.619
 DELETING TIME-RECORD FOR TIME    28977.569
 DELETING TIME-RECORD FOR TIME    29020.518
 DELETING TIME-RECORD FOR TIME    29063.468
 DELETING TIME-RECORD FOR TIME    29106.418
 DELETING TIME-RECORD FOR TIME    29149.368
 DELETING TIME-RECORD FOR TIME    29192.317
 DELETING TIME-RECORD FOR TIME    29235.267
 DELETING TIME-RECORD FOR TIME    29278.217
 DELETING TIME-RECORD FOR TIME    29342.641
 DELETING TIME-RECORD FOR TIME    29428.540
 DELETING TIME-RECORD FOR TIME    29514.440
 DELETING TIME-RECORD FOR TIME    29600.339
 DELETING TIME-RECORD FOR TIME    29643.289
 DELETING TIME-RECORD FOR TIME    29686.238
```

```
 DELETING TIME-RECORD FOR TIME    29750.663
 DELETING TIME-RECORD FOR TIME    29836.562
 DELETING TIME-RECORD FOR TIME    29922.462
 DELETING TIME-RECORD FOR TIME    30008.361
 DELETING TIME-RECORD FOR TIME    30094.260
 DELETING TIME-RECORD FOR TIME    30180.160
 DELETING TIME-RECORD FOR TIME    30266.059
 DELETING TIME-RECORD FOR TIME    30351.958
 DELETING TIME-RECORD FOR TIME    30437.858
 DELETING TIME-RECORD FOR TIME    30523.757
 DELETING TIME-RECORD FOR TIME    30566.707
 DELETING TIME-RECORD FOR TIME    30609.656
 DELETING TIME-RECORD FOR TIME    30652.606
 DELETING TIME-RECORD FOR TIME    30695.556
 DELETING TIME-RECORD FOR TIME    30738.505
 DELETING TIME-RECORD FOR TIME    30781.455
 DELETING TIME-RECORD FOR TIME    30867.354
 DELETING TIME-RECORD FOR TIME    30953.254
 DELETING TIME-RECORD FOR TIME    31039.153
 DELETING TIME-RECORD FOR TIME    31082.103
 DELETING TIME-RECORD FOR TIME    31168.002
 DELETING TIME-RECORD FOR TIME    31253.901
 DELETING TIME-RECORD FOR TIME    31339.801
 DELETING TIME-RECORD FOR TIME    31382.750
 DELETING TIME-RECORD FOR TIME    31425.700
 DELETING TIME-RECORD FOR TIME    31468.650
 DELETING TIME-RECORD FOR TIME    31511.600
 DELETING TIME-RECORD FOR TIME    31554.549
 DELETING TIME-RECORD FOR TIME    31597.499
 DELETING TIME-RECORD FOR TIME    31640.449
 DELETING TIME-RECORD FOR TIME    31683.398
 DELETING TIME-RECORD FOR TIME    31726.348
 DELETING TIME-RECORD FOR TIME    31769.298
 DELETING TIME-RECORD FOR TIME    31812.247
 DELETING TIME-RECORD FOR TIME    31855.197
 DELETING TIME-RECORD FOR TIME    31898.147
 DELETING TIME-RECORD FOR TIME    31941.096
 DELETING TIME-RECORD FOR TIME    31984.046
 DELETING TIME-RECORD FOR TIME    32026.996
 DELETING TIME-RECORD FOR TIME    32069.945
 DELETING TIME-RECORD FOR TIME    32112.895
 DELETING TIME-RECORD FOR TIME    32177.319
 DELETING TIME-RECORD FOR TIME    32220.269
 DELETING TIME-RECORD FOR TIME    32263.219

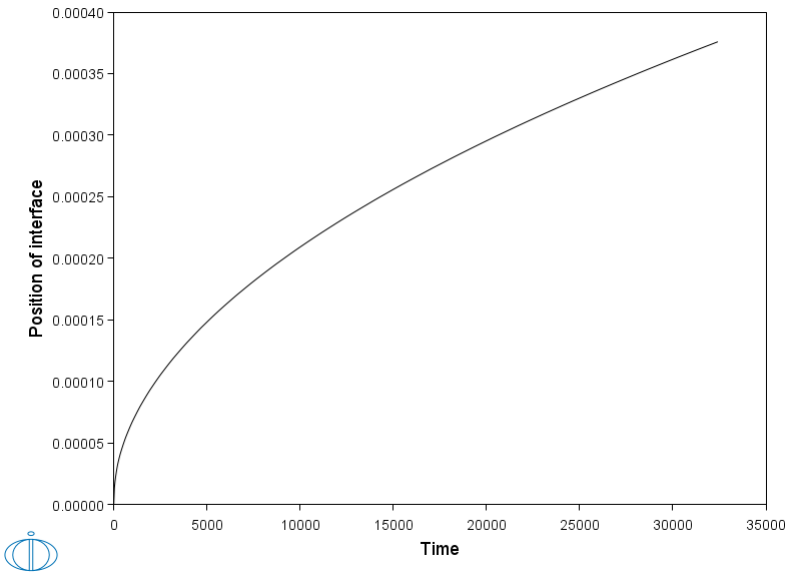
 KEEPING TIME-RECORD FOR TIME    32349.118
 AND FOR TIME                    32400.000
 WORKSPACE RECLAIMED
 -------------------------------------------------
 INTERPOLATION SCHEME USED THIS FRACTION OF
 THE ALLOCATED MEMORY:   0.122439088252744
 EFFICIENCY FACTOR:    29.1910258830722
 MEMORY FRACTION USAGE PER BRANCH:
  0.172677338019014
  8.596093720332654E-002
  9.278505153534618E-002
 -------------------------------------------------
 DEALLOCATING
 -------------------------------------------------

 TIMESTEP AT     32400.0000     SELECTED

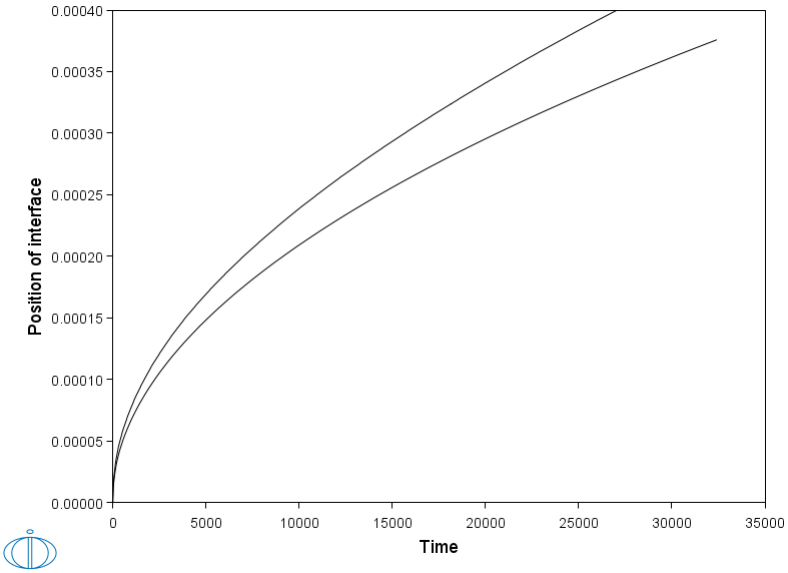
DIC>
DIC> set-inter
 --OK---
DIC>
```

exb7-plot

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exb7\plot.DCM"
DIC>
DIC>
DIC>
DIC> @@
DIC> @@ GO TO THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  3.24000E+04
 *** ENTERING GRAPHITE AS A DIFFUSION NONE PHASE
 *** ENTERING C1NB1_S AS A DIFFUSION NONE PHASE
DIC> read exb7
 OK
DIC>
DIC> @@
DIC> @@ GO TO THE POST PROCESSOR
DIC> @@
DIC> post
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1: @@
POST-1: @@ PLOT THE INTERFACE POSITION AS A FUNCTION OF TIME
POST-1: @@
POST-1: s-d-a x time
  INFO: Time is set as independent variable
POST-1: s-d-a y po-o-in aus upp
POST-1:
POST-1: plot
```

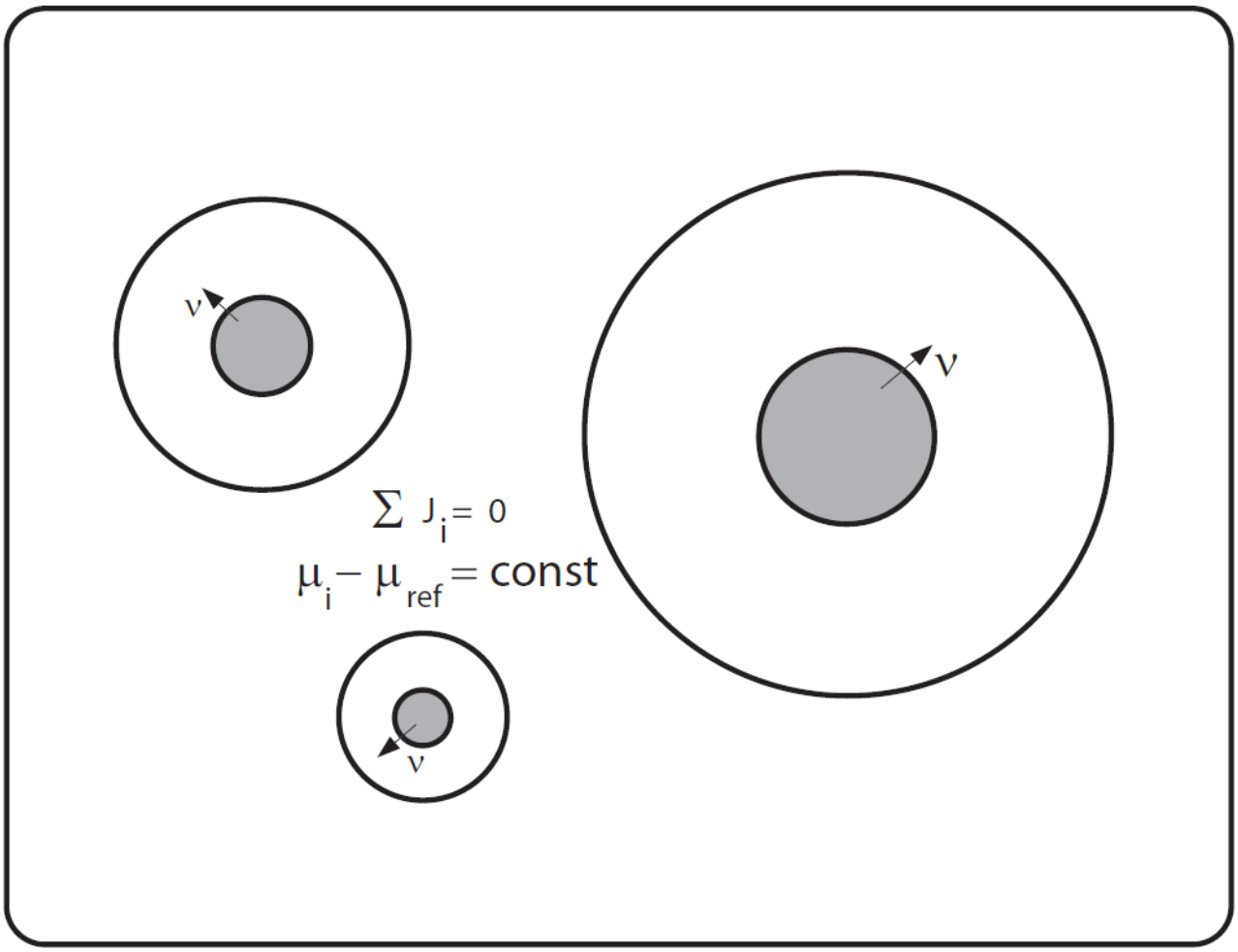



```
POST-1:
POST-1:Hit RETURN to continue
POST-1:
POST-1: @@
POST-1: @@ APPEND DATA FROM A CORRESPONDING SIMULATION
POST-1: @@ WITHOUT NIOBIUM
POST-1: @@
POST-1:
POST-1: app y fec.exp 0
DATASET NUMBER(s): /-1/: 1
POST-1:
POST-1: plot
```




```
POST-1:
POST-1: set-inter
 --OK---
POST-1:
```

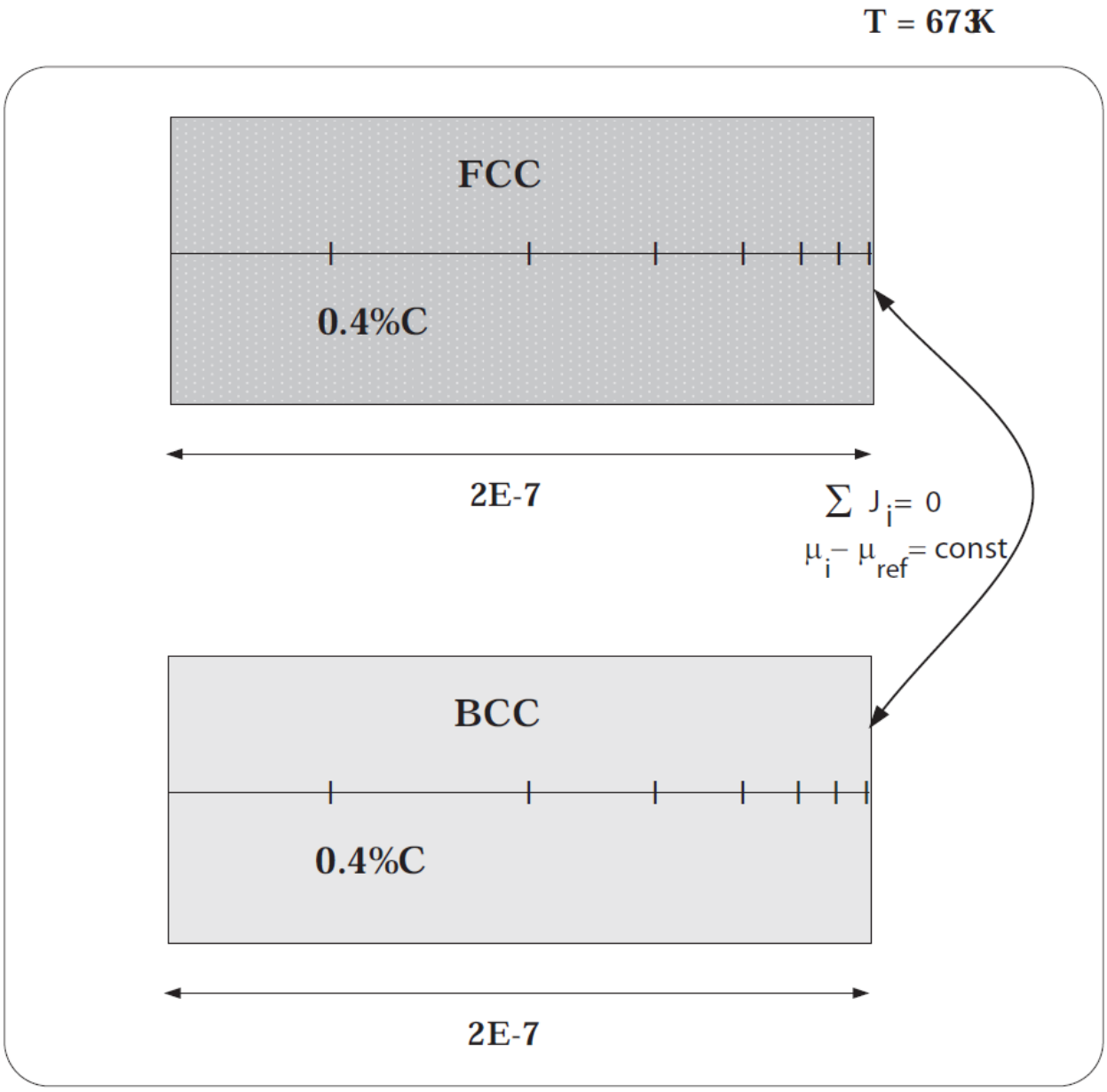
Cell Calculations



Example exc1

'Carbon cannon' in α/γ Fe-C system: Two-cell calculation

This example simulates what happens to a ferrite plate that has inherited the carbon content of its parent austenite. The ferrite plate formed is embedded in an austenite matrix. This setup corresponds to a proposed mechanism for formation of Widmannstätten ferrite or for the ferrite phase of the bainite structure. It is assumed that the phase boundary between ferrite and austenite is immobile, this is achieved in the simulation by putting the ferrite and the austenite in two different cells. See also M. Hillert, L. Höglund and J. Ågren: Acta Metall. Mater. 41 (1993), pp.1951-1957.



exc1-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exc1\setup.DCM"
SYS: ï»¿@@
 NO SUCH COMMAND, USE HELP
SYS: @@ Cell calculation.
SYS: @@ Carbon cannon in ferrite/austenite: Fe-C system, 2-cell calculation
SYS: @@ This example simulates what happens to a ferrite plate that has
SYS: @@ inherited the carbon content of its parent austenite. The ferrite
SYS: @@ plate formed is embedded in an austenite matrix. This setup
SYS: @@ corresponds to a proposed mechanism for formation of WidmannstÃ¤tten
SYS: @@ ferrite or for the ferrite phase of the bainite structure. It is
SYS: @@ assumed that the phase boundary between ferrite and austenite is
SYS: @@ immobile, this is achieved in the simulation by putting the ferrite
SYS: @@ and the austenite in two different cells. See also M. Hillert,
SYS: @@ L. HÃ¶glund and J. Ã…gren: Acta Metall. Mater. 41 (1993), pp.1951-1957.
SYS: @@----------------------------------------------------------------------
SYS:
SYS: @@ exc1_setup.DCM
SYS:
SYS: @@
SYS: @@ RETRIEVE DATA FROM THE DATABASE
SYS: @@
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                        /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12:
TDB_TCFE12: @@
TDB_TCFE12: @@ USE A THERMODYNAMIC DATABASE TO RETRIEVE DATA
TDB_TCFE12: @@
TDB_TCFE12: sw fedemo
 Current database: Iron Demo Database v6.0

 VA                        /-  DEFINED
TDB_FEDEMO: def-sys fe c
 FE                        C  DEFINED
TDB_FEDEMO: rej ph * all
 GAS:G                     LIQUID:L                  BCC_A2
 C14_LAVES                 CBCC_A12                  CEMENTITE_D011
 CUB_A13                   DIAMOND_A4                FCC_A1
 GRAPHITE_A9               HCP_A3                    KSI_CARBIDE
 M23C6_D84                 M5C2                      M7C3_D101
   REJECTED
TDB_FEDEMO: res ph fcc,bcc
 FCC_A1                    BCC_A2  RESTORED
TDB_FEDEMO: get
11:04:02,150 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ SWITCH TO A MOBILITY DATABASE TO RETRIEVE DATA
TDB_FEDEMO: @@
TDB_FEDEMO: app mfedemo
 Current database: Fe-Alloys Mobility demo database v5.0

 VA  DEFINED
APP: def-sys fe c
 FE                        C  DEFINED
APP: rej ph * all
 BCC_A2                    FCC_A1                    CEMENTITE_D011
 LIQUID:L  REJECTED
APP: res ph fcc,bcc
 FCC_A1                    BCC_A2  RESTORED
APP: get
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
APP:
APP: @@
APP: @@ ENTER THE DICTRA MONITOR
APP: @@
APP: go d-m
 NO TIME STEP DEFINED
DIC>
DIC> @@
DIC> @@ ENTER THE GLOBAL CONDITION T
DIC> @@
```

```
DIC> set-cond glob T 0 673; * N
DIC>
DIC> @@
DIC> @@ IN THE FIRST CELL
DIC> @@
DIC> @@ ENTER REGION aus CONTAINING AUSTENITE
DIC> @@ ENTER A GEOMETRICAL GRID INTO THAT REGION
DIC> @@ ENTER THE INITIAL COMPOSITION INTO THE AUSTENITE
DIC> @@
DIC> enter-region aus
DIC> enter-grid aus  0.2e-6 AUTO
DIC> enter-phase act aus  matrix fcc_a1#1
DIC>
DIC> enter-composition
REGION NAME : /AUS/: aus
PHASE NAME: /FCC_A1/: fcc_a1#1
COMPOSITION TYPE /MOLE_FRACTION/: w-p
PROFILE FOR /C/: c
TYPE /LINEAR/: lin 0.4 0.4
DIC>
DIC> @@
DIC> @@ IN THE SECOND CELL
DIC> @@
DIC> create-new-cell
CELL DISTRIBUTION FACTOR /1/: 1
 CREATING NEW CELL, NUMBER:  2
 CELL   2 SELECTED
DIC-2>
DIC-2> @@
DIC-2> @@ ENTER REGION fer CONTAINING FERRITE
DIC-2> @@ ENTER A GEOMETRICAL GRID INTO THAT REGION
DIC-2> @@ ENTER THE INITIAL COMPOSITION INTO THE FERRITE
DIC-2> @@
DIC-2> enter-region fer
DIC-2>
DIC-2>
DIC-2>
DIC-2> enter-grid fer  0.2e-6 AUTO
DIC-2> enter-phase act fer  matrix bcc_a2#1
DIC-2>
DIC-2> enter-composition
REGION NAME : /FER/: fer
PHASE NAME: /BCC_A2/: bcc_a2#1
COMPOSITION TYPE /MOLE_FRACTION/: w-p
PROFILE FOR /C/: c
TYPE /LINEAR/: lin 0.4 0.4
DIC-2>
DIC-2> @@
DIC-2> @@ SET THE SIMULATION TIME AND OTHER SIMULATION PARAMETERS
DIC-2> @@
DIC-2> set-simulation-time
END TIME FOR INTEGRATION /.1/: 0.5
AUTOMATIC TIMESTEP CONTROL /YES/:
MAX TIMESTEP DURING INTEGRATION /.05/:
INITIAL TIMESTEP : /1E-07/:
SMALLEST ACCEPTABLE TIMESTEP : /1E-07/:
DIC-2>
DIC-2>
DIC-2>
DIC-2> @@
DIC-2> @@ USE IMPLICIT (1) TIME INTEGRATION
DIC-2> @@
DIC-2> set-option DEGREE_OF_IMPLICITY 1.0
DIC-2>
DIC-2> @@
DIC-2> @@ SAVE THE SET UP TO A NEW STORE FILE AND EXIT
DIC-2> @@
DIC-2> save exc1 Y
DIC-2>
DIC-2> set-inter
 --OK---
DIC-2>
```

exc1-run

```
DIC-2>About
 NO SUCH COMMAND, USE HELP
DIC-2>DIC-2>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exc1\run.DCM"
DIC-2>
DIC-2>
DIC-2> @@ exc1_run.DCM
DIC-2>
DIC-2> @@
DIC-2> @@ READ THE WORKSPACE AND START THE SIMULATION
DIC-2> @@
DIC-2> go d-m
 TIME STEP AT TIME  0.00000E+00
DIC-2> read exc1
 OK
DIC> sim
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 Region: AUS
 geometric   0.833333     dense at   0.200000E-06   58 points
 Region: FER
 geometric   0.866747     dense at   0.200000E-06   56 points
 U-FRACTION IN SYSTEM:  C = .0186733111178274  FE = 1
 TOTAL SIZE OF SYSTEM:  4E-07 [m]
 U-FRACTION IN SYSTEM:  C = .0186733111178274  FE = 1
 TOTAL SIZE OF SYSTEM:  4E-07 [m]
  447946.878608491         447949.425773906         11997.5727803552         509.072302029083         1.64579526427206        2.991014536506762
004        1.873507877807250E-010        2.157620498397347E-020       TIME =  0.10000000E-06 DT =  0.10000000E-
06 SUM OF SQUARES =  0.21576205E-19
 U-FRACTION IN SYSTEM:  C = .0186733111178274  FE = 1
 TOTAL SIZE OF SYSTEM:  4E-07 [m]
  CPU time used in timestep                    1  seconds
  6990557.33466302         6990537.78491717         1945697.25852058         208879.794635738         5553.68156963137         18.9610917424286
003        4.905196919524002E-010       TIME =  0.18809712E-05 DT =  0.17809712E-05 SUM OF SQUARES =  0.49051969E-09
 U-FRACTION IN SYSTEM:  C = .0186752381781978  FE = 1
 TOTAL SIZE OF SYSTEM:  4E-07 [m]
  CPU time used in timestep                    0  seconds
  1192344.06100535         1192329.94850616         189579.574181709         12584.7380556981         85.4121357667536        4.689557954150148
002        1.660148003358546E-007        3.211827551363855E-016       TIME =  0.54429136E-05 DT =  0.35619424E-
05 SUM OF SQUARES =  0.32118276E-15
 U-FRACTION IN SYSTEM:  C = .0186752381781975  FE = 1
 TOTAL SIZE OF SYSTEM:  4E-07 [m]
  CPU time used in timestep                    1  seconds
  9352.72460217537         9351.24581868996         8.33131247860036        6.865464737104051E-003        4.679153161748302E-
009        2.627476288683237E-018       TIME =  0.12566798E-04 DT =  0.71238848E-05 SUM OF SQUARES =  0.26274763E-17
 U-FRACTION IN SYSTEM:  C = .0186752381781976  FE = 1
 TOTAL SIZE OF SYSTEM:  4E-07 [m]
  CPU time used in timestep                    1  seconds
  12562.6400754973         12561.6545449903         43.9288662228511        0.130473992862266        1.169682658138010E-
006        3.140511407965565E-014       TIME =  0.26814568E-04 DT =  0.14247770E-04 SUM OF SQUARES =  0.31405114E-13
 U-FRACTION IN SYSTEM:  C = .0186752381782102  FE = 1
 TOTAL SIZE OF SYSTEM:  4E-07 [m]
  CPU time used in timestep                    0  seconds
  1590264.72559312         1590193.66022020         22090.8907443916         225.836918705995         2.529807879096672E-
002        3.445480345719094E-008        4.479609687239584E-018       TIME =  0.55310107E-04 DT =  0.28495539E-
04 SUM OF SQUARES =  0.44796097E-17
 U-FRACTION IN SYSTEM:  C = .0186752381782102  FE = 1
 TOTAL SIZE OF SYSTEM:  4E-07 [m]
  CPU time used in timestep                    1  seconds
  327687.035318517         327661.898987337         1469.72470105990         5.50750601527406         7.888357767448198E-
005        4.277431172052134E-012       TIME =  0.11230118E-03 DT =  0.56991078E-04 SUM OF SQUARES =  0.42774312E-11
 U-FRACTION IN SYSTEM:  C = .0186752381782691  FE = 1
 TOTAL SIZE OF SYSTEM:  4E-07 [m]
  CPU time used in timestep                    0  seconds
  170767.367332731         170754.629137030         847.064841827446         3.49206351563984         6.064520923699286E-
005        4.389923124582143E-012       TIME =  0.22628334E-03 DT =  0.11398216E-03 SUM OF SQUARES =  0.43899231E-11
 U-FRACTION IN SYSTEM:  C = .0186752381783885  FE = 1
 TOTAL SIZE OF SYSTEM:  4E-07 [m]
  CPU time used in timestep                    0  seconds
  71469.1546492401         71463.2474554426         286.706783835063        0.974629802899678        1.147108093787204E-
005        4.630764305921858E-013

output ignored...



... output resumed

  8723.73139333764         8714.14888637668         0.142119294131426        2.293429653613097E-006        6.041677043497021E-
016       TIME =  0.19378777     DT =  0.21263337E-01 SUM OF SQUARES =  0.60416770E-15
 U-FRACTION IN SYSTEM:  C = .0186752381789553  FE = 1
 TOTAL SIZE OF SYSTEM:  4E-07 [m]
  CPU time used in timestep                    0  seconds
  3628.51077633945         3623.14317560849         5.106455988690661E-002        2.533716886273999E-007        3.058912087591196E-
017       TIME =  0.21699110     DT =  0.23203332E-01 SUM OF SQUARES =  0.30589121E-16
 U-FRACTION IN SYSTEM:  C = .0186752381789546  FE = 1
 TOTAL SIZE OF SYSTEM:  4E-07 [m]
  CPU time used in timestep                    1  seconds
  343.428217631662         342.020178386370         3.649237162950703E-004        3.883132135689597E-010        1.450665533038300E-
003        1.383662180998518E-020       TIME =  0.24328714     DT =  0.26296039E-01 SUM OF SQUARES =  0.13836622E-19
 U-FRACTION IN SYSTEM:  C = .0186752381789546  FE = 1
 TOTAL SIZE OF SYSTEM:  4E-07 [m]
  CPU time used in timestep                    0  seconds
  154953.127015460         155200.504921007         0.687315762098293        6.734203634684393E-006        2.012407000991206E-
016       TIME =  0.27504833     DT =  0.31761190E-01 SUM OF SQUARES =  0.20124070E-15
 U-FRACTION IN SYSTEM:  C = .0186752381789549  FE = 1
 TOTAL SIZE OF SYSTEM:  4E-07 [m]
  CPU time used in timestep                    1  seconds
  1082965.63954956         1083482.38009993         74.3589963968804        5.678453467944987E-003        2.871632765117707E-
011       TIME =  0.31656380     DT =  0.41515473E-01 SUM OF SQUARES =  0.28716328E-10
 U-FRACTION IN SYSTEM:  C = .0186752381790661  FE = 1
 TOTAL SIZE OF SYSTEM:  4E-07 [m]
  CPU time used in timestep                    0  seconds
  889096.550347434         889476.374328008         71.4735517583633        6.523355538661645E-003        4.517613972818337E-
011       TIME =  0.36656380     DT =  0.50000000E-01 SUM OF SQUARES =  0.45176140E-10
 U-FRACTION IN SYSTEM:  C = .0186752381792341  FE = 1
 TOTAL SIZE OF SYSTEM:  4E-07 [m]
  CPU time used in timestep                    1  seconds
  30667.4576647169         30730.0481919767         2.206536826268009E-002        2.174597970974520E-007        3.148369731517288E-
002        8.800085325441011E-019       TIME =  0.41656380     DT =  0.50000000E-01 SUM OF SQUARES =  0.88000853E-18
 U-FRACTION IN SYSTEM:  C = .018675238179234  FE = 1
 TOTAL SIZE OF SYSTEM:  4E-07 [m]
  CPU time used in timestep                    0  seconds
  96093.7077886222         95993.4121984139         1.36064627479814        1.470015689602965E-005        2.457515992303445E-
```

```
015       TIME =  0.46656380     DT =  0.50000000E-01 SUM OF SQUARES =  0.24575160E-14
 U-FRACTION IN SYSTEM:  C = .0186752381792328  FE = 1
 TOTAL SIZE OF SYSTEM:  4E-07 [m]
  CPU time used in timestep                    1  seconds
  2902084.90436944         2901466.92691898         786.289143739698        0.212525759670095        1.446423037622219E-
008        9.594350823852117E-020       TIME =  0.50000000     DT =  0.33436199E-01 SUM OF SQUARES =  0.95943508E-19
 U-FRACTION IN SYSTEM:  C = .0186752381792328  FE = 1
 TOTAL SIZE OF SYSTEM:  4E-07 [m]
 MUST SAVE WORKSPACE ON FILE
 WORKSPACE SAVED ON FILE
 RECLAIMING WORKSPACE
 DELETING TIME-RECORD FOR TIME    0.0000000
 DELETING TIME-RECORD FOR TIME   0.10000000E-06
 DELETING TIME-RECORD FOR TIME   0.18809712E-05
 DELETING TIME-RECORD FOR TIME   0.54429136E-05
 DELETING TIME-RECORD FOR TIME   0.12566798E-04
 DELETING TIME-RECORD FOR TIME   0.26814568E-04
 DELETING TIME-RECORD FOR TIME   0.55310107E-04
 DELETING TIME-RECORD FOR TIME   0.11230118E-03
 DELETING TIME-RECORD FOR TIME   0.22628334E-03
 DELETING TIME-RECORD FOR TIME   0.45424765E-03
 DELETING TIME-RECORD FOR TIME   0.91017628E-03
 DELETING TIME-RECORD FOR TIME   0.18220335E-02
 DELETING TIME-RECORD FOR TIME   0.36457480E-02
 DELETING TIME-RECORD FOR TIME   0.72931770E-02
 DELETING TIME-RECORD FOR TIME   0.14588035E-01
 DELETING TIME-RECORD FOR TIME   0.29177751E-01
 DELETING TIME-RECORD FOR TIME   0.46732906E-01
 DELETING TIME-RECORD FOR TIME   0.62920803E-01
 DELETING TIME-RECORD FOR TIME   0.80218444E-01
 DELETING TIME-RECORD FOR TIME   0.97429297E-01
 DELETING TIME-RECORD FOR TIME   0.11527725
 DELETING TIME-RECORD FOR TIME   0.13355877
 DELETING TIME-RECORD FOR TIME   0.15258192
 DELETING TIME-RECORD FOR TIME   0.17252443
 DELETING TIME-RECORD FOR TIME   0.19378777
 DELETING TIME-RECORD FOR TIME   0.21699110
 DELETING TIME-RECORD FOR TIME   0.24328714
 DELETING TIME-RECORD FOR TIME   0.27504833
 DELETING TIME-RECORD FOR TIME   0.31656380
 DELETING TIME-RECORD FOR TIME   0.36656380
 DELETING TIME-RECORD FOR TIME   0.41656380

 KEEPING TIME-RECORD FOR TIME   0.46656380
 AND FOR TIME                   0.50000000
 WORKSPACE RECLAIMED

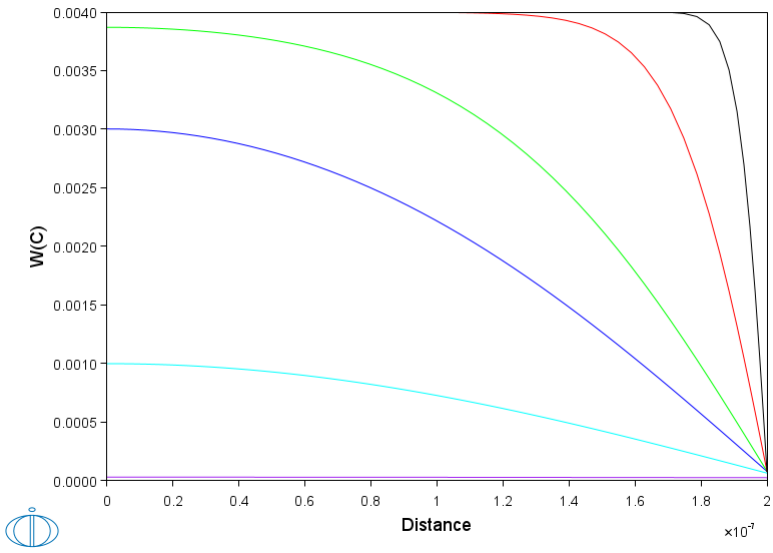
 TIMESTEP AT    0.500000000     SELECTED

DIC>
DIC>
DIC>
DIC> set-inter
 --OK---
DIC>
```

exc1-plot

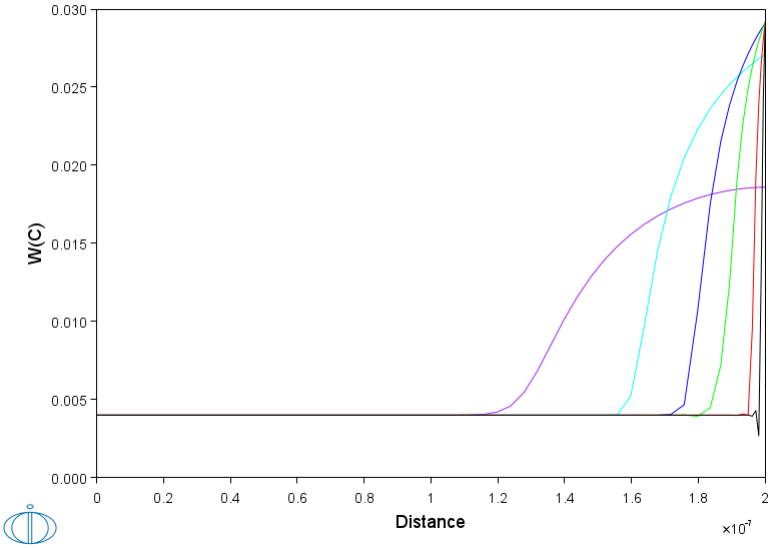
```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exc1\plot.DCM"
DIC>
DIC>
DIC> @@ exc1_plot.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR GENERATING GRAPHICAL OUTPUT FOR EXAMPLE c1
DIC> @@
DIC>
DIC> @@
DIC> @@ GO TO THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  5.00000E-01
DIC> read exc1
 OK
DIC>
DIC> @@
DIC> @@ GO TO THE POST PROCESSOR
DIC> @@
DIC> post
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1: @@
POST-1: @@ FIRST PLOT CARBON CONCENTRATION PROFILES IN FERRITE (CELL-2)
POST-1: @@ THEN SET THE DISTANCE AS X-AXIS (NOT THAT DISTANCE IS SET INDEPENDENT
POST-1: @@ VARIABLE AUTOMATICALLY) AND W-FRACTION CARBON AS Y-AXIS
POST-1: @@ REMEMBER THAT THE PLOT CONDITION ALSO MUST BE SET.
POST-1: @@
POST-1: select-cell
Number /NEXT/: 2
 CELL   2 SELECTED
POST-2:
POST-2: @@
POST-2: @@ NOTICE THAT THE PROMPT INCLUDES THE CURRENT CELL NUMBER
POST-2: @@
POST-2: s-d-a x dist glo
  INFO: Distance is set as independent variable
POST-2: s-d-a y w(c)
POST-2: s-p-c time .0001 .001 .01 .03 .1 .5
POST-2:
POST-2: @@
POST-2: @@ SET THE TITLE ON THE PLOTS
POST-2: @@
POST-2: set-title Figure c1.1
POST-2: plot
```

Figure c1.1



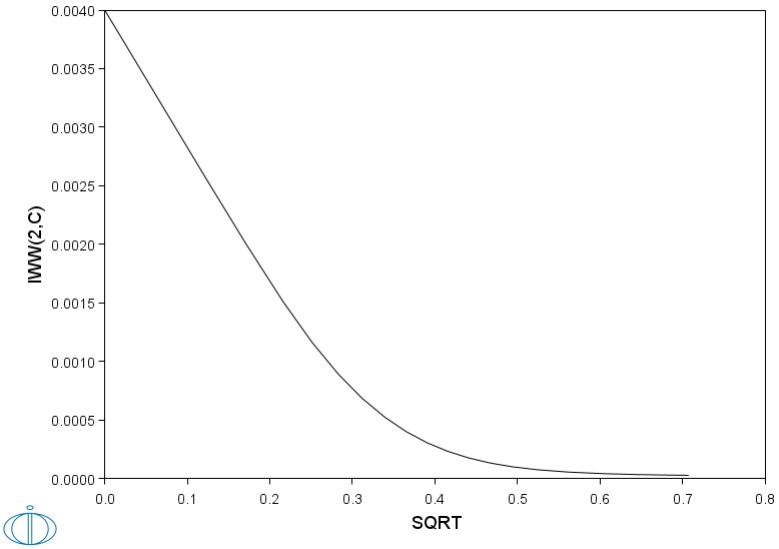

```
POST-2:
POST-2:
POST-2:
POST-2:@?<_hit_return_to_continue_>
POST-2:
POST-2: @@
POST-2: @@ DO THE SAME THING FOR THE AUSTENITE (CELL-1)
POST-2: @@
POST-2: select-cell
Number /NEXT/: 1
 CELL   1 SELECTED
POST-1: set-title Figure c1.2
POST-1: plot
```

Figure c1.2



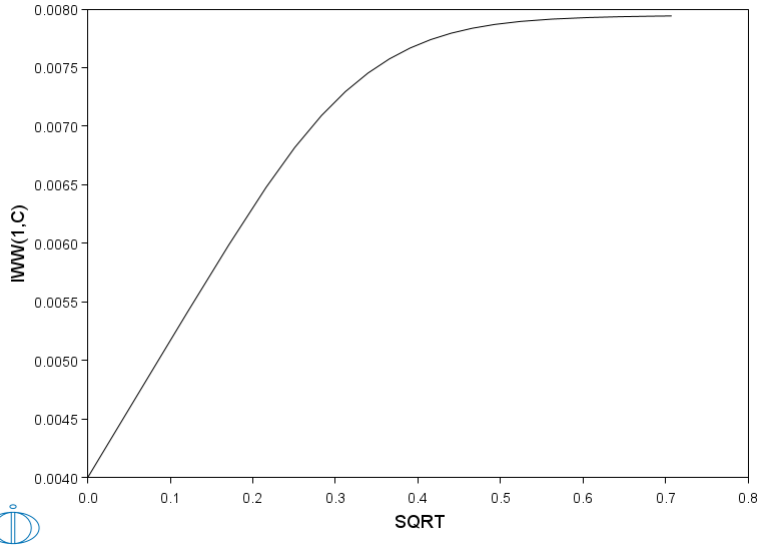

```
POST-1:
POST-1:
POST-1:
POST-1:@?<_hit_return_to_continue_>
POST-1:
POST-1: @@
POST-1: @@ PLOT THE AVARAGE WEIGHT FRACTION OF CARBON IN FERRITE VS. SQUARE ROOT
POST-1: @@ OF TIME. START BY DEFINING A "SQUARE-ROOT-OF-TIME" FUNCTION.
POST-1: @@
POST-1: sel-cell 2
 CELL   2 SELECTED
POST-2: enter func sqrt=sqrt(time);
POST-2: s-d-a x sqrt
POST-2: s-d-a y iww(2,c)
POST-2: s-i-v time
POST-2: set-title Figure c1.3
POST-2: plot
```

Figure c1.3



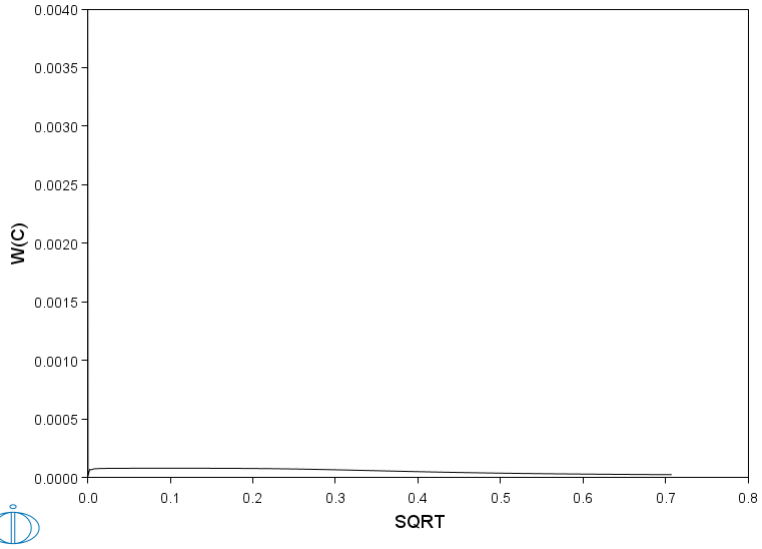

```
POST-2:
POST-2:
POST-2:
POST-2:@?<_hit_return_to_continue_>
POST-2:
POST-2: @@
POST-2: @@ DO THE SAME THING FOR THE AUSTENITE
POST-2: @@
POST-2: sel-cell 1
 CELL   1 SELECTED
POST-1: s-d-a y iww(1,c)
POST-1: set-title Figure c1.4
POST-1: plot
```

Figure c1.4



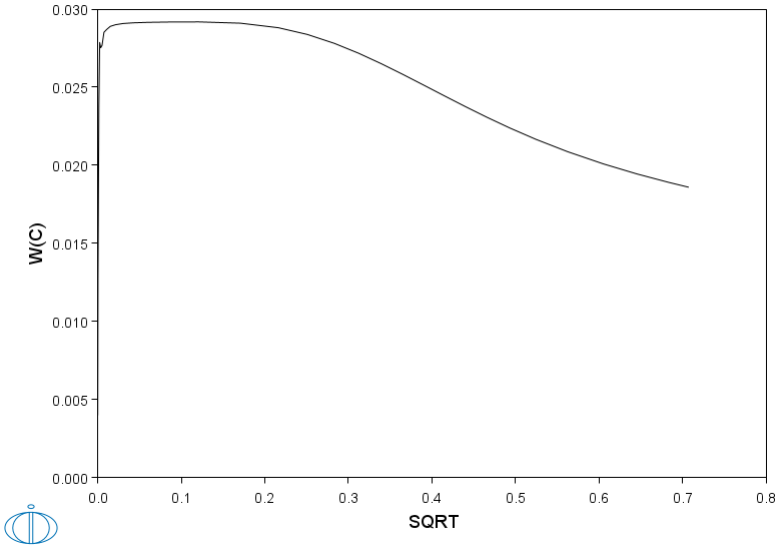

```
POST-1:
POST-1:
POST-1:
POST-1:@?<_hit_return_to_continue_>
POST-1:
POST-1: @@
POST-1: @@ PLOT HOW THE CONCENTRATION IN FERRITE AT THE FERRITE/AUSTENITE BOUNDARY
POST-1: @@ V.S SQUARE ROOT OF TIME. THE  FERRITE/AUSTENITE BOUNDARY IS REPRESENTED
POST-1: @@ BY THE CELL BOUNDARY I.E. THE "LAST" INTERFACE.
POST-1: @@
POST-1: sel-cell 2
 CELL   2 SELECTED
POST-2: s-d-a y w(c)
POST-2: s-p-c interface last
POST-2: set-title Figure c1.5
POST-2: plot
```

Figure c1.5




```
POST-2:
POST-2:
POST-2:
POST-2:@?<_hit_return_to_continue_>
POST-2:
POST-2: @@
POST-2: @@ DO THE SAME THING FOR THE AUSTENITE
POST-2: @@
POST-2: sel-cell 1
 CELL   1 SELECTED
POST-1: set-title Figure c1.6
POST-1: plot
```

Figure c1.6

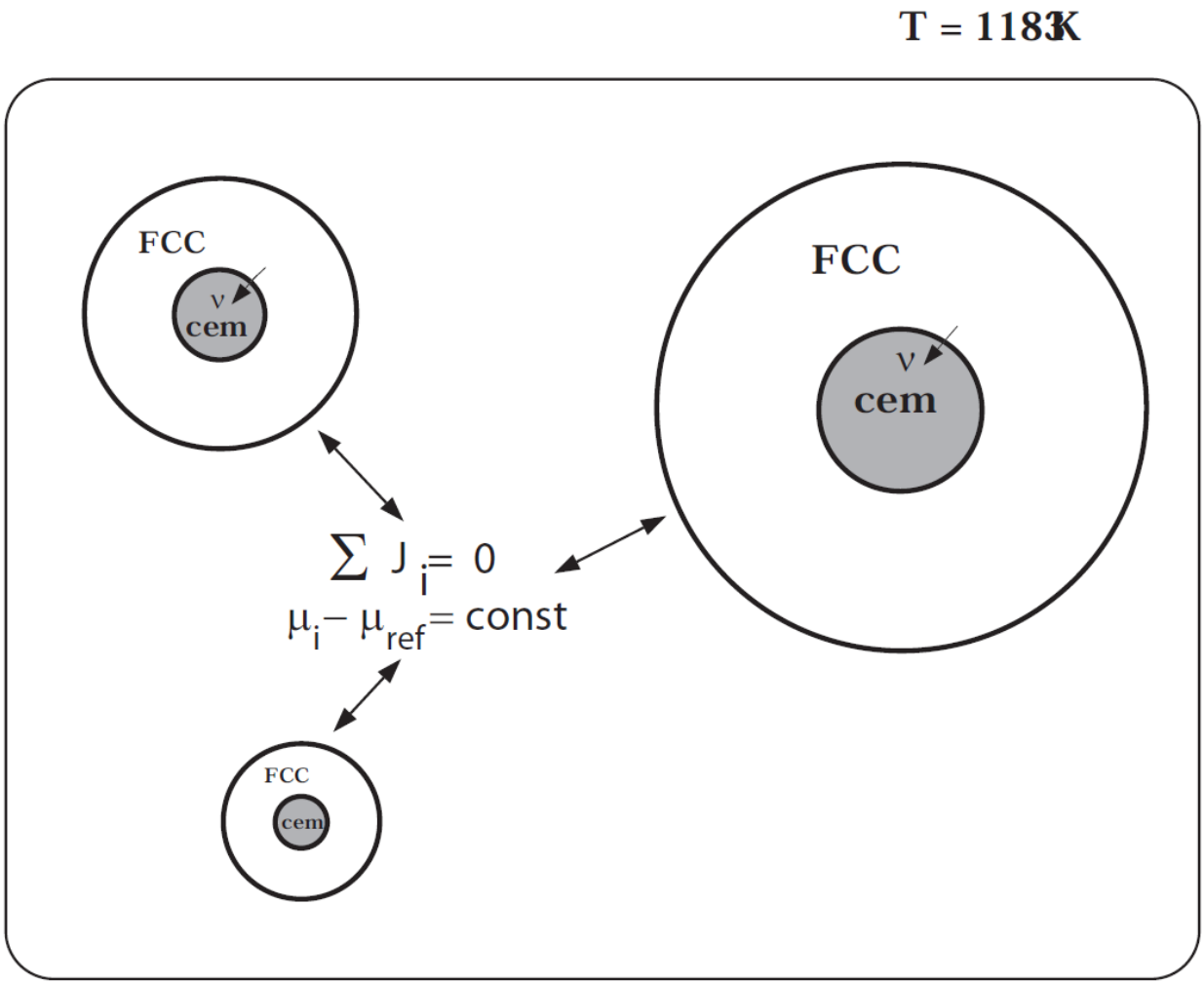



```
POST-1:
POST-1:
POST-1:
POST-1:@?<_hit_return_to_continue_>
POST-1:
POST-1: set-inter
 --OK---
POST-1:
```

Example exc2

Cementite dissolution in an Fe-Cr-C alloy: Three particle sizes and three different cells

This example calculates the dissolution of cementite particles in an austenite matrix. This is the same as exc1 except that there are three particle sizes. Altogether six particles are considered using three different cells. This is to be able to represent some size distribution among the cementite particles. See also Z.-K. Liu, L. Höglund, B. Jönsson and J. Ågren: Metall.Trans.A, v. 22A (1991), pp. 1745-1752.



exc2-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exc2\setup.DCM"
SYS: ï»¿@@
 NO SUCH COMMAND, USE HELP
SYS: @@ Cell calculation.
SYS: @@ Cementite dissolution in an Fe-Cr-C alloy: Three particle sizes and
SYS: @@ three different cells
SYS: @@ This example calculates the dissolution of cementite particles
SYS: @@ in an austenite matrix. This example is the same as exc1 but
SYS: @@ instead there are three particle sizes. A total of six
SYS: @@ particles are considered using three different cells. This is to
SYS: @@ represent some size distribution among the cementite particles.
SYS: @@ See also Z.-K. Liu, L. HÃ¶glund, B. JÃ¶nsson and J. Ã…gren:
SYS: @@ Metall.Trans.A, v. 22A (1991), pp. 1745-1752.
SYS: @@------------------------------------------------------------------
SYS:
SYS: @@ exc2_setup.DCM
SYS:
SYS: @@
SYS: @@ RETRIEVE DATA FROM THE DATABASE
SYS: @@
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                     /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12:
TDB_TCFE12: @@
TDB_TCFE12: @@ USE A THERMODYNAMIC DATABASE TO RETRIEVE DATA
TDB_TCFE12: @@
TDB_TCFE12: switch fedemo
 Current database: Iron Demo Database v6.0

 VA                     /-  DEFINED
TDB_FEDEMO: def-sys fe cr c
 FE                     CR                     C
   DEFINED
TDB_FEDEMO: rej ph * all
 GAS:G                  LIQUID:L               BCC_A2
 C14_LAVES              CBCC_A12               CEMENTITE_D011
 CHI_A12                CUB_A13                DIAMOND_A4
 FCC_A1                 GRAPHITE_A9            HCP_A3
 KSI_CARBIDE            M23C6_D84              M3C2_D510
 M5C2                   M7C3_D101              SIGMA_D8B
   REJECTED
TDB_FEDEMO: res ph fcc cementite
 FCC_A1                 CEMENTITE_D011  RESTORED
TDB_FEDEMO: get
11:07:16,403 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 Creating a new composition set FCC_A1#2
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ SWITCH TO A MOBILITY DATABASE TO RETRIEVE MOBILITY DATA
TDB_FEDEMO: @@
TDB_FEDEMO: app mfedemo
 Current database: Fe-Alloys Mobility demo database v5.0

 VA  DEFINED
APP: def-sys fe cr c
 FE                     CR                     C
   DEFINED
APP: rej ph * all
 BCC_A2                 FCC_A1                 CEMENTITE_D011
 LIQUID:L  REJECTED
APP: res ph fcc cementite
 FCC_A1                 CEMENTITE_D011  RESTORED
APP: get
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 Creating a new composition set FCC_A1#3
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
APP:
APP: @@
APP: @@ ENTER THE DICTRA MONITOR
APP: @@
APP: go d-m
 NO TIME STEP DEFINED
```

```
DIC>
DIC> @@
DIC> @@  ENTER THE GLOBAL CONDITION T
DIC> @@
DIC> set-cond glob t 0 1183; * n
DIC>
DIC> @@--------------------------------------------------------------------------
DIC> @@ CELL NUMBER ONE - Defining 1 copy of the largest particle
DIC> @@ Since the commands CRE_NEW_CELL or AMEND_CELL are not used for this
DIC> @@ first definition, it is just like any DICTRA setup.
DIC> @@--------------------------------------------------------------------------
DIC>
DIC> @@
DIC> @@ ENTER REGIONS carb AND aus
DIC> @@
DIC> enter-region carb
DIC> enter-region aus
ATTACH TO REGION NAMED /CARB/:
ATTACHED TO THE RIGHT OF CARB /YES/:
DIC> @@
DIC> @@ ENTER GEOMTRICAL GRIDS INTO THE REGIONS
DIC> @@
DIC>
DIC> @@
DIC> @@ THE SIZE OF THE CEMENTITE PARTICLES ARE KNOWN AS WE ASSUME
DIC> @@ IT HAS BEEN MEASURED.
DIC> @@
DIC> enter-grid
REGION NAME : /CARB/: carb
WIDTH OF REGION /1/: 0.700000e-6
TYPE /AUTO/: GEO
NUMBER OF POINTS /50/: 30
VALUE OF R IN THE GEOMETRICAL SERIE : 0.9
DIC>
DIC> @@
DIC> @@ THE SIZE OF THE FCC REGION CAN BE CALCULATED FROM A MASS BALANCE
DIC> @@ AFTER ESTIMATING THE INITIAL COMPOSITIONS IN THE TWO PHASES.
DIC> @@
DIC> enter-grid
REGION NAME : /AUS/: aus
WIDTH OF REGION /1/: 7.1832993E-7
TYPE /AUTO/: GEO
NUMBER OF POINTS /50/: 30
VALUE OF R IN THE GEOMETRICAL SERIE : 1.1
DIC>
DIC> @@
DIC> @@ ENTER PHASES INTO REGIONS
DIC> @@
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: act
REGION NAME : /CARB/: carb
PHASE TYPE /MATRIX/: matrix
PHASE NAME: /NONE/: cementite
DIC>
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: act
REGION NAME : /AUS/: aus
PHASE TYPE /MATRIX/: matrix
PHASE NAME: /NONE/: fcc#1
DIC>
DIC> @@
DIC> @@ ENTER INITIAL VALUES FOR THE COMPOSITIONS IN THE PHASES
DIC> @@
DIC> enter-composition carb cementite fe w-f
PROFILE FOR /CR/: cr lin 0.12423326 0.12423326
DIC>
DIC> enter-composition aus fcc#1 fe w-f
PROFILE FOR /C/: cr lin 4.6615447E-3 4.6615447E-3
PROFILE FOR /CR/: c lin 1.5135207E-4 1.5135207E-4
DIC>
DIC> @@-----------------------------------------------------------------
DIC> @@ CELL NUMBER TWO - Defining 1 copy also of the smallest particle
DIC> @@ This is done by giving the argument 1 at the CRE_NEW_CELL command.
DIC> @@-----------------------------------------------------------------
DIC> create-new-cell
CELL DISTRIBUTION FACTOR /1/: 1
 CREATING NEW CELL, NUMBER:  2
 CELL   2 SELECTED
DIC-2>
DIC-2> @@
DIC-2> @@ ENTER REGIONS carb AND aus
DIC-2> @@
DIC-2> enter-region carb
DIC-2> enter-region aus
ATTACH TO REGION NAMED /CARB/:
ATTACHED TO THE RIGHT OF CARB /YES/:
DIC-2> @@
DIC-2> @@ ENTER GEOMTRICAL GRIDS INTO THE REGIONS
DIC-2> @@
DIC-2> enter-grid carb  0.300000e-6 GEO 20 0.9
DIC-2> enter-grid aus  3.0785568E-7 GEO 20 1.1
DIC-2>
DIC-2> @@
DIC-2> @@ ENTER PHASES INTO THE REGIONS
DIC-2> @@
DIC-2> enter-phase act carb  matrix   cementite
DIC-2> enter-phase act aus   matrix   fcc#1
DIC-2>
DIC-2> @@
DIC-2> @@ ENTER INITIAL VALUES FOR THE COMPOSITIONS IN THE PHASES
DIC-2> @@
DIC-2> enter-composition carb cementite fe w-f
PROFILE FOR /CR/: cr lin 0.12423326 0.12423326
DIC-2>
DIC-2> enter-composition aus  fcc#1 fe w-f
PROFILE FOR /C/: cr lin 4.6615447E-3 4.6615447E-3
PROFILE FOR /CR/: c lin 1.5135207E-4 1.5135207E-4
DIC-2>
DIC-2> @@-----------------------------------------------------------------
DIC-2> @@ CELL NUMBER THREE - Defining 2 copies of the average sized particle
```

```
DIC-2> @@-----------------------------------------------------------------
DIC-2> create-new-cell
CELL DISTRIBUTION FACTOR /1/: 2
 CREATING NEW CELL, NUMBER:  3
 CELL   3 SELECTED
DIC-3>
DIC-3> @@
DIC-3> @@ ENTER REGIONS carb AND aus
DIC-3> @@
DIC-3> enter-region carb
DIC-3> enter-region aus
ATTACH TO REGION NAMED /CARB/:
ATTACHED TO THE RIGHT OF CARB /YES/:
DIC-3> @@
DIC-3> @@ ENTER GEOMTRICAL GRIDS INTO THE REGIONS
DIC-3> @@
DIC-3> enter-grid carb  0.525500e-6 GEO 25 0.9
DIC-3> enter-grid aus   5.3926054E-7 GEO 25 1.1
DIC-3>
DIC-3> @@
DIC-3> @@ ENTER PHASES INTO REGIONS
DIC-3> @@
DIC-3> enter-phase act carb  matrix   cementite
DIC-3> enter-phase act aus   matrix   fcc#1
DIC-3>
DIC-3> @@
DIC-3> @@ ENTER INITIAL VALUES FOR THE COMPOSITIONS IN THE PHASES
DIC-3> @@
DIC-3> enter-composition carb cementite fe w-f
PROFILE FOR /CR/: cr lin 0.12423326 0.12423326
DIC-3>
DIC-3> enter-composition aus  fcc#1 fe w-f
PROFILE FOR /C/: cr lin 4.6615447E-3 4.6615447E-3
PROFILE FOR /CR/: c lin 1.5135207E-4 1.5135207E-4
DIC-3>
DIC-3> @@-----------------------------------------------------------------
DIC-3> @@ GLOBAL CONDITIONS - Note: temperature already set.
DIC-3> @@-----------------------------------------------------------------
DIC-3>
DIC-3> @@
DIC-3> @@ SET TO A SPHERICAL GEOMETRY
DIC-3> @@
DIC-3> enter-geo 2
DIC-3>
DIC-3>
DIC-3>
DIC-3> @@
DIC-3> @@ SET THE SIMULATION TIME
DIC-3> @@
DIC-3> set-simulation-time
END TIME FOR INTEGRATION /.1/: 10000
AUTOMATIC TIMESTEP CONTROL /YES/:
MAX TIMESTEP DURING INTEGRATION /1000/:
INITIAL TIMESTEP : /1E-07/:
SMALLEST ACCEPTABLE TIMESTEP : /1E-07/:
DIC-3>
DIC-3> @@
DIC-3> @@ SAVE THE SET UP TO A NEW STORE FILE AND EXIT
DIC-3> @@
DIC-3> save exc2 Y
DIC-3>
DIC-3>
DIC-3> set-inter
 --OK---
DIC-3>
```

exc2-run

```
DIC-3>About
 NO SUCH COMMAND, USE HELP
DIC-3>DIC-3>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exc2\run.DCM"
DIC-3>
DIC-3>
DIC-3> @@ exc2_run.DCM
DIC-3>
DIC-3> @@
DIC-3> @@ READ THE SET UP FROM FILE AND START THE SIMULATION
DIC-3> @@
DIC-3>
DIC-3> go d-m
 TIME STEP AT TIME  0.00000E+00
DIC-3> read exc2
 OK
DIC> sim yes
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 DEGREE OF IMPLICITY SET TO TRAPEZOIDAL RULE
  Trying old scheme                     4
 GENERATING STARTING VALUES FOR CELL #  1 INTERFACE #  2
 DETERMINING INITIAL EQUILIBRIUM VALUES
CALCULATING STARTING VALUES:       9   EQUILIBRIUM CALCULATIONS               DONE     6 OUT OF     9
04
  Trying old scheme                     4
 GENERATING STARTING VALUES FOR CELL #  2 INTERFACE #  2
 DETERMINING INITIAL EQUILIBRIUM VALUES
CALCULATING STARTING VALUES:       9   EQUILIBRIUM CALCULATIONS               DONE     6 OUT OF     9
04
  Trying old scheme                     4
 GENERATING STARTING VALUES FOR CELL #  3 INTERFACE #  2
 DETERMINING INITIAL EQUILIBRIUM VALUES
CALCULATING STARTING VALUES:       9   EQUILIBRIUM CALCULATIONS               DONE     6 OUT OF     9
04
 U-FRACTION IN SYSTEM:  C = .0406910187115061  CR = .0214382352209387
                        FE = .978561764909568
 TOTAL SIZE OF SYSTEM:  2.30050996865E-17 [m^3]
 U-FRACTION IN SYSTEM:  C = .0406910187115061  CR = .0214382352209387
                        FE = .978561764909568
 TOTAL SIZE OF SYSTEM:  2.30050996865E-17 [m^3]
  8  GRIDPOINT(S) ADDED   TO   CELL #1   REGION: CARB
  9  GRIDPOINT(S) ADDED   TO   CELL #1   REGION: AUS
  11  GRIDPOINT(S) ADDED   TO   CELL #2   REGION: CARB
  12  GRIDPOINT(S) ADDED   TO   CELL #2   REGION: AUS
  10  GRIDPOINT(S) ADDED   TO   CELL #3   REGION: CARB
  9  GRIDPOINT(S) ADDED   TO   CELL #3   REGION: AUS
 0.562308005161987        0.562344274011782        0.562366853557356        0.562349175215441        0.562308055404654        0.562308076601151
002        3.175413249295662E-002        1.213896739589521E-002        1.062121835683817E-004        1.403438790273176E-
005        3.825371689357113E-006        1.436471950202005E-005        4.649535418442126E-006        3.845602994570142E-
006        3.953076792712090E-006        3.744817358935585E-006        3.788020535983020E-006        3.752696037130689E-
006        3.750979315676525E-006        4.093728631190408E-004        6.107394348874644E-003        3.789577105282956E-
006        3.687373747186901E-006        3.623600664792957E-006        3.626488639510961E-006        3.511997011627082E-
006        3.402323193206890E-006        3.207385177399628E-006        3.013575760568908E-006        3.034833370692124E-
006        2.666125028211296E-006        2.602539804316190E-006        2.328375229342318E-006        1.750312348994674E-
006        1.749273203691536E-006        4.075236951602559E-004        6.106453324145921E-003        1.770380341785491E-
006        1.242047203580392E-006        5.483512043523086E-007        5.480039848778492E-007        1.327538353118446E-
007        2.382133042369882E-008        1.323307162953844E-008        5.542121113340301E-009        1.039962591339205E-
009        2.958801810836022E-010        7.697361894000011E-010        4.032221926558567E-010        2.166092104248856E-
012        6.686618972581373E-017       TIME =  0.10000000E-06 DT =  0.10000000E-06 SUM OF SQUARES =  0.96243705E-21
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.29712891E-02 AND  -0.29712891E-02
 POSITION OF INTERFACE CARB / AUS IS   0.69970287E-06
 CELL # 2 VELOCITY AT INTERFACE # 2 IS  -0.35949743E-02 AND  -0.35949743E-02
 POSITION OF INTERFACE CARB / AUS IS   0.29964050E-06
 CELL # 3 VELOCITY AT INTERFACE # 2 IS  -0.36149476E-02 AND  -0.36149476E-02
 POSITION OF INTERFACE CARB / AUS IS   0.52513851E-06
 U-FRACTION IN SYSTEM:  C = .040718331897411  CR = .0214509582219592
                        FE = .978549041908548
 TOTAL SIZE OF SYSTEM:  2.30050996865E-17 [m^3]
  CPU time used in timestep                  5  seconds
  2  GRIDPOINT(S) ADDED   TO   CELL #1   REGION: CARB
  1  GRIDPOINT(S) ADDED   TO   CELL #1   REGION: AUS
  2  GRIDPOINT(S) ADDED   TO   CELL #2   REGION: CARB
  1  GRIDPOINT(S) ADDED   TO   CELL #2   REGION: AUS
  2  GRIDPOINT(S) ADDED   TO   CELL #3   REGION: CARB
  1  GRIDPOINT(S) ADDED   TO   CELL #3   REGION: AUS
 0.720078253871675

output ignored...



... output resumed

 TOTAL SIZE OF SYSTEM:  2.30050996865E-17 [m^3]
  3  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: AUS

  CPU time used in timestep                  6  seconds
 2.229667454356161E-002        2.229667475786168E-002        2.229667475323933E-002        2.229817354581277E-002        2.229831021974588E-
002        2.229288884853952E-002        2.229599789674747E-002        1.425119528666322E-003        3.669324639842843E-
006        1.040148781241546E-008        4.192167896667589E-012        1.934402257947536E-
017       TIME =   7165.8351     DT =   1000.0000     SUM OF SQUARES =  0.84728751E-17
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.13177272E-10 AND  -0.13177272E-10
 POSITION OF INTERFACE CARB / AUS IS   0.42077987E-06
 CELL # 3 VELOCITY AT INTERFACE # 2 IS  -0.14419647E-10 AND  -0.14419647E-10
 POSITION OF INTERFACE CARB / AUS IS   0.23638321E-06
 U-FRACTION IN SYSTEM:  C = .0407440455640011  CR = .0215403703713709
                        FE = .978459629759136
 TOTAL SIZE OF SYSTEM:  2.30050996865E-17 [m^3]
  1  GRIDPOINT(S) REMOVED FROM CELL #3   REGION: AUS

  CPU time used in timestep                  5  seconds
 3.364345311160721E-002        3.364345324971768E-002        3.364345322365588E-002        3.364519167745175E-002        3.364531099932380E-
002        3.363901560628884E-002        3.364253133539891E-002        2.309312616351048E-003        3.345561560452142E-
006        7.591165941353612E-010        2.319161081122149E-013        7.621818133441375E-
017       TIME =   8165.8351     DT =   1000.0000     SUM OF SQUARES =  0.53143688E-19
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.11743096E-10 AND  -0.11743096E-10
 POSITION OF INTERFACE CARB / AUS IS   0.40903677E-06
 CELL # 3 VELOCITY AT INTERFACE # 2 IS  -0.13249555E-10 AND  -0.13249555E-10
 POSITION OF INTERFACE CARB / AUS IS   0.22313366E-06
 U-FRACTION IN SYSTEM:  C = .0407440900266383  CR = .0215400101850286
                        FE = .978459989945479
 TOTAL SIZE OF SYSTEM:  2.30050996865E-17 [m^3]
  CPU time used in timestep                  5  seconds
```

```
 3.705630166391169E-002        3.705630176337865E-002        3.705630172281395E-002        3.705800171213234E-002        3.705808405673141E-
002        3.705189955621500E-002        3.705517870634564E-002        3.158234971095821E-003        4.806272829114568E-
006        3.048496197567481E-009        1.034477314758240E-012        2.978972223855546E-
016       TIME =    9165.8351     DT =    1000.0000     SUM OF SQUARES =  0.33602577E-18
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.10620254E-10 AND  -0.10620254E-10
 POSITION OF INTERFACE CARB / AUS IS   0.39841652E-06
 CELL # 3 VELOCITY AT INTERFACE # 2 IS  -0.12596837E-10 AND  -0.12596837E-10
 POSITION OF INTERFACE CARB / AUS IS   0.21053682E-06
 U-FRACTION IN SYSTEM:  C = .0407441047083711  CR = .0215397503284518
                        FE = .978460249802055
 TOTAL SIZE OF SYSTEM:  2.30050996865E-17 [m^3]
  1  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: AUS
  1  GRIDPOINT(S) REMOVED FROM CELL #3   REGION: AUS

  CPU time used in timestep                    5  seconds
 4.614833337884686E-002        4.614833346537163E-002        4.614833343952789E-002        4.615003053279432E-002        4.615008115549189E-
002        4.614377844854414E-002        4.614661401655567E-002        4.761712383992910E-003        7.908686349474443E-
006        7.580574316429073E-009        5.682776786532170E-013        2.653052237587051E-
016       TIME =   10000.000     DT =   834.16488     SUM OF SQUARES =  0.10739326E-17
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.96726218E-11 AND  -0.96726218E-11
 POSITION OF INTERFACE CARB / AUS IS   0.39034796E-06
 CELL # 3 VELOCITY AT INTERFACE # 2 IS  -0.12034478E-10 AND  -0.12034478E-10
 POSITION OF INTERFACE CARB / AUS IS   0.20049808E-06
 U-FRACTION IN SYSTEM:  C = .0407440731990143  CR = .0215395772155419
                        FE = .978460422914965
 TOTAL SIZE OF SYSTEM:  2.30050996865E-17 [m^3]
 MUST SAVE WORKSPACE ON FILE
 WORKSPACE SAVED ON FILE
 RECLAIMING WORKSPACE
 DELETING TIME-RECORD FOR TIME    2676.3768
 DELETING TIME-RECORD FOR TIME    2823.6579
 DELETING TIME-RECORD FOR TIME    2823.6579
 DELETING TIME-RECORD FOR TIME    2823.6579
 DELETING TIME-RECORD FOR TIME    2823.6579
 DELETING TIME-RECORD FOR TIME    2823.6580
 DELETING TIME-RECORD FOR TIME    2823.6582
 DELETING TIME-RECORD FOR TIME    2823.6585
 DELETING TIME-RECORD FOR TIME    2823.6591
 DELETING TIME-RECORD FOR TIME    2823.6604
 DELETING TIME-RECORD FOR TIME    2823.6630
 DELETING TIME-RECORD FOR TIME    2823.6681
 DELETING TIME-RECORD FOR TIME    2823.6783
 DELETING TIME-RECORD FOR TIME    2823.6988
 DELETING TIME-RECORD FOR TIME    2823.7398
 DELETING TIME-RECORD FOR TIME    2823.8217
 DELETING TIME-RECORD FOR TIME    2823.9855
 DELETING TIME-RECORD FOR TIME    2824.3132
 DELETING TIME-RECORD FOR TIME    2824.9686
 DELETING TIME-RECORD FOR TIME    2826.2793
 DELETING TIME-RECORD FOR TIME    2828.9007
 DELETING TIME-RECORD FOR TIME    2834.1436
 DELETING TIME-RECORD FOR TIME    2844.6294
 DELETING TIME-RECORD FOR TIME    2865.6009
 DELETING TIME-RECORD FOR TIME    2907.5439
 DELETING TIME-RECORD FOR TIME    2991.4300
 DELETING TIME-RECORD FOR TIME    3159.2022
 DELETING TIME-RECORD FOR TIME    3494.7465
 DELETING TIME-RECORD FOR TIME    4165.8351
 DELETING TIME-RECORD FOR TIME    5165.8351
 DELETING TIME-RECORD FOR TIME    6165.8351
 DELETING TIME-RECORD FOR TIME    7165.8351
 DELETING TIME-RECORD FOR TIME    8165.8351

 KEEPING TIME-RECORD FOR TIME    9165.8351
 AND FOR TIME                    10000.000
 WORKSPACE RECLAIMED

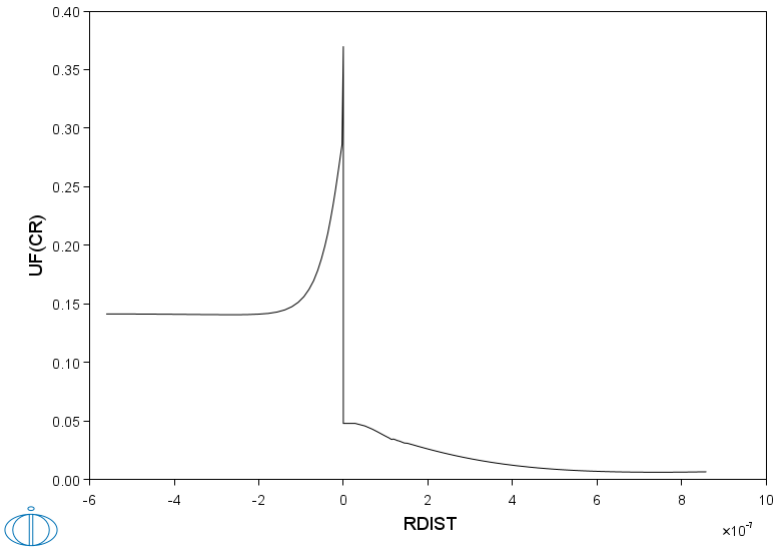
 TIMESTEP AT     10000.0000     SELECTED

DIC>
DIC>
DIC> set-inter
 --OK---
DIC>
```

exc2-plot

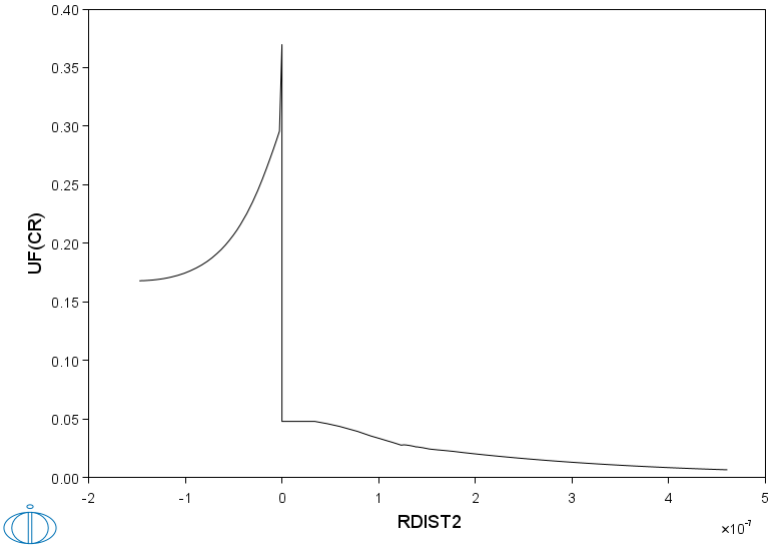
```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exc2\plot.DCM"
DIC>
DIC>
DIC> @@ exc2_plot.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR GENERATING GRAPHICAL OUTPUT FOR EXAMPLE c2
DIC> @@
DIC>
DIC> @@
DIC> @@ GO TO THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  1.00000E+04
DIC> read exc2
 OK
DIC>
DIC> @@
DIC> @@ GO TO THE POST PROCESSOR
DIC> @@
DIC> post
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1: @@
POST-1: @@ PLOT THE CHROMIUM CONCENTRATION PROFILES IN THE SAME WAY AS IN exb2
POST-1: @@ BUT NOW FOR EACH PARTICLE. LET US LOOK AT THE PROFILES AFTER 1000s.
POST-1: @@
POST-1:
POST-1: @@
POST-1: @@ FIRST CELL
POST-1: @@
POST-1: enter-symb
Function or table /FUNCTION/: func
NAME: rdist
FUNCTION: gd-poi(carb,u);
POST-1:
POST-1: s-d-a x rdist
POST-1:
POST-1: s-d-a y uf(cr)
POST-1:
POST-1: s-i-v
VARIABLE /TIME/: dist
DISTANCE : /GLOBAL/: glo
POST-1:
POST-1: s-p-c time 1000
POST-1:
POST-1: @@
POST-1: @@ SET THE TITLE ON THE PLOT
POST-1: @@
POST-1: set-title Figure C2.1
POST-1: plot
```

Figure C2.1



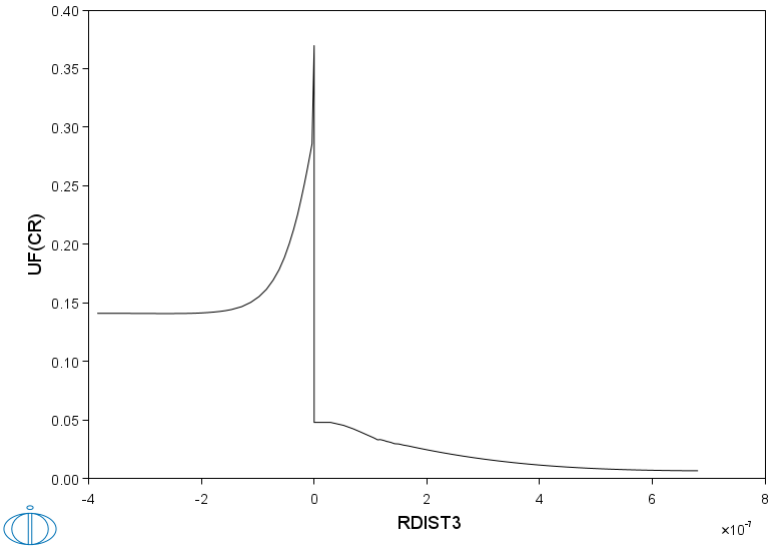

```
POST-1:
POST-1:
POST-1:@?<_hit_return_to_continue_>
POST-1:
POST-1: @@
POST-1: @@ SELECT CELL 2
POST-1: @@
POST-1: select-cell
Number /NEXT/: 2
 CELL   2 SELECTED
POST-2:
POST-2: enter-symb
Function or table /FUNCTION/: func
NAME: rdist2
FUNCTION: gd-poi(carb,u);
POST-2:
POST-2: s-d-a x rdist2
POST-2:
POST-2: set-title Figure C2.2
POST-2: plot
```

Figure C2.2




```
POST-2:
POST-2:
POST-2:
POST-2:@?<_hit_return_to_continue_>
POST-2:
POST-2: @@
POST-2: @@ SELECT CELL 3
POST-2: @@
POST-2: select-cell 3
 CELL    3 SELECTED
POST-3:
POST-3: enter-symb
Function or table /FUNCTION/: func
NAME: rdist3
FUNCTION: gd-poi(carb,u);
POST-3:
POST-3: s-d-a x rdist3
POST-3:
POST-3: set-title Figure C2.3
POST-3: plot
```

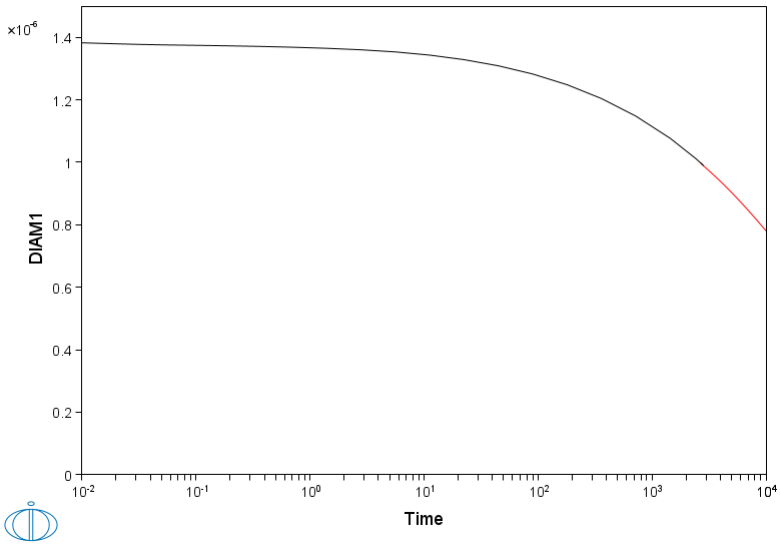
Figure C2.3




```
POST-3:
POST-3:
POST-3:
POST-3:
POST-3:@?<_hit_return_to_continue_>
POST-3:
POST-3:
POST-3: @@
POST-3: @@ ALSO PLOT HOW THE DIAMETER OF THE CEMENTITE PARTICLE VARIES
POST-3: @@ WITH TIME IN THE THREE CELLS
POST-3: @@
POST-3:
POST-3: @@
POST-3: @@ SELECT THE FIRST CELL
POST-3: @@
POST-3: sel-cell 1
 CELL    1 SELECTED
POST-1:
POST-1: s-d-a x time
  INFO: Time is set as independent variable
POST-1: s-s-s x n .01 10000
POST-1: set-axis-type x log
POST-1:
POST-1: enter func diam1=2*poi(carb,u);
POST-1: s-d-a y diam1
POST-1: s-s-s y n 0 1.5e-6
POST-1:
```

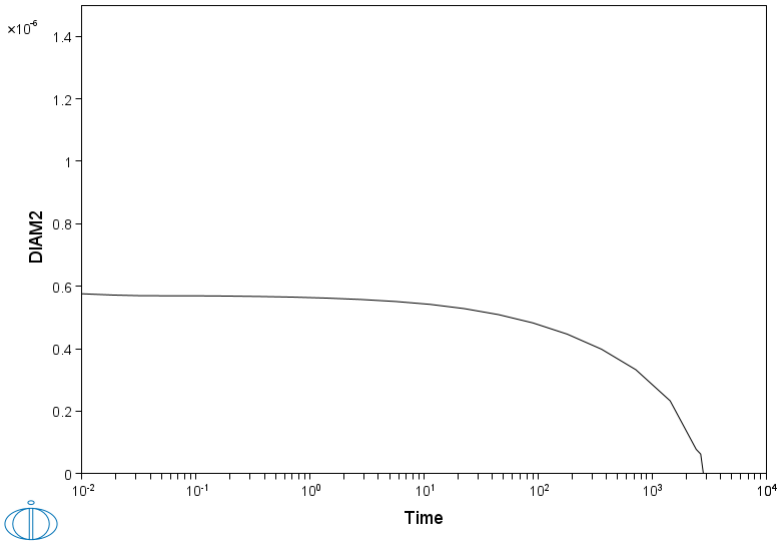
```
POST-1: s-p-c interf carb upp
POST-1:
POST-1: app n
POST-1: set-title Figure C2.4
POST-1: plot
WORKING ...
```

Figure C2.4




```
POST-1:
POST-1:
POST-1:
POST-1:
POST-1:@?<_hit_return_to_continue_>
POST-1:
POST-1:
POST-1: @@
POST-1: @@ SELECT CELL 2
POST-1: @@
POST-1: sel-cell 2
 CELL   2 SELECTED
POST-2:
POST-2: enter func diam2=2*poi(carb,u);
POST-2: s-d-a y diam2
POST-2: s-s-s y n 0 1.5e-6
POST-2:
POST-2: s-p-c interf carb upp
POST-2:
POST-2: set-title Figure C2.5
POST-2: plot
WORKING ...
```

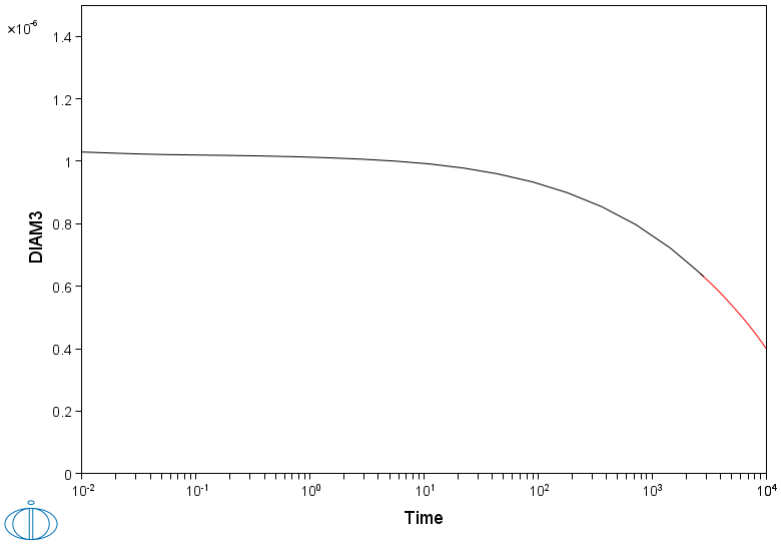
Figure C2.5




```
POST-2:
POST-2:
POST-2:
POST-2:
POST-2:@?<_hit_return_to_continue_>
POST-2:
POST-2: @@
POST-2: @@ SELECT CELL 3
POST-2: @@
POST-2: sel-cell 3
 CELL   3 SELECTED
POST-3:
POST-3: enter func diam3=2*poi(carb,u);
POST-3: s-d-a y diam3
POST-3: s-s-s y n 0 1.5e-6
POST-3:
POST-3: s-p-c interf carb upp
POST-3:
POST-3: set-title Figure C2.6
```

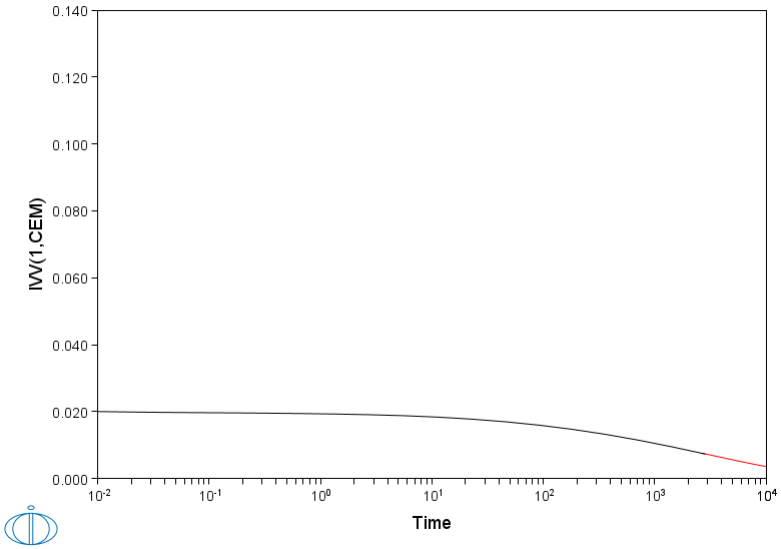
```
POST-3:
POST-3: plot
WORKING ...
```

Figure C2.6



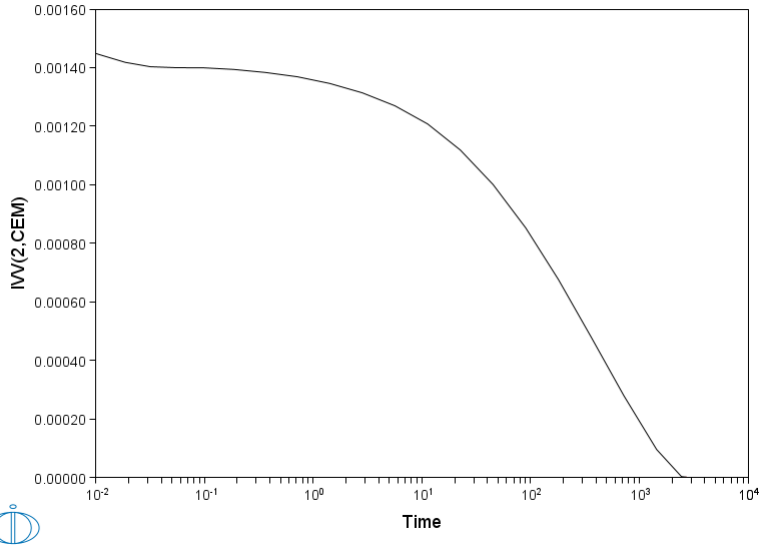

```
POST-3:
POST-3:
POST-3:
POST-3:
POST-3:@?<_hit_return_to_continue_>
POST-3:
POST-3: @@
POST-3: @@ NOW PLOT THE VOLUME FRACTION OF CEMENTITE IN THE THREE CELLS
POST-3: @@
POST-3: s-d-a x time
  INFO: Time is set as independent variable
POST-3: s-s-s x n .01 10000
POST-3: set-axis-type x log
POST-3:
POST-3: @@
POST-3: @@ CELL 1
POST-3: @@
POST-3: s-d-a y ivv(1,cem)
POST-3: s-s-s y n 0 0.14
POST-3:
POST-3: s-p-c integral
POST-3:
POST-3: set-title Figure C2.7
POST-3: plot
WORKING ...
```

Figure C2.7



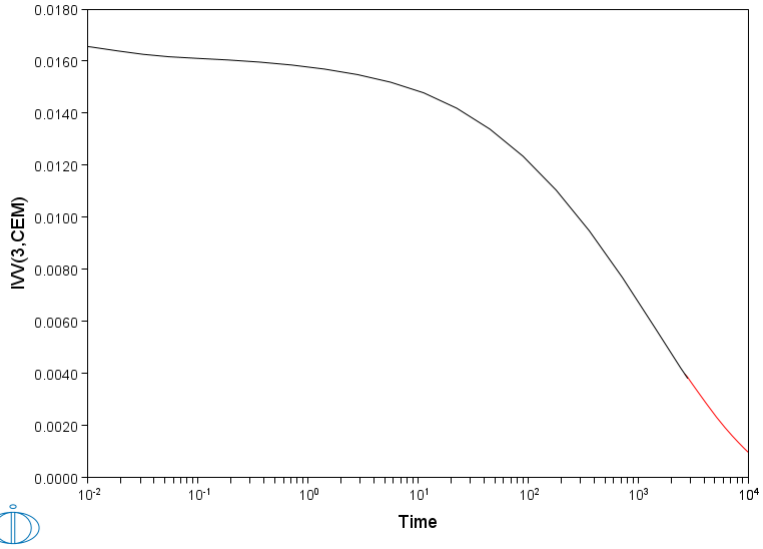

```
POST-3:
POST-3:
POST-3:
POST-3:
POST-3:@?<_hit_return_to_continue_>
POST-3:
POST-3: @@
POST-3: @@ CELL 2
POST-3: @@
POST-3: s-d-a y ivv(2,cem)
POST-3:
POST-3: set-title Figure C2.8
POST-3: plot
WORKING ...
```

Figure C2.8



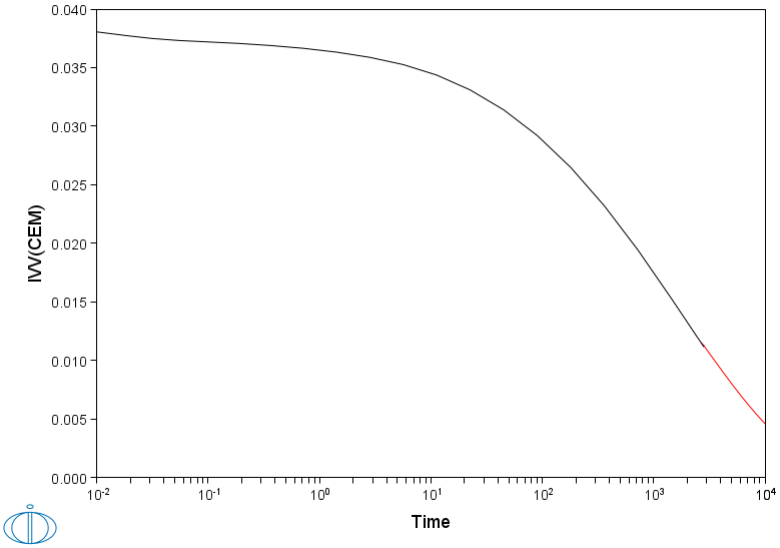

```
POST-3:
POST-3:
POST-3:
POST-3:
POST-3:@?<_hit_return_to_continue_>
POST-3:
POST-3: @@
POST-3: @@ CELL 3
POST-3: @@
POST-3: s-d-a y ivv(3,cem)
POST-3:
POST-3: set-title Figure C2.9
POST-3: plot
WORKING ...
```

Figure C2.9



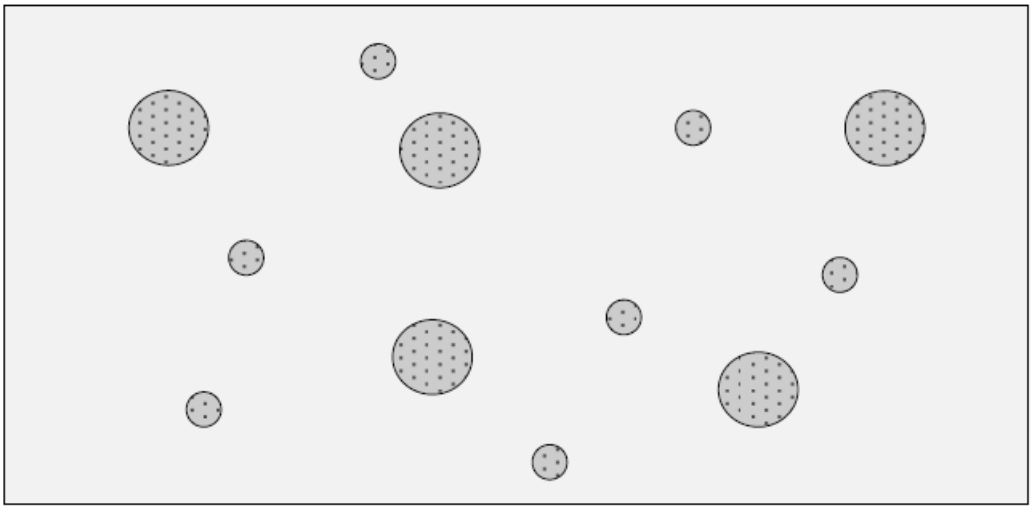

```
POST-3:
POST-3:
POST-3:
POST-3:
POST-3:@?<_hit_return_to_continue_>
POST-3:
POST-3: @@
POST-3: @@ FINALLY, PLOT HOW THE TOTAL VOLUME FRACTION OF CEMENTITE
POST-3: @@ VARIES WITH TIME.
POST-3: @@
POST-3: s-d-a y ivv(cem)
POST-3:
POST-3: set-title Figure C2.10
POST-3: plot
WORKING ...
```

Figure C2.10




```
POST-3:
POST-3:
POST-3:
POST-3:
POST-3:@?<_hit_return_to_continue_>
POST-3:
POST-3: set-inter
 --OK---
POST-3:
```

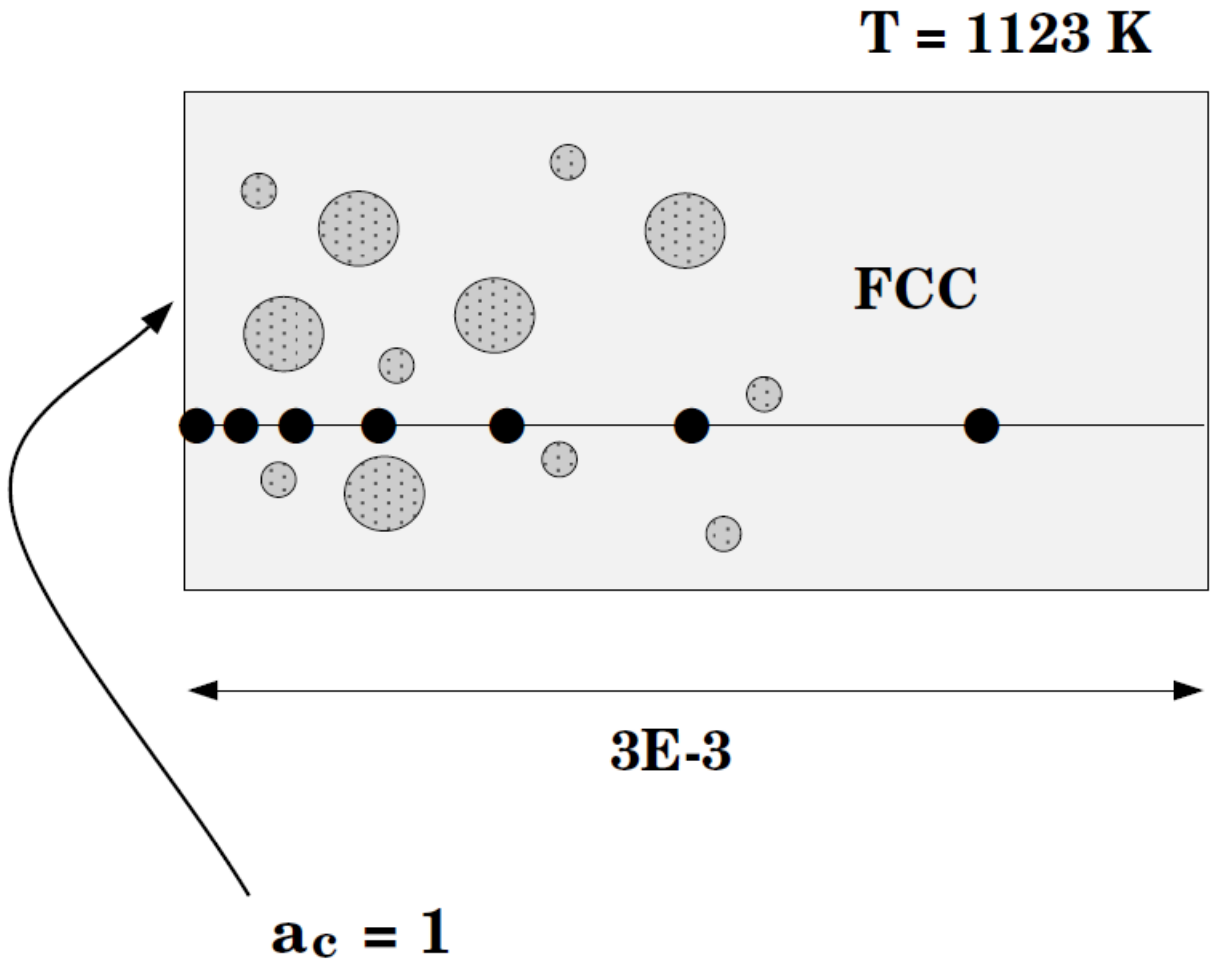
Diffusion in Dispersed Systems



Example exd1a

Carburization of a Ni-25% Cr alloy: Dispersed system model

This example is about carburization of a Ni-25Cr alloy. In this case the M3C2 and M7C3 carbides are entered as spheroid phases in a FCC matrix. In this example the DISPERSED SYSTEM MODEL is used. This case is from A. Engström, L. Höglund and J. Ågren: Metall.Trans.A v. 25A (1994), pp. 1127-1134.



exd1a-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exd1a\setup.DCM"
SYS: @@
SYS: @@ Diffusion in dispersed systems.
SYS: @@ Carburization of Ni-25%Cr alloy: Dispersed system model
SYS: @@ This example is about carburization of a Ni-25Cr alloy.
SYS: @@ In this case the M3C2 and M7C3 carbides are entered as
SYS: @@ spheroid phases in a FCC matrix. This simulation can be run
SYS: @@ with either the DISPERSED SYSTEM MODEL or the HOMOGENIZATION MODEL.
SYS: @@ In this example the DISPERSED SYSTEM MODEL is used, which requires
SYS: @@ that the default HOMOGENIZATION MODEL is disabled.
SYS: @@ With the DISPERSED SYSTEM MODEL the command
SYS: @@ ENTER_LABYRINTH_FUNCTION is used to take into account the
SYS: @@ impeding effect of dispersed phases on long-range diffusion.
SYS: @@ For the HOMOGENIZATION MODEL the command
SYS: @@ ENTER_HOMOGENIZATION_FUNCTION should be used.
SYS: @@ This case is from A. EngstrÃ¶m, L. HÃ¶glund and J. Ã…gren:
SYS: @@ Metall.Trans.A v. 25A (1994), pp. 1127-1134.
SYS: @@----------------------------------------------------------------------
SYS:
SYS: @@ exd1_setup.DCM
SYS:
SYS: @@
SYS: @@ RETRIEVE DATA FROM THE DATABASE
SYS: @@
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                       /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12:
TDB_TCFE12: @@
TDB_TCFE12: @@ USE THE SSOL DATABASE FOR THERMODYNAMIC DATA
TDB_TCFE12: @@
TDB_TCFE12: sw fedemo
 Current database: Iron Demo Database v6.0

 VA                       /-  DEFINED
TDB_FEDEMO: def-sys ni cr c
 NI                       CR                       C
   DEFINED
TDB_FEDEMO: rej ph * all
 GAS:G                    LIQUID:L                 BCC_A2
 C14_LAVES                CBCC_A12                 CEMENTITE_D011
 CHI_A12                  CUB_A13                  DIAMOND_A4
 FCC_A1                   GRAPHITE_A9              HCP_A3
 KSI_CARBIDE              M23C6_D84                M3C2_D510
 M7C3_D101                SIGMA_D8B  REJECTED
TDB_FEDEMO: res ph fcc,m7c3,m3c2,grap
 FCC_A1                   M7C3_D101                M3C2_D510
 GRAPHITE_A9  RESTORED
TDB_FEDEMO: get
11:27:29,535 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 Creating a new composition set FCC_A1#2
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ SWITCH TO A MOBILITY DATABASE TO RETRIEVE MOBILITY DATA
TDB_FEDEMO: @@
TDB_FEDEMO: app mfedemo
 Current database: Fe-Alloys Mobility demo database v5.0

 VA  DEFINED
APP: def-sys ni c cr
 NI                       C                        CR
   DEFINED
APP: rej ph * all
 BCC_A2                   FCC_A1                   CEMENTITE_D011
 LIQUID:L  REJECTED
APP: res ph fcc,m7c3,m3c2,grap
 *** ERROR M7C3 INPUT IGNORED
 *** ERROR M3C2 INPUT IGNORED
 *** ERROR GRAP INPUT IGNORED
 FCC_A1  RESTORED
APP: get
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 Creating a new composition set FCC_A1#3
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data
```

```
 -OK-
APP:
APP: @@
APP: @@ ENTER THE DICTRA MONITOR
APP: @@
APP: go d-m
 NO TIME STEP DEFINED
 *** ENTERING GRAPHITE_A9 AS A DIFFUSION NONE PHASE
 *** ENTERING M3C2_D510 AS A DIFFUSION NONE PHASE
 *** ENTERING M7C3_D101 AS A DIFFUSION NONE PHASE
DIC>
DIC> @@
DIC> @@ ENTER THE GLOBAL CONDITION T
DIC> @@
DIC> set-cond glob T 0 1123; * N
DIC>
DIC> @@
DIC> @@ SET THE REFERENCE STATE FOR CARBON
DIC> @@
DIC> set-reference-state
Component: C
Reference state: grap
Temperature /*/: *
Pressure /100000/: 1E5
DIC>
DIC> @@
DIC> @@ ENTER THE REGION aus
DIC> @@
DIC> enter-region aus
DIC>
DIC> @@
DIC> @@ ENTER A GEOMETRICAL GRID INTO THE REGION
DIC> @@
DIC> enter-grid aus 3e-3 geo 100 1.02
DIC>
DIC> @@
DIC> @@ ENTER A MATRIX PHASE IN THE REGION
DIC> @@
DIC> enter-phase act aus matrix fcc_a1#1
DIC>
DIC> @@
DIC> @@ ENTER THE START COMPOSITION FOR THE MATRIX PHASE
DIC> @@
DIC> enter-composition
REGION NAME : /AUS/: aus
PHASE NAME: /FCC_A1#1/: fcc#1
DEPENDENT COMPONENT ? /NI/: ni
COMPOSITION TYPE /MOLE_FRACTION/: w-p
PROFILE FOR /C/: cr
TYPE /LINEAR/: lin 25 25
PROFILE FOR /CR/: c
TYPE /LINEAR/: lin 1e-4 1e-4
DIC>
DIC> @@
DIC> @@ ENTER SPHEROIDAL PHASES IN THE REGION
DIC> @@
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: act
REGION NAME : /AUS/: aus
PHASE TYPE /MATRIX/: sph
PHASE NAME: /NONE/: m7c3
 INFO: EQUILIBRIUM COMPOSITION AND FRACTION OF SPHEROID PHASES USED AS DEFAULT
DIC>
DIC> @@
DIC> @@ ENTER A STOICHOMETRIC SPHEROIDAL PHASE IN THE REGION
DIC> @@
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: act
REGION NAME : /AUS/: aus
PHASE TYPE /MATRIX/: sph
PHASE NAME: /NONE/: m3c2
 INFO: EQUILIBRIUM COMPOSITION AND FRACTION OF SPHEROID PHASES USED AS DEFAULT
DIC>
DIC>
DIC> @@
DIC> @@ ENTER A START COMPOSITION FOR THE SPHEROIDAL PHASES
DIC> @@
DIC> enter-composition
REGION NAME : /AUS/: aus
PHASE NAME: /FCC_A1#1/: m7c3
USE EQUILIBRIUM VALUE /Y/: Y
DIC> enter-composition
REGION NAME : /AUS/: aus
PHASE NAME: /FCC_A1#1/: m3c2
USE EQUILIBRIUM VALUE /Y/: Y
DIC>
DIC> @@
DIC> @@ SET THE BOUNDARY CONDITION
DIC> @@
DIC> set-cond
GLOBAL OR BOUNDARY CONDITION /GLOBAL/: boundary
BOUNDARY /LOWER/: lower
CONDITION TYPE /CLOSED_SYSTEM/: mixed
Dependent substitutional element:NI
Dependent interstitial element:VA
TYPE OF CONDITION FOR COMPONENT C /ZERO_FLUX/: activity
LOW TIME LIMIT /0/: 0
ACR(C)(TIME)= 1;
HIGH TIME LIMIT /*/: *
ANY MORE RANGES /N/: N
TYPE OF CONDITION FOR COMPONENT CR /ZERO_FLUX/: zero-flux
DIC>
DIC> @@
DIC> @@ ENTER THE LABYRINTH FACTOR
DIC> @@
DIC> enter-lab
REGION NAME : aus
f(T,P,VOLFR,X)= volfr**2;
DIC>
DIC> @@
```

```
DIC> @@ SET THE SIMULATION TIME. REMEMBER TO BE CAREFUL WITH THE
DIC> @@ TIMESTEP WHEN THERE ARE SPHEROIDAL PHASES PRESENT. IN THIS CASE
DIC> @@ THE TIMESTEP IS NOT ALLOWED TO BE LARGER THAN 1800s.
DIC> @@
DIC> set-simulation-time
END TIME FOR INTEGRATION /.1/: 3600000
AUTOMATIC TIMESTEP CONTROL /YES/: YES
MAX TIMESTEP DURING INTEGRATION /360000/: 1800
INITIAL TIMESTEP : /1E-07/:
SMALLEST ACCEPTABLE TIMESTEP : /1E-07/:
DIC>
DIC>
DIC> @@
DIC> @@ IN ORDER SO SAVE SOME SPACE ON THE DISK THE RESULT IS STORED
DIC> @@ SELECTIVELY. OTHERWISE THE STORE-RESULT-FILE FROM THIS EXAMPLE
DIC> @@ WOULD BE VERY LARGE.
DIC> @@
DIC> set-option SAVE_WORKSPACE_ON_FILE 99
DIC>
DIC> @@ BY DEFAULT THE "HOMOGENIZATION MODEL" IS USED WHEN MULTIPLE PHASES
DIC> @@ ARE ENTERED IN A SINGLE REGION. FOR THIS EXAMPLE THE HOMOGENIZATION
DIC> @@ MODEL IS DISABLED.
DIC> ho n
 HOMOGENIZATION DISABLED
DIC>
DIC>
DIC> @@
DIC> @@ SAVE THE SET UP TO A NEW STORE FILE AND EXIT
DIC> @@
DIC> save exd1 y
DIC>
DIC> set-inter
 --OK---
DIC>
```

exd1a-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exd1a\run.DCM"
DIC>
DIC>
DIC> @@ exd1_run.DCM
DIC>
DIC> @@
DIC> @@ READ THE SETUP FILE AND START THE SIMULATION
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  0.00000E+00
 *** ENTERING GRAPHITE_A9 AS A DIFFUSION NONE PHASE
 *** ENTERING M3C2_D510 AS A DIFFUSION NONE PHASE
 *** ENTERING M7C3_D101 AS A DIFFUSION NONE PHASE
DIC> read exd1
 OK
DIC> sim
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 DEGREE OF IMPLICITY SET TO TRAPEZOIDAL RULE
 U-FRACTION IN SYSTEM:  C = 4.73399450059566E-06  CR = .273386452547573
                        NI = .726613547452427
 TOTAL SIZE OF SYSTEM:  .003 [m]
  WARNING:M7C3_D101 HAS NO VOLUME FRACTION, CREATING ONE
  WARNING:M3C2_D510 HAS NO VOLUME FRACTION, CREATING ONE
 U-FRACTION IN SYSTEM:  C = 4.73399450059567E-06  CR = .273386452547573
                        NI = .726613547452427
 TOTAL SIZE OF SYSTEM:  .003 [m]
 TIME =  0.10000000E-06 DT =  0.10000000E-06 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = 8.32233224030127E-05  CR = .273386452547572
                        NI = .726613547452428
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.10010000E-03 DT =  0.10000000E-03 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = 1.14491916844134E-04  CR = .273386452547545
                        NI = .726613547452455
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.40010010     DT =  0.40000000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = 1.34397473834078E-04  CR = .273386452541228
                        NI = .726613547458772
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    0  seconds
 TIME =   61.226617     DT =   60.826517     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = 1.7323410372616E-04  CR = .273386451404806
                        NI = .726613548595194
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    1  seconds
 TIME =   136.73134     DT =   75.504726     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = 2.15195250520531E-04  CR = .273386450378639
                        NI = .726613549621361
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    0  seconds
 TIME =   246.77995     DT =   110.04860     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = 2.65132643074028E-04  CR = .273386449367933
                        NI = .726613550632067
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    0  seconds
 TIME =   417.73097     DT =   170.95102     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = 3.26703370219 43E-04  CR = .273386448427438
                        NI = .726613551572562
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    0  seconds
 TIME =   700.87785     DT =   283.14689     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = 4.03852012958394E-04  CR = .273386447458974
                        NI = .726613552541026
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    1  seconds
 TIME =   1196.7622     DT =   495.88434     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = 5.03958087673235E-04  CR = .273386446322886
                        NI = .726613553677114
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    0  seconds
 TIME =   2136.4657     DT =   939.70351     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = 6.43011746169158E-04  CR = .273386444988439
                        NI = .726613555011561
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    0  seconds
 TIME =   3936.4657     DT =   1800.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = 8.38519317570 87E-04  CR = .273386443511137
                        NI = .726613556488862
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    1  seconds
 TIME =   5736.4657     DT =   1800.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00101736919091153  CR = .273386442681228
                        NI = .726613557318772
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    0  seconds
 TIME =   7536.4657     DT =   1800.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00118296843235547  CR = .273386442066148
                        NI = .726613557933852
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    0  seconds
 TIME =   9336.4657     DT =   1800.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00133879473943311  CR = .273386441011304
                        NI = .726613558988696
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    0  seconds
 TIME =   11136.466     DT =   1800.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00148538356586206  CR = .273386439279047
                        NI = .726613560720953
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    0  seconds
 TIME =   12936.466     DT =   1800.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00162329914518437  CR = .273386436825686
                        NI = .726613563174314
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    1  seconds
 TIME =   14736.466     DT =   1800.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00175666281801172  CR = .273386434544918
                        NI = .726613565455081
 TOTAL SIZE OF SYSTEM:  .003 [m]
```

```
 CPU time used in timestep                    0  seconds
TIME =   16509.561     DT =   1773.0953     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .00188419609237157  CR = .273386432317836
                       NI = .726613567682163
TOTAL SIZE OF SYSTEM:  .003 [m]
 CPU time used in timestep                    0  seconds
TIME =   18202.531     DT =   1692.9700     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .00200374276123893  CR = .273386430131738
                       NI = .726613569868262
TOTAL SIZE OF SYSTEM:  .003 [m]
 CPU time used in timestep                    0  seconds
TIME =   19871.498     DT =   1668.9675     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .00212043303520678  CR = .273386427985713
                       NI = .726613572014287
TOTAL SIZE OF SYSTEM:  .003 [m]
 CPU time used in timestep                    1  seconds
TIME =   21585.289     DT =   1713.7906     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .00223650931817923  CR = .273386426227093
                       NI = .726613573772906
TOTAL SIZE OF SYSTEM:  .003 [m]
 CPU time used in timestep                    0  seconds
TIME =   23385.289     DT =   1800.0000     SUM OF SQUARES =   0.0000000


output ignored...



... output resumed

 CPU time used in timestep                    0  seconds
TIME =   3563985.3     DT =   1800.0000     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0314537850194298  CR = .2733863252107
                       NI = .7266136747893
TOTAL SIZE OF SYSTEM:  .003 [m]
 CPU time used in timestep                    0  seconds
TIME =   3565785.3     DT =   1800.0000     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0314617195673842  CR = .273386325190243
                       NI = .726613674809756
TOTAL SIZE OF SYSTEM:  .003 [m]
 CPU time used in timestep                    1  seconds
TIME =   3567585.3     DT =   1800.0000     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0314696517261714  CR = .27338632516957
                       NI = .72661367483043
TOTAL SIZE OF SYSTEM:  .003 [m]
 CPU time used in timestep                    0  seconds
TIME =   3569385.3     DT =   1800.0000     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0314775815074803  CR = .273386325148678
                       NI = .726613674851322
TOTAL SIZE OF SYSTEM:  .003 [m]
 CPU time used in timestep                    0  seconds
TIME =   3571185.3     DT =   1800.0000     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0314855089234026  CR = .27338632512757
                       NI = .72661367487243
TOTAL SIZE OF SYSTEM:  .003 [m]
 CPU time used in timestep                    0  seconds
TIME =   3572985.3     DT =   1800.0000     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0314934339864118  CR = .273386325106243
                       NI = .726613674893757
TOTAL SIZE OF SYSTEM:  .003 [m]
 CPU time used in timestep                    0  seconds
TIME =   3574785.3     DT =   1800.0000     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0315013567093432  CR = .273386325084699
                       NI = .726613674915301
TOTAL SIZE OF SYSTEM:  .003 [m]
 CPU time used in timestep                    1  seconds
TIME =   3576585.3     DT =   1800.0000     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0315092771053743  CR = .273386325062936
                       NI = .726613674937064
TOTAL SIZE OF SYSTEM:  .003 [m]
 CPU time used in timestep                    0  seconds
TIME =   3578385.3     DT =   1800.0000     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0315171195188006  CR = .273386325040956
                       NI = .726613674959044
TOTAL SIZE OF SYSTEM:  .003 [m]
 CPU time used in timestep                    0  seconds
TIME =   3580185.3     DT =   1800.0000     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0315251109710436  CR = .273386325018757
                       NI = .726613674981243
TOTAL SIZE OF SYSTEM:  .003 [m]
 CPU time used in timestep                    0  seconds
TIME =   3581985.3     DT =   1800.0000     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0315330244685791  CR = .27338632499634
                       NI = .72661367500366
TOTAL SIZE OF SYSTEM:  .003 [m]
 CPU time used in timestep                    1  seconds
TIME =   3583785.3     DT =   1800.0000     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0315409356949736  CR = .273386324973704
                       NI = .726613675026296
TOTAL SIZE OF SYSTEM:  .003 [m]
 CPU time used in timestep                    0  seconds
TIME =   3585585.3     DT =   1800.0000     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0315488446648401  CR = .273386324950849
                       NI = .726613675049151
TOTAL SIZE OF SYSTEM:  .003 [m]
 CPU time used in timestep                    0  seconds
TIME =   3587385.3     DT =   1800.0000     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0315567513930271  CR = .273386324927775
                       NI = .726613675072225
TOTAL SIZE OF SYSTEM:  .003 [m]
 CPU time used in timestep                    0  seconds
TIME =   3589185.3     DT =   1800.0000     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0315646558946027  CR = .273386324904482
                       NI = .726613675095517
TOTAL SIZE OF SYSTEM:  .003 [m]
 CPU time used in timestep                    0  seconds
TIME =   3590985.3     DT =   1800.0000     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0315725581848389  CR = .27338632488097
                       NI = .726613675119031
TOTAL SIZE OF SYSTEM:  .003 [m]
 CPU time used in timestep                    1  seconds
TIME =   3592785.3     DT =   1800.0000     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .031580458279197  CR = .273386324857237
                       NI = .726613675142763
TOTAL SIZE OF SYSTEM:  .003 [m]
 CPU time used in timestep                    0  seconds
```

```
 TIME =   3594585.3     DT =   1800.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0315883561933127  CR = .273386324833285
                        NI = .726613675166715
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    0  seconds
 TIME =   3596385.3     DT =   1800.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0315962519429824  CR = .273386324809113
                        NI = .726613675190887
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    0  seconds
 TIME =   3598185.3     DT =   1800.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0316041455441495  CR = .273386324784721
                        NI = .726613675215279
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    0  seconds
 TIME =   3599985.3     DT =   1800.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0316120370128917  CR = .273386324760108
                        NI = .726613675239892
 TOTAL SIZE OF SYSTEM:  .003 [m]
  CPU time used in timestep                    1  seconds
 TIME =   3600000.0     DT =   14.711046     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0316121023506871  CR = .273386324759897
                        NI = .726613675240103
 TOTAL SIZE OF SYSTEM:  .003 [m]
 MUST SAVE WORKSPACE ON FILE
 WORKSPACE SAVED ON FILE
 RECLAIMING WORKSPACE
 DELETING TIME-RECORD FOR TIME    0.0000000
 DELETING TIME-RECORD FOR TIME   0.10000000E-06
 DELETING TIME-RECORD FOR TIME   0.10010000E-03
 DELETING TIME-RECORD FOR TIME    163785.29
 DELETING TIME-RECORD FOR TIME    341985.29
 DELETING TIME-RECORD FOR TIME    520185.29
 DELETING TIME-RECORD FOR TIME    698385.29
 DELETING TIME-RECORD FOR TIME    876585.29
 DELETING TIME-RECORD FOR TIME    1054785.3
 DELETING TIME-RECORD FOR TIME    1232985.3
 DELETING TIME-RECORD FOR TIME    1411185.3
 DELETING TIME-RECORD FOR TIME    1589385.3
 DELETING TIME-RECORD FOR TIME    1767585.3
 DELETING TIME-RECORD FOR TIME    1945785.3
 DELETING TIME-RECORD FOR TIME    2123985.3
 DELETING TIME-RECORD FOR TIME    2302185.3
 DELETING TIME-RECORD FOR TIME    2480385.3
 DELETING TIME-RECORD FOR TIME    2658585.3
 DELETING TIME-RECORD FOR TIME    2836785.3
 DELETING TIME-RECORD FOR TIME    3014985.3
 DELETING TIME-RECORD FOR TIME    3193185.3
 DELETING TIME-RECORD FOR TIME    3371385.3
 DELETING TIME-RECORD FOR TIME    3549585.3
 DELETING TIME-RECORD FOR TIME    3596385.3
 DELETING TIME-RECORD FOR TIME    3598185.3

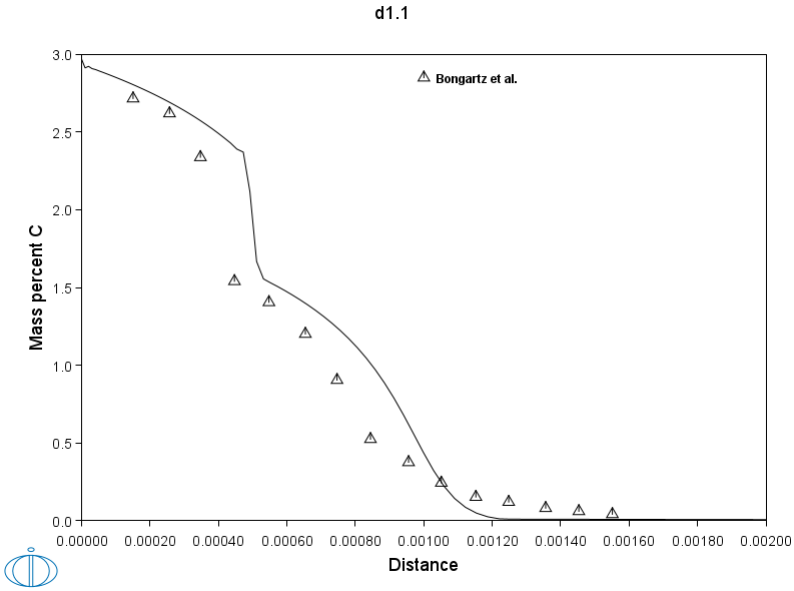
 KEEPING TIME-RECORD FOR TIME    3599985.3
 AND FOR TIME                    3600000.0
 WORKSPACE RECLAIMED

 TIMESTEP AT     3600000.00     SELECTED

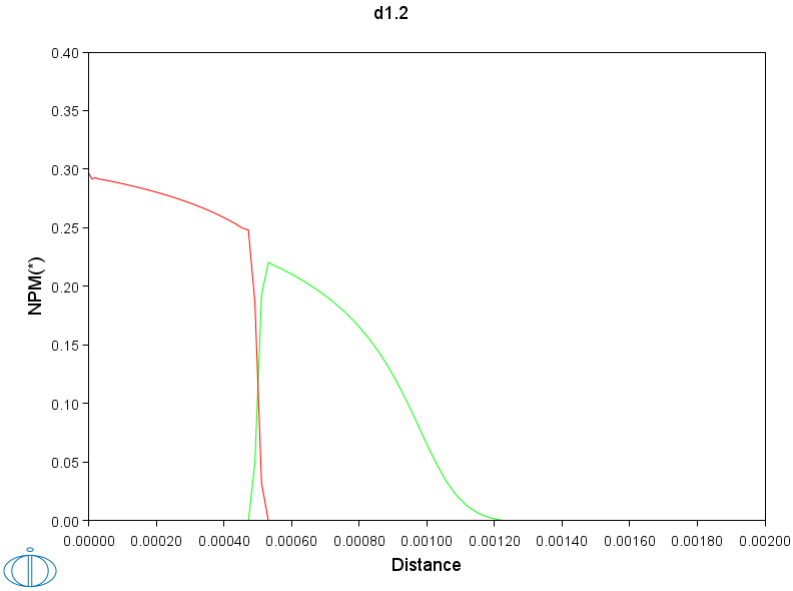
DIC>
DIC> set-inter
 --OK---
DIC>
```

exd1a-plot

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exd1a\plot.DCM"
DIC>
DIC>
DIC> @@ exd1_plot.DCM
DIC>
DIC> @@
DIC> @@ FOR GENERATING GRAPHICAL OUTPUT FOR EXAMPLE exd1
DIC> @@
DIC>
DIC> @@
DIC> @@ GO TO THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  3.60000E+06
 *** ENTERING GRAPHITE_A9 AS A DIFFUSION NONE PHASE
 *** ENTERING M3C2_D510 AS A DIFFUSION NONE PHASE
 *** ENTERING M7C3_D101 AS A DIFFUSION NONE PHASE
DIC> read exd1
 OK
DIC>
DIC> @@
DIC> @@ GO TO THE POST PROCESSOR
DIC> @@
DIC> post
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1: @@
POST-1: @@ LOT THE TOTAL CARBON CONCENTRATION PROFILE
POST-1: @@
POST-1: s-d-a y w-p c
POST-1: s-d-a x distance global
  INFO: Distance is set as independent variable
POST-1: s-s-s x n 0 2e-3
POST-1: s-p-c time 3600000
POST-1:
POST-1: app y exd1.exp
PROLOGUE NUMBER: /0/: 1
DATASET NUMBER(s): /-1/: 1
POST-1:
POST-1: @@
POST-1: @@ SET THE TITLE ON THE PLOT
POST-1: @@
POST-1: set-tit d1.1
POST-1:
POST-1: plot
```




```
POST-1:
POST-1:
POST-1:
POST-1:@?<_hit_return_to_continue_>
POST-1:
POST-1: @@
POST-1: @@ NOW PLOT THE AMOUNT OF CARBIDES FORMED
POST-1: @@
POST-1: s-d-a y npm(*)
POST-1: s-s-s y n 0 0.4
POST-1: app n
POST-1:
POST-1: set-tit d1.2
POST-1: plot
```




```
POST-1:
POST-1:
POST-1:
POST-1:@?<_hit_return_to_continue_>
POST-1:
POST-1: set-inter
 --OK---
POST-1:
```

exd1b-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exd1b\setup.DCM"
SYS: ï»¿@@
 NO SUCH COMMAND, USE HELP
SYS: @@ Diffusion in dispersed systems.
SYS: @@ Carburization of Ni-25%Cr alloy: Homogenization model
SYS: @@ This example is about carburization of a Ni-25Cr alloy.
SYS: @@ In this case the M3C2 and M7C3 carbides are entered as
SYS: @@ spheroid phases in a FCC matrix. This case is from
SYS: @@ A. EngstrÃ¶m, L. HÃ¶glund and J. Ã…gren: Metall.Trans. A,
SYS: @@ v.25A (1994), pp. 1127-1134.
SYS: @@ This simulation can be run with the DISPERSED SYSTEM MODEL or
SYS: @@ HOMOGENIZATION MODEL. The default HOMOGENIZATION MODEL is used
SYS: @@ and then ENTER_HOMOGENIZATION_FUNCTION should be used instead of
SYS: @@ ENTER_LABYRINTH_FUNCTION.
SYS: @@----------------------------------------------------------------------
SYS:
SYS: @@ exd1b_setup.DCM
SYS:
SYS: @@
SYS: @@ RETRIEVE DATA FROM THE DATABASE
SYS: @@
SYS:
SYS: @@ This example modifies the database interactively, which is not
SYS: @@ yet supported by GES6. Therefore, we enforce the use of GES5.
SYS: set-ges-version 5
SYS:
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                        /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12:
TDB_TCFE12: @@
TDB_TCFE12: @@ USE THE SSOL DATABASE FOR THERMODYNAMIC DATA
TDB_TCFE12: @@
TDB_TCFE12: sw fedemo
 Current database: Iron Demo Database v6.0

 VA                        /-  DEFINED
TDB_FEDEMO: def-sys ni cr c
 NI                        CR                        C
   DEFINED
TDB_FEDEMO: rej ph * all
 GAS:G                     LIQUID:L                  BCC_A2
 C14_LAVES                 CBCC_A12                  CEMENTITE_D011
 CHI_A12                   CUB_A13                   DIAMOND_A4
 FCC_A1                    GRAPHITE_A9               HCP_A3
 KSI_CARBIDE               M23C6_D84                 M3C2_D510
 M7C3_D101                 SIGMA_D8B  REJECTED
TDB_FEDEMO: res ph fcc,m7c3,m3c2,grap
 FCC_A1                    M7C3_D101                 M3C2_D510
 GRAPHITE_A9  RESTORED
TDB_FEDEMO: get
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 Creating a new composition set FCC_A1#2
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ SWITCH TO A MOBILITY DATABASE TO RETRIEVE MOBILITY DATA
TDB_FEDEMO: @@
TDB_FEDEMO: app mfedemo
 Current database: Fe-Alloys Mobility demo database v5.0

 VA  DEFINED
APP: def-sys ni c cr
 NI                        C                         CR
   DEFINED
APP: rej ph * all
 BCC_A2                    FCC_A1                    CEMENTITE_D011
 LIQUID:L  REJECTED
APP: res ph fcc,m7c3,m3c2,grap
 *** ERROR M7C3 INPUT IGNORED
 *** ERROR M3C2 INPUT IGNORED
 *** ERROR GRAP INPUT IGNORED
 FCC_A1  RESTORED
APP: get
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 Creating a new composition set FCC_A1#3
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data
```

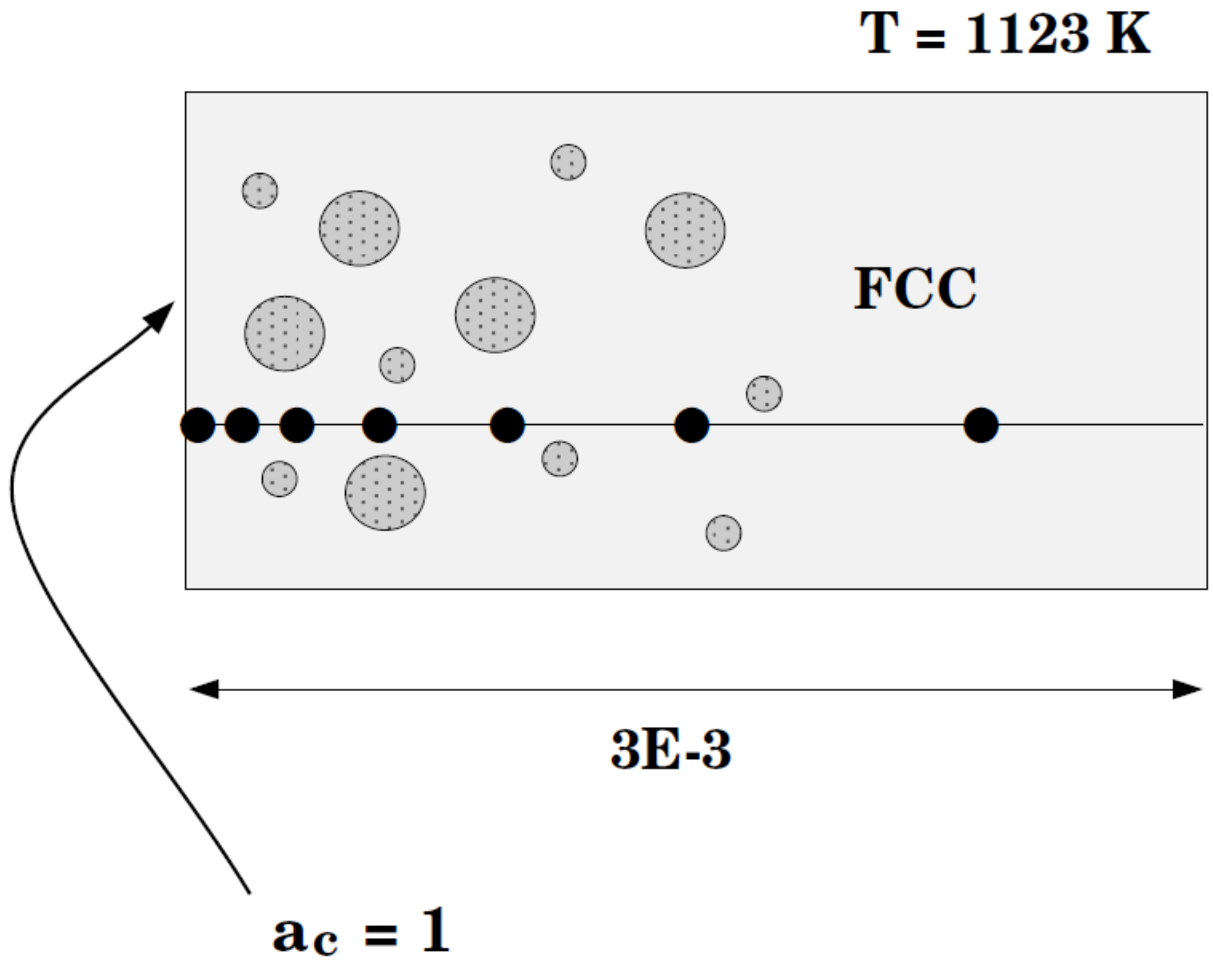
```
 -OK-
APP:
APP: @@
APP: @@ ENTER THE DICTRA MONITOR
APP: @@
APP: go d-m
 NO TIME STEP DEFINED
 *** ENTERING GRAPHITE_A9 AS A DIFFUSION NONE PHASE
 *** ENTERING M3C2_D510 AS A DIFFUSION NONE PHASE
 *** ENTERING M7C3_D101 AS A DIFFUSION NONE PHASE
DIC>
DIC> @@
DIC> @@ ENTER THE GLOBAL CONDITION T
DIC> @@
DIC> set-cond glob T 0 1123; * N
DIC>
DIC> @@
DIC> @@ SET THE REFERENCE STATE FOR CARBON
DIC> @@
DIC> set-reference-state
Component: C
Reference state: grap
Temperature /*/: *
Pressure /100000/: 1E5
DIC>
DIC> @@
DIC> @@ ENTER THE REGION aus
DIC> @@
DIC> enter-region aus
DIC>
DIC> @@
DIC> @@ ENTER A GEOMETRICAL GRID INTO THE REGION
DIC> @@
DIC> enter-grid aus 3e-3 geo 100 1.02
DIC>
DIC> @@
DIC> @@ ENTER A MATRIX PHASE IN THE REGION
DIC> @@
DIC> enter-phase act aus matrix fcc_a1#1
DIC>
DIC> @@
DIC> @@ ENTER THE START COMPOSITION FOR THE MATRIX PHASE
DIC> @@
DIC> enter-composition
REGION NAME : /AUS/: aus
PHASE NAME: /FCC_A1#1/: fcc#1
DEPENDENT COMPONENT ? /NI/: ni
COMPOSITION TYPE /MOLE_FRACTION/: w-p
PROFILE FOR /C/: cr
TYPE /LINEAR/: lin 25 25
PROFILE FOR /CR/: c
TYPE /LINEAR/: lin 1e-4 1e-4
DIC>
DIC> @@
DIC> @@ ENTER SPHEROIDAL PHASES IN THE REGION
DIC> @@
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: act
REGION NAME : /AUS/: aus
PHASE TYPE /MATRIX/: sph
PHASE NAME: /NONE/: m7c3
 INFO: EQUILIBRIUM COMPOSITION AND FRACTION OF SPHEROID PHASES USED AS DEFAULT
DIC>
DIC> @@
DIC> @@ ENTER A STOICHOMETRIC SPHEROIDAL PHASE IN THE REGION
DIC> @@
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: act
REGION NAME : /AUS/: aus
PHASE TYPE /MATRIX/: sph
PHASE NAME: /NONE/: m3c2
 INFO: EQUILIBRIUM COMPOSITION AND FRACTION OF SPHEROID PHASES USED AS DEFAULT
DIC>
DIC>
DIC> @@
DIC> @@ ENTER A START COMPOSITION FOR THE SPHEROIDAL PHASES
DIC> @@
DIC> enter-composition
REGION NAME : /AUS/: aus
PHASE NAME: /FCC_A1#1/: m7c3
USE EQUILIBRIUM VALUE /Y/: Y
DIC> enter-composition
REGION NAME : /AUS/: aus
PHASE NAME: /FCC_A1#1/: m3c2
USE EQUILIBRIUM VALUE /Y/: Y
DIC>
DIC> @@
DIC> @@ SET THE BOUNDARY CONDITION
DIC> @@
DIC> set-cond
GLOBAL OR BOUNDARY CONDITION /GLOBAL/: boundary
BOUNDARY /LOWER/: lower
CONDITION TYPE /CLOSED_SYSTEM/: mixed
Dependent substitutional element:NI
Dependent interstitial element:VA
TYPE OF CONDITION FOR COMPONENT C /ZERO_FLUX/: activity
LOW TIME LIMIT /0/: 0
ACR(C)(TIME)= 1;
HIGH TIME LIMIT /*/: *
ANY MORE RANGES /N/: N
TYPE OF CONDITION FOR COMPONENT CR /ZERO_FLUX/: zero-flux
DIC>
DIC> @@
DIC> @@ SELECT THE HOMOGENIZATION FUNCTION
DIC> @@
DIC> enter-homo
ENTER HOMOGENIZATION FUNCTION # /5/: 8
 SELECTED FUNCTION IS LABYRINTH FACTOR f**2 WITH PRESCRIBED MATRIX PHASE
PHASE NAME: fcc#1
```

```
DIC>
DIC> @@
DIC> @@ SET THE SIMULATION TIME. REMEMBER TO BE CAREFUL WITH THE
DIC> @@ TIMESTEP WHEN SPHEROIDAL PHASES ARE PRESENT. IN THIS CASE
DIC> @@ THE TIMESTEP IS NOT ALLOWED TO BE LARGER THAN 1800s.
DIC> @@
DIC> set-simulation-time
END TIME FOR INTEGRATION /.1/: 3600000
AUTOMATIC TIMESTEP CONTROL /YES/: YES
MAX TIMESTEP DURING INTEGRATION /360000/:
INITIAL TIMESTEP : /1E-07/:
SMALLEST ACCEPTABLE TIMESTEP : /1E-07/:
DIC>
DIC>
DIC> @@
DIC> @@ TO SAVE SOME SPACE ON THE DISK THE RESULTS ARE STORED SELECTIVELY,
DIC> @@ OTHERWISE THE STORE-RESULT-FILE FROM THIS EXAMPLE WOULD BE
DIC> @@ VERY LARGE.
DIC> @@
DIC> set-option SAVE_WORKSPACE_ON_FILE 99
DIC>
DIC> @@
DIC> @@ SAVE THE SETUP TO A NEW STORE FILE AND EXIT
DIC> @@
DIC> save exd1 y
DIC>
DIC> set-inter
 --OK---
DIC>
```

Example exd1b

Carburization of a Ni-25% Cr alloy: Homogenization model

This example is about carburization of a Ni-25Cr alloy. In this case the M3C2 and M7C3 carbides are entered as spheroid phases in a FCC matrix. It is similar to exd1a except the default HOMOGENIZATION MODEL is used and then ENTER_HOMOGENIZATION_FUNCTION should be used instead of ENTER_LABYRINTH_FUNCTION. This case is from A. Engström, L. Höglund and J. Ågren: Metall.Trans. A, v.25A (1994), pp. 1127-1134.



exd1b-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exd1b\run.DCM"
DIC>
DIC>
DIC> @@ exd1_run.DCM
DIC>
DIC> @@
DIC> @@ READ THE SETUP FILE AND START THE SIMULATION
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  0.00000E+00
 *** ENTERING GRAPHITE_A9 AS A DIFFUSION NONE PHASE
 *** ENTERING M3C2_D510 AS A DIFFUSION NONE PHASE
 *** ENTERING M7C3_D101 AS A DIFFUSION NONE PHASE
DIC> read exd1
 OK
DIC> sim
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 DEGREE OF IMPLICITY SET TO EULER BACKWARD
 INFO: not solving in latticefixed frame of reference
 STARTING SIMULATION USING HOMOGENIZATION MODEL
 ------------------------------------------------
 INFO: PHASE WITH LIMITED SOLUBILITY OF ELEMENT(S) EXIST
 A FALLBACK PHASE ZZDICTRA_GHOST WILL BE DEFINED
 ALONG WITH THE FOLLOWING PARAMETERS:
 G(ZZDICTRA_GHOST,C;0)-H298(GRAPHITE,C;0)
 G(ZZDICTRA_GHOST,CR;0)-H298(BCC_A2,CR;0)
 G(ZZDICTRA_GHOST,NI;0)-H298(FCC_A1,NI;0)
 L(ZZDICTRA_GHOST,C,CR;0)
 L(ZZDICTRA_GHOST,C,NI;0)
 L(ZZDICTRA_GHOST,CR,NI;0)
  WARNING:M7C3_D101 HAS NO VOLUME FRACTION, CREATING ONE
  WARNING:M3C2_D510 HAS NO VOLUME FRACTION, CREATING ONE
Starting time-step t0=   0.0000000     dt=  0.10000000E-06
Starting time-step t0=  0.10000000E-06 dt=  0.20000000E-06
Starting time-step t0=  0.30000000E-06 dt=  0.40000000E-06
Starting time-step t0=  0.70000000E-06 dt=  0.80000000E-06
Starting time-step t0=  0.15000000E-05 dt=  0.16000000E-05
Starting time-step t0=  0.31000000E-05 dt=  0.32000000E-05
Starting time-step t0=  0.63000000E-05 dt=  0.64000000E-05
Starting time-step t0=  0.12700000E-04 dt=  0.12800000E-04
Starting time-step t0=  0.25500000E-04 dt=  0.25600000E-04
Starting time-step t0=  0.51100000E-04 dt=  0.51200000E-04
Starting time-step t0=  0.10230000E-03 dt=  0.10240000E-03
Starting time-step t0=  0.20470000E-03 dt=  0.20480000E-03
Starting time-step t0=  0.40950000E-03 dt=  0.40960000E-03
Starting time-step t0=  0.81910000E-03 dt=  0.81920000E-03
Starting time-step t0=  0.16383000E-02 dt=  0.16384000E-02
Starting time-step t0=  0.32767000E-02 dt=  0.32768000E-02
Starting time-step t0=  0.65535000E-02 dt=  0.65536000E-02
Starting time-step t0=  0.13107100E-01 dt=  0.13107200E-01
Starting time-step t0=  0.26214300E-01 dt=  0.26214400E-01
Starting time-step t0=  0.52428700E-01 dt=  0.52428800E-01
Starting time-step t0=  0.10485750     dt=  0.52428800E-01
Starting time-step t0=  0.15728630     dt=  0.52428800E-01
Starting time-step t0=  0.20971510     dt=  0.52428800E-01
Starting time-step t0=  0.26214390     dt=  0.52428800E-01
Starting time-step t0=  0.31457270     dt=  0.52428800E-01
Starting time-step t0=  0.36700150     dt=  0.10485760
Starting time-step t0=  0.47185910     dt=  0.20971520
Starting time-step t0=  0.68157430     dt=  0.41943040
Starting time-step t0=   1.1010047     dt=  0.41943040
Starting time-step t0=   1.5204351     dt=  0.83886080
Starting time-step t0=   2.3592959     dt=  0.83886080
Starting time-step t0=   3.1981567     dt=  0.83886080
Starting time-step t0=   4.0370175     dt=  0.83886080
Starting time-step t0=   4.8758783     dt=  0.83886080
Starting time-step t0=   5.7147391     dt=  0.83886080
Starting time-step t0=   6.5535999     dt=  0.83886080
Starting time-step t0=   7.3924607     dt=  0.83886080
Starting time-step t0=   8.2313215     dt=  0.83886080
Starting time-step t0=   9.0701823     dt=  0.83886080
Starting time-step t0=   9.9090431     dt=  0.83886080
Starting time-step t0=   10.747904     dt=  0.83886080
Starting time-step t0=   11.586765     dt=  0.83886080
Starting time-step t0=   12.425625     dt=  0.83886080
Starting time-step t0=   13.264486     dt=  0.83886080
Starting time-step t0=   14.103347     dt=  0.83886080
Starting time-step t0=   14.942208     dt=  0.83886080
Starting time-step t0=   15.781069     dt=  0.83886080
Starting time-step t0=   16.619929     dt=  0.83886080
Starting time-step t0=   17.458790     dt=  0.83886080
Starting time-step t0=   18.297651     dt=  0.83886080
Starting time-step t0=   19.136512     dt=  0.83886080
Starting time-step t0=   19.975373     dt=  0.83886080
Starting time-step t0=   20.814233     dt=  0.83886080
Starting time-step t0=   21.653094     dt=  0.83886080
Starting time-step t0=   22.491955     dt=  0.83886080
Starting time-step t0=   23.330816     dt=  0.83886080
Starting time-step t0=   24.169677     dt=  0.83886080
Starting time-step t0=   25.008537     dt=  0.83886080
Starting time-step t0=   25.847398     dt=  0.83886080
Starting time-step t0=   26.686259     dt=  0.83886080
Starting time-step t0=   27.525120     dt=  0.83886080
Starting time-step t0=   28.363981     dt=  0.83886080
Starting time-step t0=   29.202841     dt=  0.83886080
Starting time-step t0=   30.041702     dt=  0.83886080
Starting time-step t0=   30.880563     dt=  0.83886080
Starting time-step t0=   31.719424     dt=  0.83886080
Starting time-step t0=   32.558285     dt=  0.83886080
Starting time-step t0=   33.397145     dt=  0.83886080
Starting time-step t0=   34.236006     dt=  0.83886080
Starting time-step t0=   35.074867     dt=  0.83886080
Starting time-step t0=   35.913728     dt=  0.83886080
Starting time-step t0=   36.752589     dt=  0.83886080
Starting time-step t0=   37.591449     dt=  0.83886080
Starting time-step t0=   38.430310     dt=   1.6777216
Starting time-step t0=   40.108032     dt=   1.6777216
Starting time-step t0=   41.785753     dt=   1.6777216
Starting time-step t0=   43.463475     dt=   1.6777216
Starting time-step t0=   45.141197     dt=   1.6777216
```

```
Starting time-step t0=   46.818918     dt=   1.6777216
Starting time-step t0=   48.496640     dt=   1.6777216
Starting time-step t0=   50.174361     dt=   1.6777216
Starting time-step t0=   51.852083     dt=   1.6777216
Starting time-step t0=   53.529805     dt=   1.6777216
Starting time-step t0=   55.207526     dt=   1.6777216
Starting time-step t0=   56.885248     dt=   1.6777216
Starting time-step t0=   58.562969     dt=   1.6777216
Starting time-step t0=   60.240691     dt=   1.6777216
Starting time-step t0=   61.918413     dt=   1.6777216
Starting time-step t0=   63.596134     dt=   1.6777216
Starting time-step t0=   65.273856     dt=   1.6777216
Starting time-step t0=   66.951577     dt=   1.6777216
Starting time-step t0=   68.629299     dt=   1.6777216
Starting time-step t0=   70.307021     dt=   1.6777216
Starting time-step t0=   71.984742     dt=   1.6777216
Starting time-step t0=   73.662464     dt=   1.6777216
Starting time-step t0=   75.340185     dt=   1.6777216
Starting time-step t0=   77.017907     dt=   3.3554432
Starting time-step t0=   80.373350     dt=   3.3554432
Starting time-step t0=   83.728793     dt=   3.3554432
Starting time-step t0=   87.084237     dt=   3.3554432


output ignored...


... output resumed

 DELETING TIME-RECORD FOR TIME    2335827.9
 DELETING TIME-RECORD FOR TIME    2342699.8
 DELETING TIME-RECORD FOR TIME    2349571.8
 DELETING TIME-RECORD FOR TIME    2356443.7
 DELETING TIME-RECORD FOR TIME    2363315.7
 DELETING TIME-RECORD FOR TIME    2370187.6
 DELETING TIME-RECORD FOR TIME    2377059.6
 DELETING TIME-RECORD FOR TIME    2383931.5
 DELETING TIME-RECORD FOR TIME    2390803.5
 DELETING TIME-RECORD FOR TIME    2397675.4
 DELETING TIME-RECORD FOR TIME    2404547.3
 DELETING TIME-RECORD FOR TIME    2411419.3
 DELETING TIME-RECORD FOR TIME    2418291.2
 DELETING TIME-RECORD FOR TIME    2425163.2
 DELETING TIME-RECORD FOR TIME    2432035.1
 DELETING TIME-RECORD FOR TIME    2438907.1
 DELETING TIME-RECORD FOR TIME    2445779.0
 DELETING TIME-RECORD FOR TIME    2452651.0
 DELETING TIME-RECORD FOR TIME    2459522.9
 DELETING TIME-RECORD FOR TIME    2466394.9
 DELETING TIME-RECORD FOR TIME    2473266.8
 DELETING TIME-RECORD FOR TIME    2480138.8
 DELETING TIME-RECORD FOR TIME    2487010.7
 DELETING TIME-RECORD FOR TIME    2493882.7
 DELETING TIME-RECORD FOR TIME    2500754.6
 DELETING TIME-RECORD FOR TIME    2507626.6
 DELETING TIME-RECORD FOR TIME    2514498.5
 DELETING TIME-RECORD FOR TIME    2521370.5
 DELETING TIME-RECORD FOR TIME    2528242.4
 DELETING TIME-RECORD FOR TIME    2535114.4
 DELETING TIME-RECORD FOR TIME    2541986.3
 DELETING TIME-RECORD FOR TIME    2548858.3
 DELETING TIME-RECORD FOR TIME    2555730.2
 DELETING TIME-RECORD FOR TIME    2562602.1
 DELETING TIME-RECORD FOR TIME    2569474.1
 DELETING TIME-RECORD FOR TIME    2576346.0
 DELETING TIME-RECORD FOR TIME    2583218.0
 DELETING TIME-RECORD FOR TIME    2593525.9
 DELETING TIME-RECORD FOR TIME    2600397.9
 DELETING TIME-RECORD FOR TIME    2607269.8
 DELETING TIME-RECORD FOR TIME    2614141.8
 DELETING TIME-RECORD FOR TIME    2621013.7
 DELETING TIME-RECORD FOR TIME    2627885.6
 DELETING TIME-RECORD FOR TIME    2634757.6
 DELETING TIME-RECORD FOR TIME    2641629.5
 DELETING TIME-RECORD FOR TIME    2648501.5
 DELETING TIME-RECORD FOR TIME    2655373.4
 DELETING TIME-RECORD FOR TIME    2662245.4
 DELETING TIME-RECORD FOR TIME    2669117.3
 DELETING TIME-RECORD FOR TIME    2675989.3
 DELETING TIME-RECORD FOR TIME    2682861.2
 DELETING TIME-RECORD FOR TIME    2689733.2
 DELETING TIME-RECORD FOR TIME    2696605.1
 DELETING TIME-RECORD FOR TIME    2703477.1
 DELETING TIME-RECORD FOR TIME    2710349.0
 DELETING TIME-RECORD FOR TIME    2717221.0
 DELETING TIME-RECORD FOR TIME    2724092.9
 DELETING TIME-RECORD FOR TIME    2730964.9
 DELETING TIME-RECORD FOR TIME    2737836.8
 DELETING TIME-RECORD FOR TIME    2744708.8
 DELETING TIME-RECORD FOR TIME    2758452.7
 DELETING TIME-RECORD FOR TIME    2772196.6
 DELETING TIME-RECORD FOR TIME    2785940.4
 DELETING TIME-RECORD FOR TIME    2799684.3
 DELETING TIME-RECORD FOR TIME    2813428.2
 DELETING TIME-RECORD FOR TIME    2827172.1
 DELETING TIME-RECORD FOR TIME    2840916.0
 DELETING TIME-RECORD FOR TIME    2854659.9
 DELETING TIME-RECORD FOR TIME    2868403.8
 DELETING TIME-RECORD FOR TIME    2875275.8
 DELETING TIME-RECORD FOR TIME    2882147.7
 DELETING TIME-RECORD FOR TIME    2895891.6
 DELETING TIME-RECORD FOR TIME    2909635.5
 DELETING TIME-RECORD FOR TIME    2923379.4
 DELETING TIME-RECORD FOR TIME    2937123.3
 DELETING TIME-RECORD FOR TIME    2950867.2
 DELETING TIME-RECORD FOR TIME    2964611.1
 DELETING TIME-RECORD FOR TIME    2978355.0
 DELETING TIME-RECORD FOR TIME    2992098.9
 DELETING TIME-RECORD FOR TIME    3005842.8
 DELETING TIME-RECORD FOR TIME    3019586.7
 DELETING TIME-RECORD FOR TIME    3033330.6
 DELETING TIME-RECORD FOR TIME    3047074.5
 DELETING TIME-RECORD FOR TIME    3053946.4
 DELETING TIME-RECORD FOR TIME    3060818.4
 DELETING TIME-RECORD FOR TIME    3074562.2
```

```
 DELETING TIME-RECORD FOR TIME    3088306.1
 DELETING TIME-RECORD FOR TIME    3102050.0
 DELETING TIME-RECORD FOR TIME    3115793.9
 DELETING TIME-RECORD FOR TIME    3129537.8
 DELETING TIME-RECORD FOR TIME    3143281.7
 DELETING TIME-RECORD FOR TIME    3157025.6
 DELETING TIME-RECORD FOR TIME    3170769.5
 DELETING TIME-RECORD FOR TIME    3184513.4
 DELETING TIME-RECORD FOR TIME    3198257.3
 DELETING TIME-RECORD FOR TIME    3212001.2
 DELETING TIME-RECORD FOR TIME    3225745.1
 DELETING TIME-RECORD FOR TIME    3232617.0
 DELETING TIME-RECORD FOR TIME    3239489.0
 DELETING TIME-RECORD FOR TIME    3246360.9
 DELETING TIME-RECORD FOR TIME    3253232.9
 DELETING TIME-RECORD FOR TIME    3260104.8
 DELETING TIME-RECORD FOR TIME    3266976.8
 DELETING TIME-RECORD FOR TIME    3273848.7
 DELETING TIME-RECORD FOR TIME    3280720.7
 DELETING TIME-RECORD FOR TIME    3287592.6
 DELETING TIME-RECORD FOR TIME    3294464.6
 DELETING TIME-RECORD FOR TIME    3301336.5
 DELETING TIME-RECORD FOR TIME    3308208.5
 DELETING TIME-RECORD FOR TIME    3315080.4
 DELETING TIME-RECORD FOR TIME    3321952.4
 DELETING TIME-RECORD FOR TIME    3328824.3
 DELETING TIME-RECORD FOR TIME    3335696.3
 DELETING TIME-RECORD FOR TIME    3349440.2
 DELETING TIME-RECORD FOR TIME    3363184.1
 DELETING TIME-RECORD FOR TIME    3376927.9
 DELETING TIME-RECORD FOR TIME    3390671.8
 DELETING TIME-RECORD FOR TIME    3404415.7
 DELETING TIME-RECORD FOR TIME    3418159.6
 DELETING TIME-RECORD FOR TIME    3431903.5
 DELETING TIME-RECORD FOR TIME    3445647.4
 DELETING TIME-RECORD FOR TIME    3459391.3
 DELETING TIME-RECORD FOR TIME    3473135.2
 DELETING TIME-RECORD FOR TIME    3486879.1
 DELETING TIME-RECORD FOR TIME    3500623.0
 DELETING TIME-RECORD FOR TIME    3514366.9
 DELETING TIME-RECORD FOR TIME    3528110.8
 DELETING TIME-RECORD FOR TIME    3541854.7
 DELETING TIME-RECORD FOR TIME    3555598.6
 DELETING TIME-RECORD FOR TIME    3562470.5
 DELETING TIME-RECORD FOR TIME    3572778.5

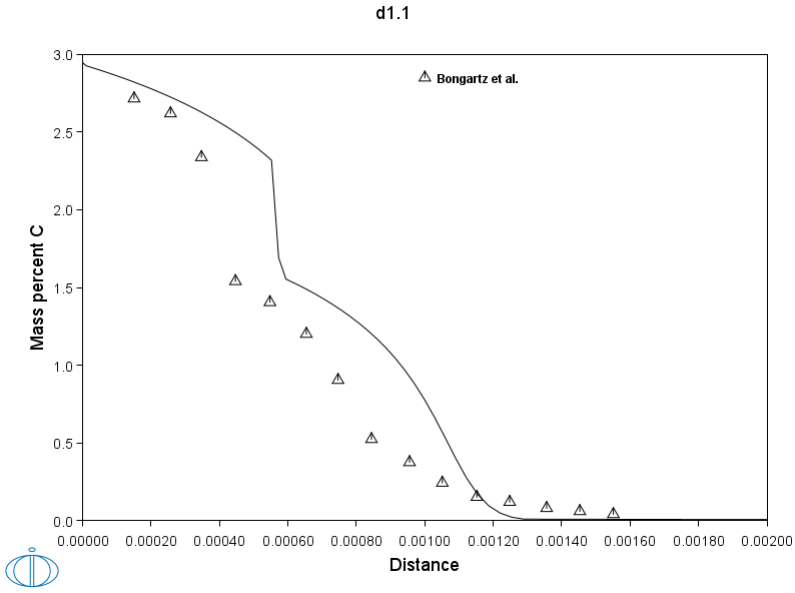
 KEEPING TIME-RECORD FOR TIME    3586522.3
 AND FOR TIME                    3600000.0
 WORKSPACE RECLAIMED
 -------------------------------------------------
 INTERPOLATION SCHEME USED THIS FRACTION OF
 THE ALLOCATED MEMORY:   5.283679648756118E-002
 EFFICIENCY FACTOR:    65.2378885941645
 -------------------------------------------------
 DEALLOCATING
 -------------------------------------------------

 TIMESTEP AT     3600000.00     SELECTED

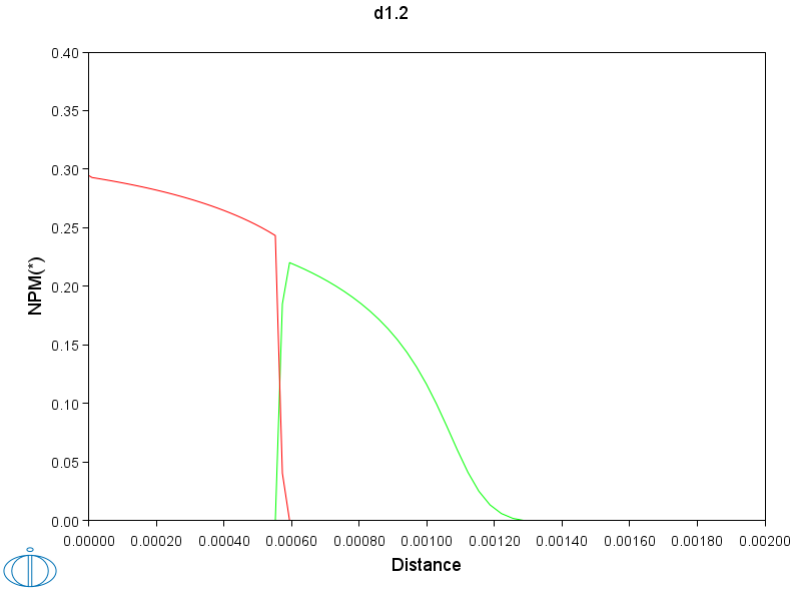
DIC>
DIC> set-inter
 --OK---
DIC>
```

exd1b-plot

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exd1b\plot.DCM"
DIC>
DIC>
DIC> @@ exd1_plot.DCM
DIC>
DIC> @@
DIC> @@ FOR GENERATING GRAPHICAL OUTPUT FOR EXAMPLE exd1b
DIC> @@
DIC>
DIC> @@
DIC> @@ GO TO THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  3.60000E+06
 *** ENTERING GRAPHITE_A9 AS A DIFFUSION NONE PHASE
 *** ENTERING M3C2_D510 AS A DIFFUSION NONE PHASE
 *** ENTERING M7C3_D101 AS A DIFFUSION NONE PHASE
DIC> read exd1
 OK
DIC>
DIC> @@
DIC> @@ GO TO THE POST PROCESSOR
DIC> @@
DIC> post
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1: @@
POST-1: @@ PLOT THE TOTAL CARBON CONCENTRATION PROFILE
POST-1: @@
POST-1: s-d-a y w-p c
POST-1: s-d-a x distance global
  INFO: Distance is set as independent variable
POST-1: s-s-s x n 0 2e-3
POST-1: s-p-c time 3600000
POST-1:
POST-1: app y exd1.exp
PROLOGUE NUMBER: /0/: 1
DATASET NUMBER(s): /-1/: 1
POST-1:
POST-1: @@
POST-1: @@ SET A TITLE ON THE PLOT
POST-1: @@
POST-1: set-tit d1.1
POST-1:
POST-1: plot
```




```
POST-1:
POST-1:
POST-1:
POST-1:@?<_hit_return_to_continue_>
POST-1:
POST-1: @@
POST-1: @@ PLOT THE AMOUNT OF CARBIDES FORMED
POST-1: @@
POST-1: s-d-a y npm(*)
POST-1: s-s-s y n 0 0.4
POST-1: app n
POST-1:
POST-1: set-tit d1.2
POST-1: plot
```



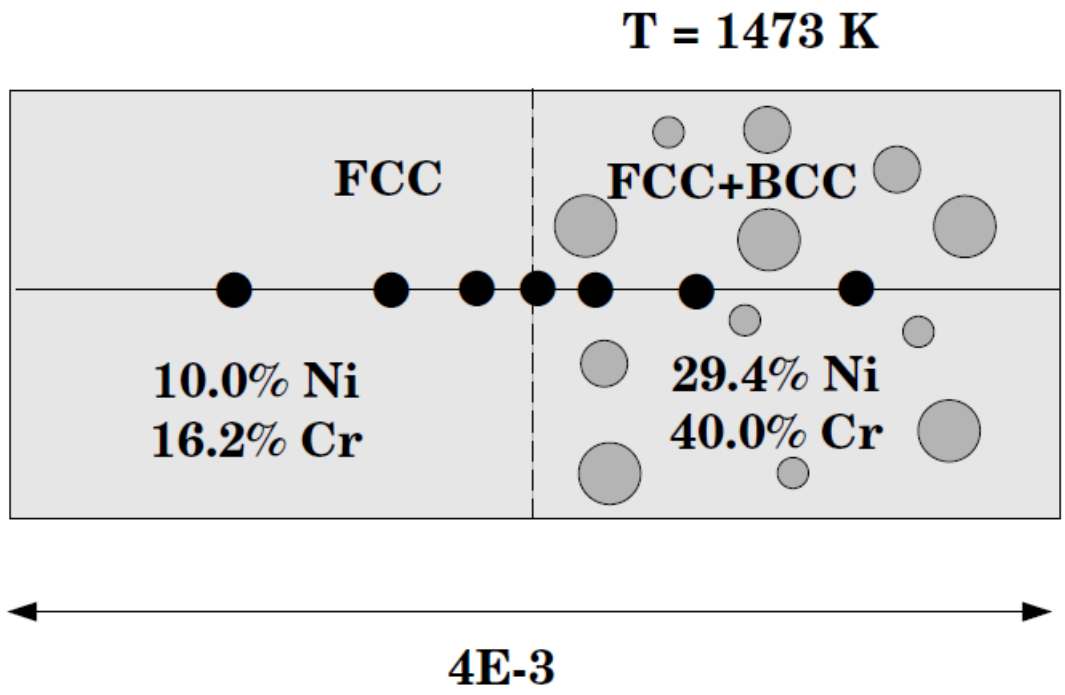

```
POST-1:
POST-1:
POST-1:
POST-1:@?<_hit_return_to_continue_>
POST-1:
POST-1: set-inter
 --OK---
POST-1:
```

Example exd2a

Diffusion couple of Fe-Ni-Cr alloys: Step-profile

This example calculates the interdiffusion in a diffusion couple between a two-phase (FCC+BCC) and a single-phase (FCC) Fe-Ni-Cr alloy. Initially it uses a step profile. This simulation can be run with either the DISPERSED SYSTEM MODEL or the HOMOGENIZATION MODEL. In this example the DISPERSED SYSTEM MODEL is used.

This case is from A. Engström: Scand. J. Met., vol. 24, 1995, pp.12-20.



exd2a-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exd2a\setup.DCM"
SYS: @@
SYS: @@ Diffusion in dispersed systems.
SYS: @@ Diffusion couple of Fe-Cr-Ni alloys: Dispersed system model
SYS: @@ This example calculates the interdiffusion in a diffusion
SYS: @@ couple between a two-phase (FCC+BCC) and a single-phase (FCC)
SYS: @@ Fe-Ni-Cr alloy. This case is from A. EngstrÃ¶m: Scand. J. Met., v. 24,
SYS: @@ 1995, pp.12-20. This simulation can be run with either the DISPERSED
SYS: @@ SYSTEM MODEL or the HOMOGENIZATION MODEL.
SYS: @@ In this example the DISPERSED SYSTEM MODEL is used, which requires
SYS: @@ that the default HOMOGENIZATION MODEL is disabled.
SYS: @@ With the DISPERSED SYSTEM MODEL the command
SYS: @@ ENTER_LABYRINTH_FUNCTION is used to take into account the
SYS: @@ impeding effect of dispersed phases on long-range diffusion.
SYS: @@ For the HOMOGENIZATION MODEL the command
SYS: @@ ENTER_HOMOGENIZATION_FUNCTION should be used.
SYS: @@----------------------------------------------------------------------
SYS:
SYS: @@ exd2_setup.DCM
SYS:
SYS: @@
SYS: @@ RETRIEVE DATA FROM THE DATABASE
SYS: @@
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                       /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12: sw fedemo
 Current database: Iron Demo Database v6.0

 VA                       /-  DEFINED
TDB_FEDEMO: def-sys fe ni cr
 FE                       NI                       CR
   DEFINED
TDB_FEDEMO: rej ph * all
 GAS:G                    LIQUID:L                 BCC_A2
 C14_LAVES                CBCC_A12                 CHI_A12
 CUB_A13                  FCC_A1                   HCP_A3
 SIGMA_D8B  REJECTED
TDB_FEDEMO: res ph fcc,bcc
 FCC_A1                   BCC_A2  RESTORED
TDB_FEDEMO: get
11:43:26,310 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ SWITCH TO A MOBILITY DATABASE TO RETRIEVE MOBILITY DATA
TDB_FEDEMO: @@
TDB_FEDEMO: app mfedemo
 Current database: Fe-Alloys Mobility demo database v5.0

 VA  DEFINED
APP: def-sys fe ni cr
 FE                       NI                       CR
   DEFINED
APP: rej ph * all
 BCC_A2                   FCC_A1                   LIQUID:L
   REJECTED
APP: res ph fcc,bcc
 FCC_A1                   BCC_A2  RESTORED
APP: get
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
APP:
APP: @@
APP: @@ ENTER THE DICTRA MONITOR
APP: @@
APP: go d-m
 NO TIME STEP DEFINED
DIC>
DIC> @@
DIC> @@ ENTER THE GLOBAL CONDITION T
DIC> @@
DIC> set-cond glob T 0 1473; * N
DIC>
```

```
DIC> @@
DIC> @@ ENTER THE REGION fer
DIC> @@
DIC> enter-region fer
DIC>
DIC>
DIC> @@
DIC> @@ ENTER GRID INTO THE REGION
DIC> @@
DIC> enter-grid fer 4e-3 auto
DIC>
DIC> @@
DIC> @@ ENTER A MATRIX PHASE IN THE REGION
DIC> @@
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: act fer matrix fcc
DIC>
DIC> @@
DIC> @@ ENTER THE START COMPOSITION FOR THE MATRIX PHASE
DIC> @@
DIC> enter-composition
REGION NAME : /FER/: fer
PHASE NAME: /FCC_A1/: fcc
DEPENDENT COMPONENT ? /NI/: fe
COMPOSITION TYPE /MOLE_FRACTION/: w-p
PROFILE FOR /CR/: cr function 16.2+23.8*HS(x-2e-3);
PROFILE FOR /NI/: ni function 10+19.4*HS(x-2e-3);
DIC>
DIC> @@
DIC> @@ ENTER FERRITE AS THE SPHEROIDAL PHASE IN THE REGION.
DIC> @@ SINCE THE FRACTION OF FERRITE IS SMALL, AND THESE APPEAR
DIC> @@ AS ISOLATED PARTICLES, FERRITE IS ENTERED AS A SPHEROIDAL PHASE
DIC> @@
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: act
REGION NAME : /FER/: fer
PHASE TYPE /MATRIX/: sph
PHASE NAME: /NONE/: bcc
 INFO: EQUILIBRIUM COMPOSITION AND FRACTION OF SPHEROID PHASES USED AS DEFAULT
DIC>
DIC> @@
DIC> @@ ENTER A COMPOSITION FOR THE SPHEROIDAL PHASE
DIC> @@ USE THE EQUILIBRIUM VALUE
DIC> @@
DIC> enter-composition
REGION NAME : /FER/: fer
PHASE NAME: /FCC_A1/: bcc
USE EQUILIBRIUM VALUE /Y/: y
DIC>
DIC>
DIC> @@
DIC> @@ ENTER A LABYRINTH FACTOR
DIC> @@ IN THIS CASE THE LOW DIFFUSIVITY PHASE IS THE MATRIX AND THE
DIC> @@ "EFFECTIVE" DIFFUSIVITY IN THE AUSTENITE+FERRITE TWO-PHASE
DIC> @@ REGION IS EXPECTED TO BE HIGHER THAN THE DIFFUSIVITY IN THE
DIC> @@ AUSTENITE.
DIC> enter-lab
REGION NAME : fer
f(T,P,VOLFR,X)= 1+3*(1-volfr)/volfr;
DIC>
DIC> @@
DIC> @@ SET THE SIMULATION TIME AND OTHER SIMULATION PARAMETERS
DIC> @@
DIC> set-simulation-time
END TIME FOR INTEGRATION /.1/: 720000
AUTOMATIC TIMESTEP CONTROL /YES/: YES
MAX TIMESTEP DURING INTEGRATION /72000/: 5000
INITIAL TIMESTEP : /1E-07/:
SMALLEST ACCEPTABLE TIMESTEP : /1E-07/:
DIC>
DIC> set-option SAVE_WORKSPACE_ON_FILE 99
DIC>
DIC> @@ BY DEFAULT THE "HOMOGENIZATION MODEL" IS USED WHEN MULTIPLE PHASES
DIC> @@ ARE ENTERED IN A SINGLE REGION. THE HOMOGENIZATION MODEL NEEDS TO BE
DIC> @@ DISABLED FOR THIS EXAMPLE.
DIC> ho n
 HOMOGENIZATION DISABLED
DIC>
DIC> @@
DIC> @@ SAVE THE SET UP TO A NEW STORE FILE AND EXIT
DIC> @@
DIC>
DIC> save exd2 y
DIC>
DIC> set-inter
 --OK---
DIC>
```

exd2a-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exd2a\run.DCM"
DIC>
DIC>
DIC> @@ exd2_run.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR RUNNING THE SIMULATION OF EXAMPLE D2
DIC> @@
DIC>
DIC> @@
DIC> @@ READ THE SETUP FROM FILE AND START THE SIMULATION
DIC> @@
DIC>
DIC> go d-m
 TIME STEP AT TIME  0.00000E+00
DIC> read exd2
 OK
DIC> sim
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 Region: FER
 geometric   0.833333     dense at   0.200000E-02   36 points
 geometric    1.20000     dense at   0.200000E-02   35 points
 DEGREE OF IMPLICITY SET TO TRAPEZOIDAL RULE
 U-FRACTION IN SYSTEM:  CR = .297939277178739  FE = .517060814291125
                        NI = .184999908530136
 TOTAL SIZE OF SYSTEM:  .004 [m]
  WARNING:BCC_A2 HAS NO VOLUME FRACTION, CREATING ONE
 U-FRACTION IN SYSTEM:  CR = .297939277178739  FE = .517060814291125
                        NI = .184999908530136
 TOTAL SIZE OF SYSTEM:  .004 [m]
 TIME =  0.10000000E-06 DT =  0.10000000E-06 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297939277178046  FE = .517060814294107
                        NI = .184999908527847
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    1  seconds
 TIME =  0.10010000E-03 DT =  0.10000000E-03 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .29793927648544  FE = .51706081727548
                        NI = .18499990623908
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.40010010     DT =  0.40000000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297939277135146  FE = .517060817343833
                        NI = .184999905521021
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   1101.1611     DT =   1100.7610     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297941099202627  FE = .517057019687635
                        NI = .185001881109738
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   3302.6831     DT =   2201.5220     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297942257810931  FE = .517054162996745
                        NI = .185003579192324
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   7705.7271     DT =   4403.0440     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297942991235041  FE = .517052326688897
                        NI = .185004682076062
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    1  seconds
 TIME =   12705.727     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297943676929859  FE = .517051286209105
                        NI = .185005036861036
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   17705.727     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297944185786995  FE = .517050701992937
                        NI = .185005112220069
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   22705.727     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297944546826876  FE = .517050331194696
                        NI = .185005121978428
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   27705.727     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297944794978927  FE = .51705007591364
                        NI = .185005129107433
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    1  seconds
 TIME =   32705.727     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297944953959204  FE = .517049882754367
                        NI = .185005163286429
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   37705.727     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297945041499985  FE = .517049733111145
                        NI = .18500522538887
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   42705.727     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .29794506795221  FE = .51704961509448
                        NI = .18500531695331
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    1  seconds
 TIME =   47705.727     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297945044324655  FE = .517049519058708
                        NI = .185005436616637
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   52705.727     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297945073170377  FE = .517049417655774
                        NI = .18500550917385
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   57705.727     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297945101278653  FE = .517049327301327
                        NI = .18500557142002
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
```

```
 TIME =   62705.727     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297945113441899  FE = .517049246325909
                        NI = .185005640232191
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   67705.727     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297945104683444  FE = .517049174072711
                        NI = .185005721243846
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    1  seconds
 TIME =   72705.727     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .29794507379698  FE = .517049109192889
                        NI = .185005817010131
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   77705.727     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297945060594546  FE = .517049041582619


output ignored...



... output resumed

 U-FRACTION IN SYSTEM:  CR = .297944333181282  FE = .51704626318521
                        NI = .185009403633508
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   607705.73     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297944425239856  FE = .517046227417362
                        NI = .185009347342782
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   612705.73     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297944515312297  FE = .517046192225715
                        NI = .185009292461987
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   617705.73     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297944602704325  FE = .517046157760735
                        NI = .185009239534939
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   622705.73     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297944686905369  FE = .517046124128251
                        NI = .18500918896638
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   627705.73     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297944767527865  FE = .517046091404046
                        NI = .185009141068089
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    1  seconds
 TIME =   632705.73     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297944844270216  FE = .517046059642946
                        NI = .185009096086838
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   637705.73     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297944916893067  FE = .51704602888457
                        NI = .185009054222363
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   642705.73     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297944985203518  FE = .517045999157801
                        NI = .18500901563868
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   647705.73     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297945049044104  FE = .517045970483118
                        NI = .185008980472778
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   652705.73     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297945108285015  FE = .517045942874776
                        NI = .185008948840209
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   657705.73     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297945162818325  FE = .517045916342331
                        NI = .185008920839345
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   662705.73     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .29794521255387  FE = .517045890891698
                        NI = .185008896554432
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   667705.73     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297945257415957  FE = .517045866526057
                        NI = .185008876057986
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   672705.73     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297945297340851  FE = .517045843246529
                        NI = .18500885941262
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   677705.73     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297945332274807  FE = .517045821052724
                        NI = .185008846672469
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   682705.73     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297945362172496  FE = .517045799943177
                        NI = .185008837884327
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    1  seconds
 TIME =   687705.73     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297945386995732  FE = .517045779915716
                        NI = .185008833088553
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   692705.73     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297945406712412  FE = .51704576096776
```

```
                        NI = .185008832319828
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   697705.73     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297945421295774  FE = .517045743096579
                        NI = .185008835607647
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   702705.73     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297945430723465  FE = .517045726299507
                        NI = .185008842977028
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   707705.73     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297945434976962  FE = .517045710574128
                        NI = .18500885444891
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   712705.73     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297945434041613  FE = .517045695917164
                        NI = .185008870041223
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   717705.73     DT =   5000.0000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297945427905335  FE = .517045682328835
                        NI = .18500888976583
 TOTAL SIZE OF SYSTEM:  .004 [m]
  CPU time used in timestep                    0  seconds
 TIME =   720000.00     DT =   2294.2729     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  CR = .297945415695563  FE = .517045677674604
                        NI = .185008906629832
 TOTAL SIZE OF SYSTEM:  .004 [m]
 MUST SAVE WORKSPACE ON FILE
 WORKSPACE SAVED ON FILE
 RECLAIMING WORKSPACE
 DELETING TIME-RECORD FOR TIME    0.0000000
 DELETING TIME-RECORD FOR TIME   0.10000000E-06
 DELETING TIME-RECORD FOR TIME   0.10010000E-03
 DELETING TIME-RECORD FOR TIME    477705.73
 DELETING TIME-RECORD FOR TIME    707705.73
 DELETING TIME-RECORD FOR TIME    712705.73

 KEEPING TIME-RECORD FOR TIME    717705.73
 AND FOR TIME                    720000.00
 WORKSPACE RECLAIMED

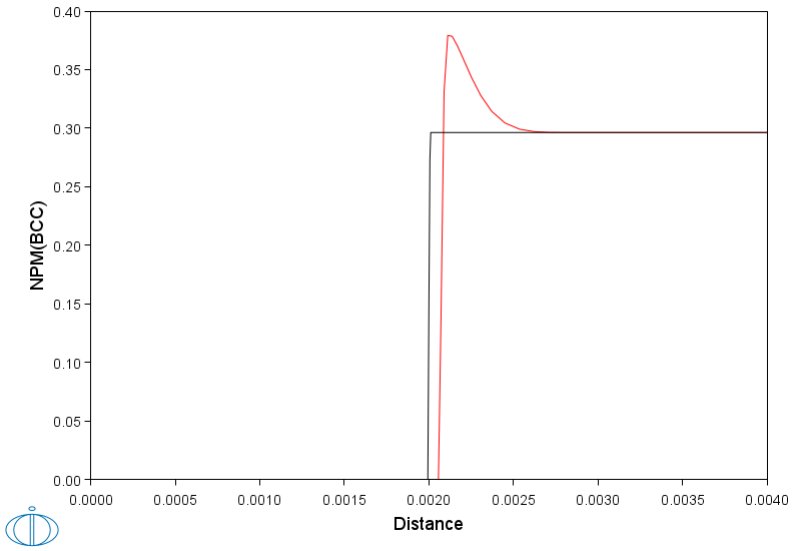
 TIMESTEP AT     720000.000     SELECTED

DIC>
DIC>
DIC>
DIC>
DIC> set-inter
 --OK---
DIC>
```

exd2a-plot

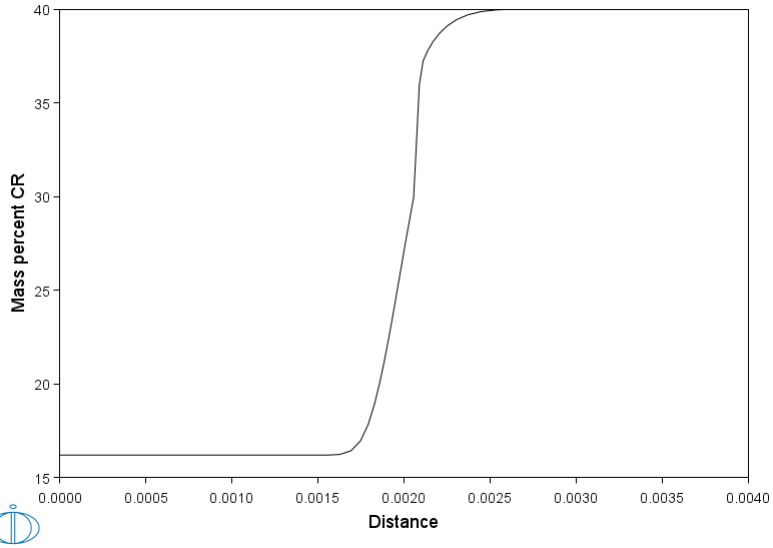
```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exd2a\plot.DCM"
DIC>
DIC>
DIC> @@ exd2_plot.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR GENERATING GRAPHICAL OUTPUT FOR EXAMPLE D2
DIC> @@
DIC> @@ ENTER THE DICTRA MODULE AND SPECIFY THE STORE-RESULT FILE
DIC> @@
DIC>
DIC> go d-m
 TIME STEP AT TIME  7.20000E+05
DIC> read  exd2
 OK
DIC>
DIC> @@
DIC> @@ ENTER THE DICTRA POST PROCESSOR
DIC> @@
DIC> post
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1:
POST-1: @@
POST-1: @@ LET US SEE HOW THE FRACTION OF FERRITE HAS CHANGED
POST-1: @@ AS A RESULT OF THE DIFFUSION
POST-1: @@
POST-1: s-d-a y npm(bcc)
POST-1: s-d-a x distance global
  INFO: Distance is set as independent variable
POST-1: s-p-c time 0 720000
POST-1: set-tit Figure D2.1
POST-1: plot
```

Figure D2.1



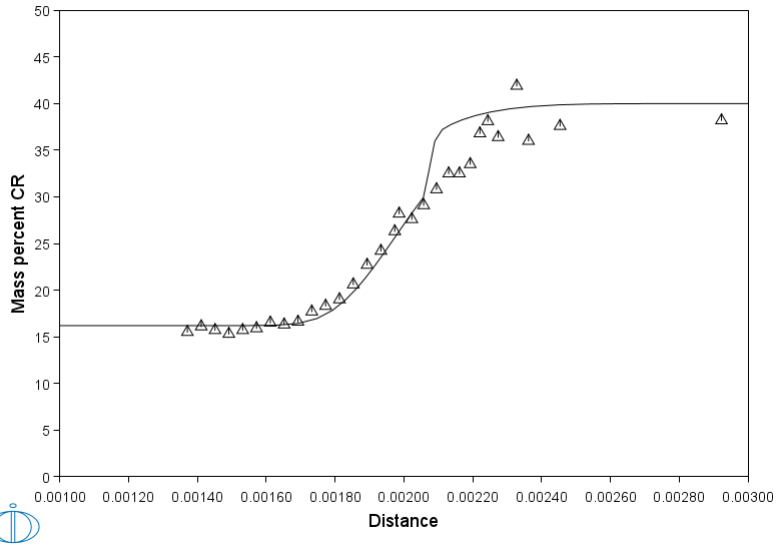

```
POST-1:
POST-1:
POST-1:
POST-1:@?<_hit_return_to_continue_>
POST-1: @@
POST-1: @@ NOW PLOT HOW THE AVERAGE Cr-CONCENTRATION VARIES WITH DISTANCE
POST-1: @@
POST-1: s-d-a y w-p cr
POST-1: s-p-c time last
POST-1: set-tit Figure D2.2
POST-1: plot
```

Figure D2.2



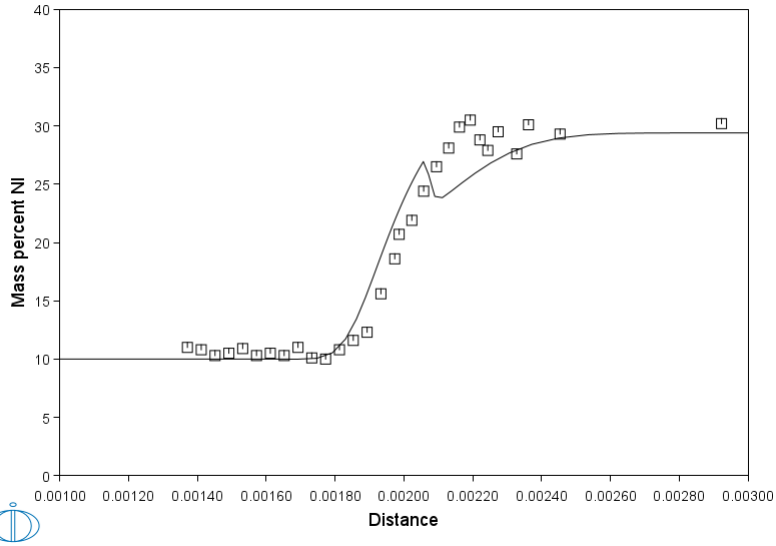

```
POST-1:
POST-1:
POST-1:
POST-1:@?<_hit_return_to_continue_>
POST-1: @@
POST-1: @@ NOW SELECT A BETTER SCALING AND APPEND THE EXPERIMENTAL DATA
POST-1: @@
POST-1:
POST-1: app y exd2.exp
PROLOGUE NUMBER: /0/: 1
DATASET NUMBER(s): /-1/: 4
POST-1:
POST-1: s-s-s y n 0 50
POST-1: s-s-s x n 10e-4 30e-4
POST-1:
POST-1: set-tit Figure D2.3
POST-1: plot
```

Figure D2.3



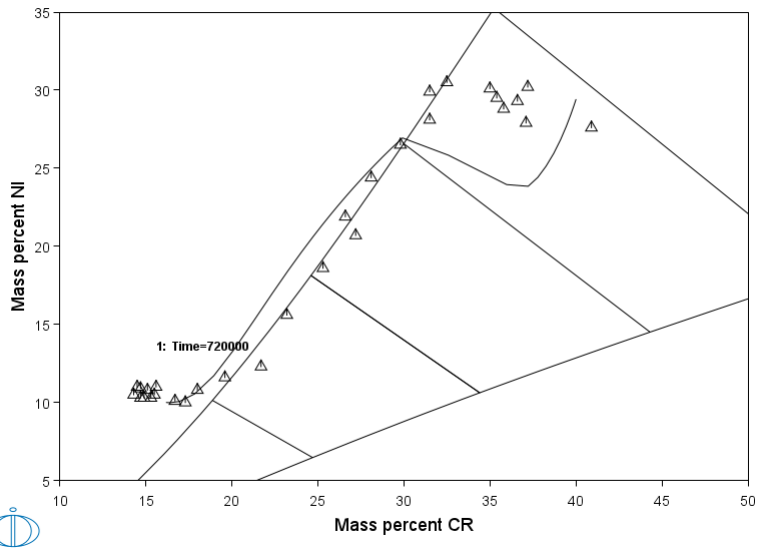

```
POST-1:
POST-1:
POST-1:
POST-1:@?<_hit_return_to_continue_>
POST-1: @@
POST-1: @@ NOW WE DO THE SAME FOR NICKEL
POST-1: @@
POST-1:
POST-1: s-d-a y w-p ni
POST-1:
POST-1: app y exd2.exp
PROLOGUE NUMBER: /1/: 1
DATASET NUMBER(s): /-1/: 5
POST-1:
POST-1: s-s-s x n 10e-4 30e-4
POST-1: s-s-s y n 0 40
POST-1:
POST-1: set-tit Figure D2.4
POST-1: plot
```

Figure D2.4




```
POST-1:
POST-1:
POST-1:
POST-1:@?<_hit_return_to_continue_>
POST-1: @@
POST-1: @@ LET US PLOT THE DIFFUSION PATH FOR THE COUPLE.
POST-1: @@ WE APPEND THE TERNARY PHASE-DIAGRAM CALCULATED IN THERMO-CALC
POST-1: @@ AND THE EXPERIMENTAL DATA
POST-1: @@
POST-1: s-d-a x w-p cr
POST-1: s-d-a y w-p ni
POST-1: s-i-v dis gl
POST-1: s-p-c time last
POST-1:
POST-1: app y exd2.exp
PROLOGUE NUMBER: /1/: 1
DATASET NUMBER(s): /-1/: 6 7 8
POST-1:
POST-1: s-s-s x n 10 50
POST-1: s-s-s y n 5 35
POST-1:
POST-1: set-tit Figure D2.5
POST-1: plot
```

Figure D2.5



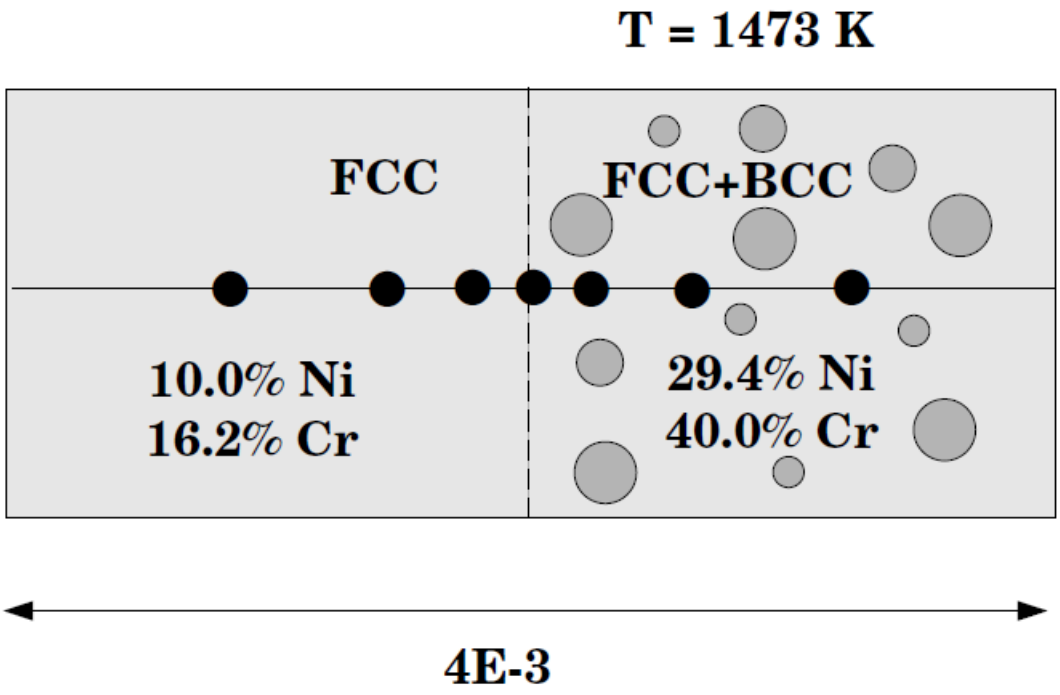

```
POST-1:
POST-1:
POST-1:
POST-1:
POST-1: set-interactive
 --OK---
POST-1:
```

Example exd2b

Diffusion couple of Fe-Ni-Cr alloys: Interdiffusion and the Homogenization Model

This example calculates the interdiffusion in a diffusion couple between a two-phase (FCC+BCC) and a single-phase (FCC) Fe-Ni-Cr alloy. Initially it has a step profile. It is similar to exd2a except the default HOMOGENIZATION MODEL is used and then ENTER_HOMOGENIZATION_FUNCTION is used instead of ENTER_LABYRINTH_FUNCTION.

This case is from A. Engström: Scand. J. Met., vol. 24, 1995, pp.12-20.



exd2b-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exd2b\setup.DCM"
SYS: ï»¿@@
 NO SUCH COMMAND, USE HELP
SYS: @@ Diffusion in dispersed systems.
SYS: @@ Diffusion couple of Fe-Cr-Ni alloys: Homogenization model
SYS: @@ This example calculates the interdiffusion in a diffusion
SYS: @@ couple between a two-phase (FCC+BCC) and a single-phase (FCC)
SYS: @@ Fe-Ni-Cr alloy. This case is from A. EngstrÃ¶m: Scand. J. Met.,
SYS: @@ v. 24, 1995, pp.12-20. This simulation can be run with either
SYS: @@ the DISPERSED SYSTEM MODEL or the HOMOGENIZATION MODEL.
SYS: @@ Here the default HOMOGENIZATION MODEL is used and then
SYS: @@ ENTER_HOMOGENIZATION_FUNCTION should be used instead of
SYS: @@ ENTER_LABYRINTH_FUNCTION.
SYS: @@------------------------------------------------------------------
SYS:
SYS: @@
SYS: @@ RETRIEVE DATA FROM THE DATABASE
SYS: @@
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                       /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12: sw fedemo
 Current database: Iron Demo Database v6.0

 VA                       /-  DEFINED
TDB_FEDEMO: def-sys fe ni cr
 FE                       NI                       CR
   DEFINED
TDB_FEDEMO: rej ph * all
 GAS:G                    LIQUID:L                 BCC_A2
 C14_LAVES                CBCC_A12                 CHI_A12
 CUB_A13                  FCC_A1                   HCP_A3
 SIGMA_D8B  REJECTED
TDB_FEDEMO: res ph fcc,bcc
 FCC_A1                   BCC_A2  RESTORED
TDB_FEDEMO: get
11:46:38,019 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ SWITCH TO A MOBILITY DATABASE TO RETRIEVE MOBILITY DATA
TDB_FEDEMO: @@
TDB_FEDEMO: app mfedemo
 Current database: Fe-Alloys Mobility demo database v5.0

 VA  DEFINED
APP: def-sys fe ni cr
 FE                       NI                       CR
   DEFINED
APP: rej ph * all
 BCC_A2                   FCC_A1                   LIQUID:L
   REJECTED
APP: res ph fcc,bcc
 FCC_A1                   BCC_A2  RESTORED
APP: get
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
APP:
APP: @@
APP: @@ ENTER THE DICTRA MONITOR
APP: @@
APP: go d-m
 NO TIME STEP DEFINED
DIC>
DIC> @@
DIC> @@ ENTER THE GLOBAL CONDITION T
DIC> @@
DIC> set-cond glob T 0 1473; * N
DIC>
DIC> @@
DIC> @@ ENTER THE REGION fer
DIC> @@
DIC> enter-region fer
DIC>
```

```
DIC>
DIC> @@
DIC> @@ ENTER GRID INTO THE REGION
DIC> @@
DIC> enter-grid fer 4e-3 auto
DIC>
DIC> @@
DIC> @@ ENTER A MATRIX PHASE IN THE REGION
DIC> @@
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: act fer matrix fcc
DIC>
DIC> @@
DIC> @@ ENTER THE START COMPOSITION FOR THE MATRIX PHASE
DIC> @@
DIC> enter-composition
REGION NAME : /FER/: fer
PHASE NAME: /FCC_A1/: fcc
DEPENDENT COMPONENT ? /NI/: fe
COMPOSITION TYPE /MOLE_FRACTION/: w-p
PROFILE FOR /CR/: cr function 16.2+23.8*HS(x-2e-3);
PROFILE FOR /NI/: ni function 10+19.4*HS(x-2e-3);
DIC>
DIC> @@
DIC> @@ ENTER FERRITE AS THE SPHEROIDAL PHASE IN THE REGION
DIC> @@ SINCE THE FRACTION OF FERRITE IS SMALL, AND THESE APPEAR
DIC> @@ AS ISOLATED PARTICLES, FERRITE IS ENTERED AS A SPHEROIDAL PHASE
DIC> @@
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: act
REGION NAME : /FER/: fer
PHASE TYPE /MATRIX/: sph
PHASE NAME: /NONE/: bcc
 INFO: EQUILIBRIUM COMPOSITION AND FRACTION OF SPHEROID PHASES USED AS DEFAULT
DIC>
DIC> @@
DIC> @@ ENTER THE COMPOSITION FOR THE SPHEROIDAL PHASE
DIC> @@ USE THE EQUILIBRIUM VALUE
DIC> @@
DIC> enter-composition
REGION NAME : /FER/: fer
PHASE NAME: /FCC_A1/: bcc
USE EQUILIBRIUM VALUE /Y/: y
DIC>
DIC> @@ SELECT A HOMOGENIZATION FUNCTION
DIC> @@ IN THIS CASE THE LOWER HASHIN-SHTRIKMAN BOUND
DIC> en-ho 1
 SELECTED FUNCTION IS HASHIN-SHTRIKMAN BOUND: GENERAL LOWER
DIC>
DIC>
DIC> @@
DIC> @@ SET THE SIMULATION TIME AND OTHER SIMULATION PARAMETERS
DIC> @@
DIC> set-simulation-time
END TIME FOR INTEGRATION /.1/: 720000
AUTOMATIC TIMESTEP CONTROL /YES/: YES
MAX TIMESTEP DURING INTEGRATION /72000/:
INITIAL TIMESTEP : /1E-07/:
SMALLEST ACCEPTABLE TIMESTEP : /1E-07/:
DIC>
DIC> @@
DIC> @@ SAVE THE SETUP TO A NEW STORE FILE AND EXIT
DIC> @@
DIC>
DIC> save exd2 y
DIC>
DIC> set-inter
 --OK---
DIC>
```

exd2b-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exd2b\run.DCM"
DIC>
DIC>
DIC> @@ exd2_run.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR RUNNING THE SIMULATION OF EXAMPLE D2
DIC> @@
DIC>
DIC> @@
DIC> @@ READ THE SETUP FROM FILE AND START THE SIMULATION
DIC> @@
DIC>
DIC> go d-m
 TIME STEP AT TIME  0.00000E+00
DIC> read exd2
 OK
DIC> sim
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 Region: FER
 geometric   0.980392     dense at   0.200000E-02   27 points
 geometric    1.02000     dense at   0.200000E-02   26 points
 DEGREE OF IMPLICITY SET TO EULER BACKWARD
 INFO: not solving in latticefixed frame of reference
 STARTING SIMULATION USING HOMOGENIZATION MODEL
 -------------------------------------------------
  WARNING:BCC_A2 HAS NO VOLUME FRACTION, CREATING ONE
Starting time-step t0=   0.0000000     dt=  0.10000000E-06
Starting time-step t0=  0.10000000E-06 dt=  0.20000000E-06
Starting time-step t0=  0.30000000E-06 dt=  0.40000000E-06
Starting time-step t0=  0.70000000E-06 dt=  0.80000000E-06
Starting time-step t0=  0.15000000E-05 dt=  0.16000000E-05
Starting time-step t0=  0.31000000E-05 dt=  0.32000000E-05
Starting time-step t0=  0.63000000E-05 dt=  0.64000000E-05
Starting time-step t0=  0.12700000E-04 dt=  0.12800000E-04
Starting time-step t0=  0.25500000E-04 dt=  0.25600000E-04
Starting time-step t0=  0.51100000E-04 dt=  0.51200000E-04
Starting time-step t0=  0.10230000E-03 dt=  0.10240000E-03
Starting time-step t0=  0.20470000E-03 dt=  0.20480000E-03
Starting time-step t0=  0.40950000E-03 dt=  0.40960000E-03
Starting time-step t0=  0.81910000E-03 dt=  0.81920000E-03
Starting time-step t0=  0.16383000E-02 dt=  0.16384000E-02
Starting time-step t0=  0.32767000E-02 dt=  0.32768000E-02
Starting time-step t0=  0.65535000E-02 dt=  0.65536000E-02
Starting time-step t0=  0.13107100E-01 dt=  0.13107200E-01
Starting time-step t0=  0.26214300E-01 dt=  0.26214400E-01
Starting time-step t0=  0.52428700E-01 dt=  0.52428800E-01
Starting time-step t0=  0.10485750     dt=  0.10485760
Starting time-step t0=  0.20971510     dt=  0.20971520
Starting time-step t0=  0.41943030     dt=  0.41943040
Starting time-step t0=  0.83886070     dt=  0.83886080
Starting time-step t0=   1.6777215     dt=   1.6777216
Starting time-step t0=   3.3554431     dt=   3.3554432
Starting time-step t0=   6.7108863     dt=   6.7108864
Starting time-step t0=   13.421773     dt=   13.421773
Starting time-step t0=   26.843545     dt=   26.843546
Starting time-step t0=   53.687091     dt=   53.687091
Starting time-step t0=   107.37418     dt=   107.37418
Starting time-step t0=   214.74836     dt=   214.74836
Starting time-step t0=   429.49673     dt=   429.49673
Starting time-step t0=   858.99346     dt=   858.99346
Starting time-step t0=   1717.9869     dt=   1717.9869
Starting time-step t0=   3435.9738     dt=   3435.9738
Starting time-step t0=   6871.9477     dt=   6871.9477
Starting time-step t0=   13743.895     dt=   13743.895
Starting time-step t0=   27487.791     dt=   13743.895
Starting time-step t0=   41231.686     dt=   13743.895
Starting time-step t0=   54975.581     dt=   13743.895
Starting time-step t0=   68719.477     dt=   27487.791
Starting time-step t0=   96207.267     dt=   27487.791
Starting time-step t0=   123695.06     dt=   27487.791
Starting time-step t0=   151182.85     dt=   27487.791
Starting time-step t0=   178670.64     dt=   27487.791
Starting time-step t0=   206158.43     dt=   54975.581
Starting time-step t0=   261134.01     dt=   54975.581
Starting time-step t0=   316109.59     dt=   54975.581
Starting time-step t0=   371085.17     dt=   54975.581
Starting time-step t0=   426060.76     dt=   54975.581
Starting time-step t0=   481036.34     dt=   54975.581
Starting time-step t0=   536011.92     dt=   54975.581
Starting time-step t0=   590987.50     dt=   54975.581
Starting time-step t0=   645963.08     dt=   72000.000
Starting time-step t0=   717963.08     dt=   2036.9187
 MUST SAVE WORKSPACE ON FILE
 WORKSPACE SAVED ON FILE
 RECLAIMING WORKSPACE
 DELETING TIME-RECORD FOR TIME    0.0000000
 DELETING TIME-RECORD FOR TIME   0.10000000E-06
 DELETING TIME-RECORD FOR TIME    858.99346
 DELETING TIME-RECORD FOR TIME    1717.9869
 DELETING TIME-RECORD FOR TIME    3435.9738
 DELETING TIME-RECORD FOR TIME    6871.9477
 DELETING TIME-RECORD FOR TIME    13743.895
 DELETING TIME-RECORD FOR TIME    27487.791
 DELETING TIME-RECORD FOR TIME    41231.686
 DELETING TIME-RECORD FOR TIME    54975.581
 DELETING TIME-RECORD FOR TIME    68719.477
 DELETING TIME-RECORD FOR TIME    96207.267
 DELETING TIME-RECORD FOR TIME    123695.06
 DELETING TIME-RECORD FOR TIME    151182.85
 DELETING TIME-RECORD FOR TIME    178670.64
 DELETING TIME-RECORD FOR TIME    206158.43
 DELETING TIME-RECORD FOR TIME    261134.01
 DELETING TIME-RECORD FOR TIME    316109.59
 DELETING TIME-RECORD FOR TIME    371085.17
 DELETING TIME-RECORD FOR TIME    426060.76
 DELETING TIME-RECORD FOR TIME    481036.34
 DELETING TIME-RECORD FOR TIME    536011.92
 DELETING TIME-RECORD FOR TIME    590987.50
 DELETING TIME-RECORD FOR TIME    645963.08
```

```
 KEEPING TIME-RECORD FOR TIME    717963.08
 AND FOR TIME                    720000.00
 WORKSPACE RECLAIMED
 -------------------------------------------------
 INTERPOLATION SCHEME USED THIS FRACTION OF
 THE ALLOCATED MEMORY:   5.706238112003934E-003
 EFFICIENCY FACTOR:    3.23110624315444
 -------------------------------------------------
 DEALLOCATING
 -------------------------------------------------

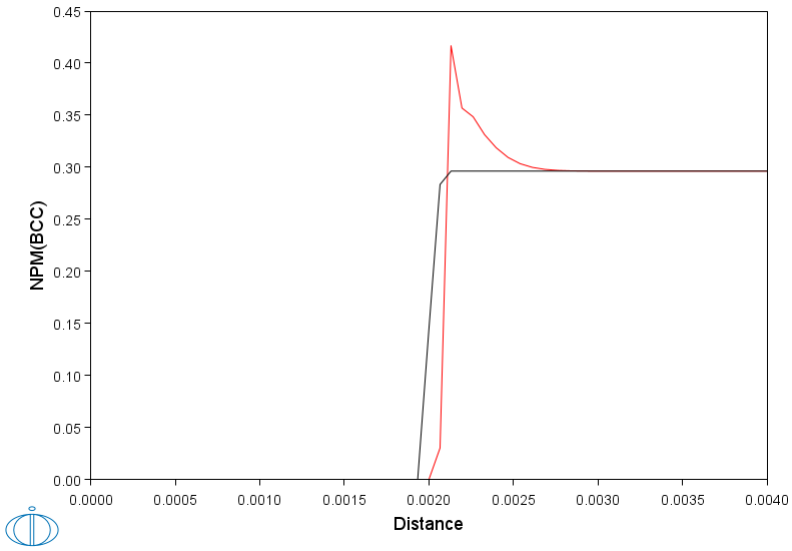
 TIMESTEP AT     720000.000     SELECTED

DIC>
DIC>
DIC>
DIC>
DIC> set-inter
 --OK---
DIC>
```

exd2b-plot

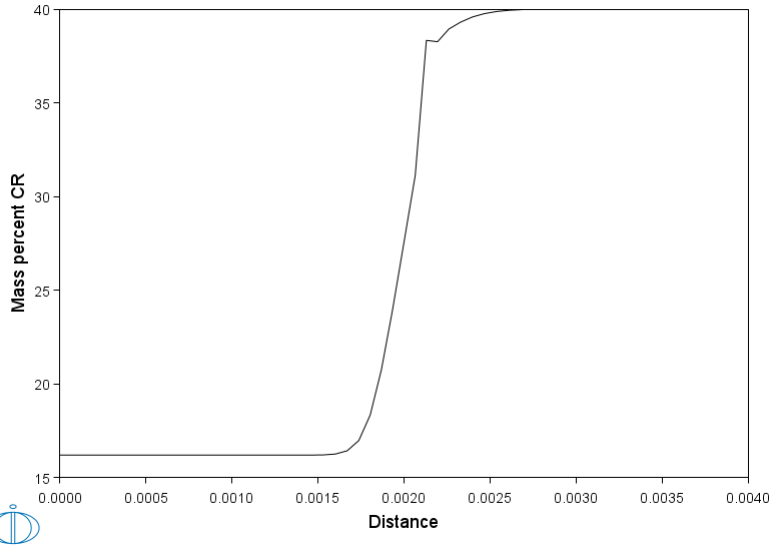
```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exd2b\plot.DCM"
DIC>
DIC>
DIC> @@ exd2_plot.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR GENERATING GRAPHICAL OUTPUT FOR EXAMPLE D2
DIC> @@
DIC> @@ ENTER THE DICTRA MODULE AND SPECIFY THE STORE-RESULT FILE
DIC> @@
DIC>
DIC> go d-m
 TIME STEP AT TIME  7.20000E+05
DIC> read  exd2
 OK
DIC>
DIC> @@
DIC> @@ ENTER THE DICTRA POST PROCESSOR
DIC> @@
DIC> post
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1:
POST-1: @@
POST-1: @@ LET US FIRST SEE HOW THE FRACTION OF FERRITE  HAS CHANGED
POST-1: @@ AS A RESULT OF THE DIFFUSION
POST-1: @@
POST-1: s-d-a y npm(bcc)
POST-1: s-d-a x distance global
  INFO: Distance is set as independent variable
POST-1: s-p-c time 0 720000
POST-1: set-tit Figure D2.1
POST-1: plot
```

Figure D2.1



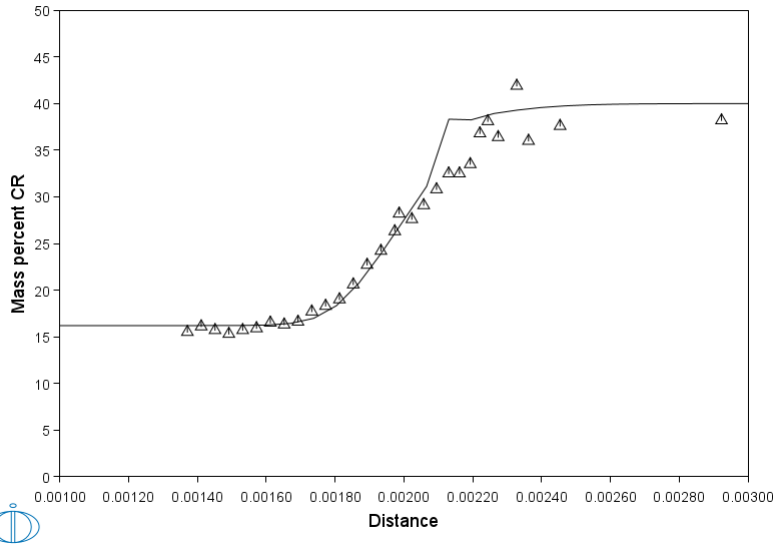

```
POST-1:
POST-1:
POST-1:
POST-1:@?<_hit_return_to_continue_>
POST-1: @@
POST-1: @@ LET US NOW PLOT HOW THE AVERAGE CR-CONCENTRATION VARIES WITH DISTANCE
POST-1: @@
POST-1: s-d-a y w-p cr
POST-1: s-p-c time last
POST-1: set-tit Figure D2.2
POST-1: plot
```

Figure D2.2



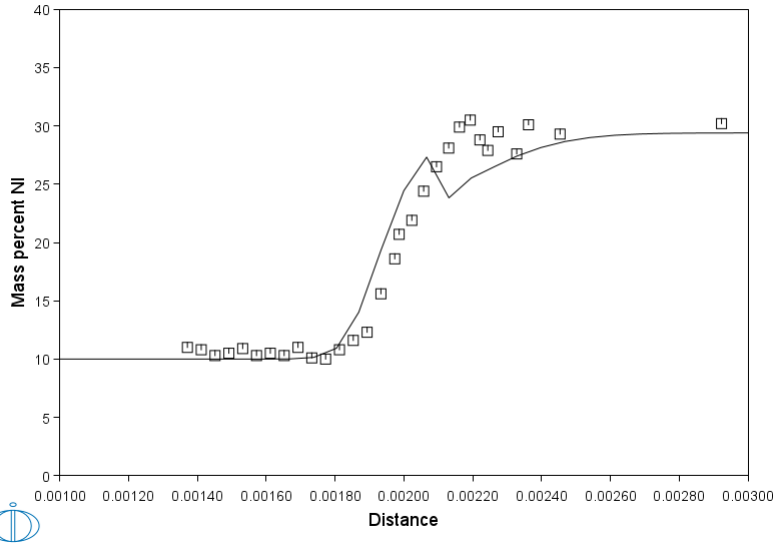

```
POST-1:
POST-1:
POST-1:
POST-1:@?<_hit_return_to_continue_>
POST-1: @@
POST-1: @@ WE SELECT A BETTER SCALING AND APPEND EXPERIMENTAL DATA
POST-1: @@
POST-1:
POST-1: app y exd2.exp
PROLOGUE NUMBER: /0/: 1
DATASET NUMBER(s): /-1/: 4
POST-1:
POST-1: s-s-s y n 0 50
POST-1: s-s-s x n 10e-4 30e-4
POST-1:
POST-1: set-tit Figure D2.3
POST-1: plot
```

Figure D2.3



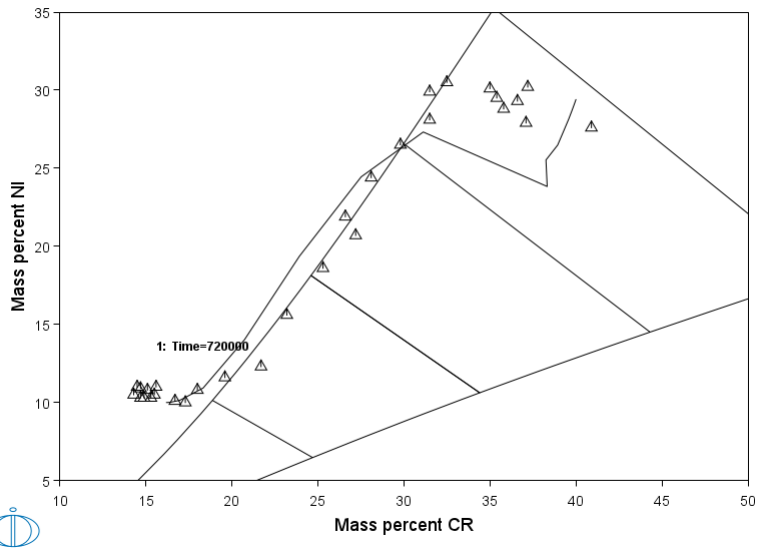

```
POST-1:
POST-1:
POST-1:
POST-1:@?<_hit_return_to_continue_>
POST-1: @@
POST-1: @@ NOW WE DO THE SAME FOR NICKEL
POST-1: @@
POST-1:
POST-1: s-d-a y w-p ni
POST-1:
POST-1: app y exd2.exp
PROLOGUE NUMBER: /1/: 1
DATASET NUMBER(s): /-1/: 5
POST-1:
POST-1: s-s-s x n 10e-4 30e-4
POST-1: s-s-s y n 0 40
POST-1:
POST-1: set-tit Figure D2.4
POST-1: plot
```

Figure D2.4




```
POST-1:
POST-1:
POST-1:
POST-1:@?<_hit_return_to_continue_>
POST-1: @@
POST-1: @@ LET US PLOT THE DIFFUSION PATH FOR THE COUPLE
POST-1: @@ WE APPEND THE TERNARY PHASE-DIAGRAM CALCULATED IN THERMO-CALC
POST-1: @@ AND THE EXPERIMENTAL DATA
POST-1: @@
POST-1: s-d-a x w-p cr
POST-1: s-d-a y w-p ni
POST-1: s-i-v dis gl
POST-1: s-p-c time last
POST-1:
POST-1: app y exd2.exp
PROLOGUE NUMBER: /1/: 1
DATASET NUMBER(s): /-1/: 6 7 8
POST-1:
POST-1: s-s-s x n 10 50
POST-1: s-s-s y n 5 35
POST-1:
POST-1: set-tit Figure D2.5
POST-1: plot
```

Figure D2.5

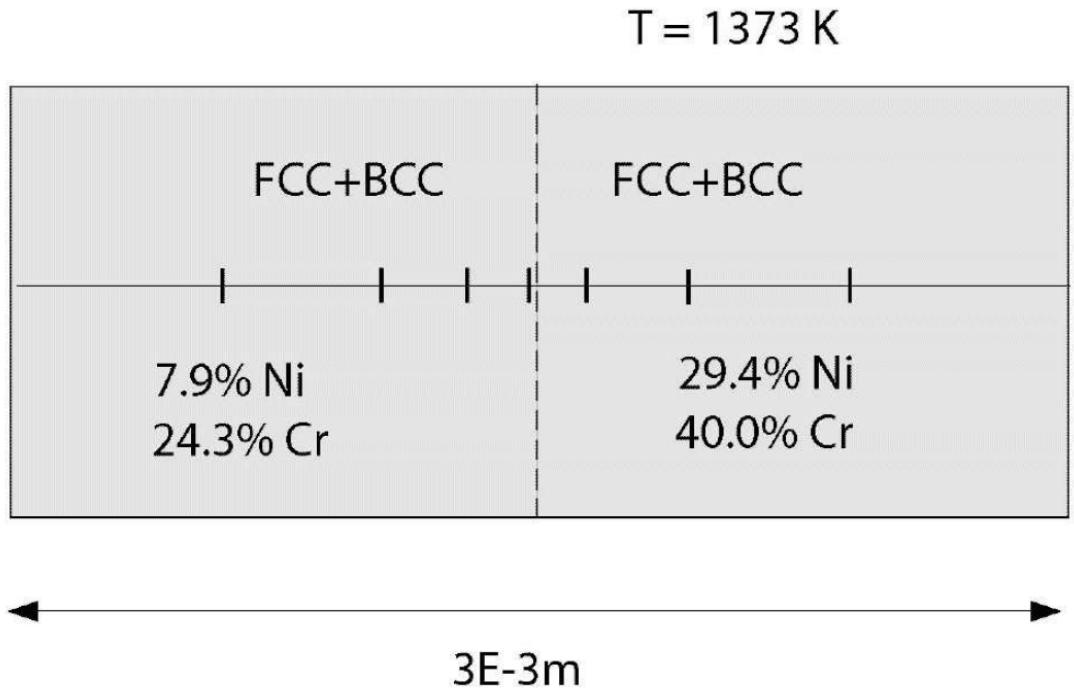



```
POST-1:
POST-1:
POST-1:
POST-1:
POST-1: set-interactive
 --OK---
POST-1:
```

Example exd3

Diffusion couple of Fe-Ni-Cr alloys: Homogenization Model

This example shows the use of the homogenization model. It is taken from H. Larsson and A. Engström, Acta. Mater. v.54 (2006), pp. 2431-2439. Experimental data from A. Engström, Scand J Metall, v.243 (1995), p.12. The homogenization model can be used for multiphase simulations like the dispersed system model, but unlike the dispersed system model there is no need to have a single continuous matrix phase and, furthermore, there is no need to limit the size of time-steps. The set-up is performed in the same manner as for the dispersed system model, which means that a certain phase is entered as the matrix phase and the other phases are entered as spheroidal, but the choice of matrix phase will not affect the simulation.



exd3-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exd3\setup.DCM.test"
SYS: ï»¿@@
 NO SUCH COMMAND, USE HELP
SYS: @@ Diffusion in dispersed systems.
SYS: @@ Diffusion couple of Fe-Cr-Ni alloys: Homogenization model
SYS: @@ This example uses the homogenization model. It is taken from
SYS: @@ H. Larsson and A. EngstrÃ¶m, Acta. Mater. v.54 (2006), pp. 2431-2439.
SYS: @@ Experimental data from A. EngstrÃ¶m, Scand J Metall, v.243 (1995), p.12.
SYS: @@ The homogenization model can be used for multiphase simulations
SYS: @@ like the dispersed system model, but unlike the dispersed system model
SYS: @@ there is no need to have a single continuous matrix phase and, furthermore,
SYS: @@ there is no need to limit the size of time-steps.
SYS: @@ The set-up is performed in the same manner as for the dispersed system
SYS: @@ model, which means that a certain phase is entered as the matrix phase
SYS: @@ and the other phases are entered as spheroidal, but the choice of matrix
SYS: @@ phase will not affect the simulation.
SYS: @@----------------------------------------------------------------------
SYS:
SYS: @@ exd3_setup.DCM
SYS:
SYS:
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                        /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12: sw fedemo
 Current database: Iron Demo Database v6.0

 VA                        /-  DEFINED
TDB_FEDEMO: def-sys fe cr ni
 FE                        CR                        NI
   DEFINED
TDB_FEDEMO: rej-ph *
 GAS:G                     LIQUID:L                  BCC_A2
 C14_LAVES                 CBCC_A12                  CHI_A12
 CUB_A13                   FCC_A1                    HCP_A3
 SIGMA_D8B  REJECTED
TDB_FEDEMO: rest-ph bcc,fcc
 BCC_A2                    FCC_A1  RESTORED
TDB_FEDEMO: get
11:49:42,967 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_FEDEMO:
TDB_FEDEMO: app mfedemo
 Current database: Fe-Alloys Mobility demo database v5.0

 VA  DEFINED
APP: def-sys fe cr ni
 FE                        CR                        NI
   DEFINED
APP: rej-ph *
 BCC_A2                    FCC_A1                    LIQUID:L
   REJECTED
APP: rest-ph bcc,fcc
 BCC_A2                    FCC_A1  RESTORED
APP: get
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
APP:
APP: go -m
 NO TIME STEP DEFINED
DIC>
DIC> set-cond glob T 0 1373.15; * N
DIC>
DIC> ent-geo 0
DIC>
DIC> ent-reg
REGION NAME : fecrni
DIC>
DIC> ent-grid
REGION NAME : /FECRNI/: fecrni
WIDTH OF REGION /1/: 3e-3
TYPE /AUTO/: double
NUMBER OF POINTS /50/: 60
VALUE OF R IN THE GEOMETRICAL SERIE FOR LOWER PART OF REGION: 0.85
```

```
VALUE OF R IN THE GEOMETRICAL SERIE FOR UPPER PART OF REGION: 1.15
DIC>
DIC> ent-ph
ACTIVE OR INACTIVE PHASE /ACTIVE/: act
REGION NAME : /FECRNI/: fecrni
PHASE TYPE /MATRIX/: matrix
PHASE NAME: /NONE/: fcc#1
DIC>
DIC> ent-ph
ACTIVE OR INACTIVE PHASE /ACTIVE/: act
REGION NAME : /FECRNI/: fecrni
PHASE TYPE /MATRIX/: sph
PHASE NAME: /NONE/: bcc
 INFO: EQUILIBRIUM COMPOSITION AND FRACTION OF SPHEROID PHASES USED AS DEFAULT
DIC>
DIC> ent-comp
REGION NAME : /FECRNI/: fecrni
PHASE NAME: /FCC_A1/: fcc#1
DEPENDENT COMPONENT ? /NI/: fe
COMPOSITION TYPE /MOLE_FRACTION/: m-f
PROFILE FOR /CR/: cr
TYPE /LINEAR/: read cr.dat
PROFILE FOR /NI/: ni
TYPE /READ_POINT_BY_POINT/: read ni.dat
DIC>
DIC> ent-comp
REGION NAME : /FECRNI/: fecrni
PHASE NAME: /FCC_A1/: bcc
USE EQUILIBRIUM VALUE /Y/: y
DIC>
DIC> se-si-ti
END TIME FOR INTEGRATION /.1/: 3.6e5
AUTOMATIC TIMESTEP CONTROL /YES/: yes
MAX TIMESTEP DURING INTEGRATION /36000/: 3.6e4
INITIAL TIMESTEP : /1E-07/: 1
SMALLEST ACCEPTABLE TIMESTEP : /1E-07/: 1e-7
DIC>
DIC> @@ SIMULATIONS ARE FASTER WHEN THE RESULTS ARE NOT SAVED
DIC> @@ FOR EVERY TIME STEP
DIC> set-option SAVE_WORKSPACE_ON_FILE 99
DIC>
DIC>
DIC> @@ There are a several options available for the homogenization
DIC> @@ model. There is also an interpolation scheme that may reduce
DIC> @@ simulation times. However, for this example, the default settings
DIC> @@ are kept and the interpolation scheme is turned off.
DIC> @@
DIC> homogen yes yes
 INFO: HOMOGENIZATION MODEL ENABLED
DIC>
DIC> @@ There are a large number of homogenization functions
DIC> @@ available. These determine how the average kinetics
DIC> @@ of the multiphase mixture is evaluated. For this example
DIC> @@ the General lower Hashin-Shtrikman bound is a good choice.
DIC> en-ho
ENTER HOMOGENIZATION FUNCTION # /5/: 1
 SELECTED FUNCTION IS HASHIN-SHTRIKMAN BOUND: GENERAL LOWER
DIC>
DIC>
DIC>
DIC> save exd3 Y
DIC>
DIC>
DIC> set-inter
 --OK---
DIC>
```

exd3-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exd3\run.DCM.test"
DIC>
DIC>
DIC> @@ exd3_run.DCM
DIC>
DIC> @@
DIC> @@ READ THE SETUP FROM FILE AND START THE SIMULATION
DIC> @@
DIC>
DIC> go d-m
 TIME STEP AT TIME  0.00000E+00
DIC> read exd3
 OK
DIC>
DIC> sim
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 DEGREE OF IMPLICITY SET TO EULER BACKWARD
 INFO: not solving in latticefixed frame of reference
 STARTING SIMULATION USING HOMOGENIZATION MODEL
 -----------------------------------------------
  WARNING:BCC_A2 HAS NO VOLUME FRACTION, CREATING ONE
Starting time-step t0=   0.0000000     dt=   1.0000000
Starting time-step t0=   1.0000000     dt=   2.0000000
Starting time-step t0=   3.0000000     dt=   4.0000000
Starting time-step t0=   7.0000000     dt=   8.0000000
Starting time-step t0=   15.000000     dt=   16.000000
Starting time-step t0=   31.000000     dt=   32.000000
Starting time-step t0=   63.000000     dt=   64.000000
Starting time-step t0=   127.00000     dt=   64.000000
Starting time-step t0=   191.00000     dt=   64.000000
Starting time-step t0=   255.00000     dt=   64.000000
Starting time-step t0=   319.00000     dt=   64.000000
Starting time-step t0=   383.00000     dt=   64.000000
Starting time-step t0=   447.00000     dt=   128.00000
Starting time-step t0=   575.00000     dt=   128.00000
Starting time-step t0=   703.00000     dt=   128.00000
Starting time-step t0=   831.00000     dt=   128.00000
Starting time-step t0=   959.00000     dt=   128.00000
Starting time-step t0=   1087.0000     dt=   256.00000
Starting time-step t0=   1343.0000     dt=   256.00000
Starting time-step t0=   1599.0000     dt=   256.00000
Starting time-step t0=   1855.0000     dt=   256.00000
Starting time-step t0=   2111.0000     dt=   256.00000
Starting time-step t0=   2367.0000     dt=   512.00000
Starting time-step t0=   2879.0000     dt=   512.00000
Starting time-step t0=   3391.0000     dt=   512.00000
Starting time-step t0=   3903.0000     dt=   512.00000
Starting time-step t0=   4415.0000     dt=   512.00000
Starting time-step t0=   4927.0000     dt=   1024.0000
Starting time-step t0=   5951.0000     dt=   1024.0000
Starting time-step t0=   6975.0000     dt=   1024.0000
Starting time-step t0=   7999.0000     dt=   1024.0000
Starting time-step t0=   9023.0000     dt=   1024.0000
Starting time-step t0=   10047.000     dt=   2048.0000
Starting time-step t0=   12095.000     dt=   2048.0000
Starting time-step t0=   14143.000     dt=   2048.0000
Starting time-step t0=   16191.000     dt=   2048.0000
Starting time-step t0=   18239.000     dt=   2048.0000
Starting time-step t0=   20287.000     dt=   2048.0000
Starting time-step t0=   22335.000     dt=   2048.0000
Starting time-step t0=   24383.000     dt=   4096.0000
Starting time-step t0=   28479.000     dt=   4096.0000
Starting time-step t0=   32575.000     dt=   4096.0000
Starting time-step t0=   36671.000     dt=   4096.0000
Starting time-step t0=   40767.000     dt=   4096.0000
Starting time-step t0=   44863.000     dt=   4096.0000
Starting time-step t0=   48959.000     dt=   4096.0000
Starting time-step t0=   53055.000     dt=   8192.0000
Starting time-step t0=   61247.000     dt=   8192.0000
Starting time-step t0=   69439.000     dt=   8192.0000
Starting time-step t0=   77631.000     dt=   8192.0000
Starting time-step t0=   85823.000     dt=   8192.0000
Starting time-step t0=   94015.000     dt=   8192.0000
Starting time-step t0=   102207.00     dt=   8192.0000
Starting time-step t0=   110399.00     dt=   16384.000
Starting time-step t0=   126783.00     dt=   16384.000
Starting time-step t0=   143167.00     dt=   16384.000
Starting time-step t0=   159551.00     dt=   16384.000
Starting time-step t0=   175935.00     dt=   16384.000
Starting time-step t0=   192319.00     dt=   16384.000
Starting time-step t0=   208703.00     dt=   16384.000
Starting time-step t0=   225087.00     dt=   16384.000
Starting time-step t0=   241471.00     dt=   32768.000
Starting time-step t0=   274239.00     dt=   32768.000
Starting time-step t0=   307007.00     dt=   32768.000
Starting time-step t0=   339775.00     dt=   20225.000
 MUST SAVE WORKSPACE ON FILE
 WORKSPACE SAVED ON FILE
 RECLAIMING WORKSPACE
 DELETING TIME-RECORD FOR TIME    0.0000000
 DELETING TIME-RECORD FOR TIME    1.0000000
 DELETING TIME-RECORD FOR TIME    383.00000
 DELETING TIME-RECORD FOR TIME    831.00000
 DELETING TIME-RECORD FOR TIME    1343.0000
 DELETING TIME-RECORD FOR TIME    1855.0000
 DELETING TIME-RECORD FOR TIME    2367.0000
 DELETING TIME-RECORD FOR TIME    2879.0000
 DELETING TIME-RECORD FOR TIME    3391.0000
 DELETING TIME-RECORD FOR TIME    3903.0000
 DELETING TIME-RECORD FOR TIME    4415.0000
 DELETING TIME-RECORD FOR TIME    4927.0000
 DELETING TIME-RECORD FOR TIME    5951.0000
 DELETING TIME-RECORD FOR TIME    6975.0000
 DELETING TIME-RECORD FOR TIME    7999.0000
 DELETING TIME-RECORD FOR TIME    9023.0000
 DELETING TIME-RECORD FOR TIME    10047.000
 DELETING TIME-RECORD FOR TIME    12095.000
 DELETING TIME-RECORD FOR TIME    14143.000
 DELETING TIME-RECORD FOR TIME    16191.000
 DELETING TIME-RECORD FOR TIME    18239.000
```

```
 DELETING TIME-RECORD FOR TIME    20287.000
 DELETING TIME-RECORD FOR TIME    22335.000
 DELETING TIME-RECORD FOR TIME    24383.000
 DELETING TIME-RECORD FOR TIME    28479.000
 DELETING TIME-RECORD FOR TIME    32575.000
 DELETING TIME-RECORD FOR TIME    36671.000
 DELETING TIME-RECORD FOR TIME    40767.000
 DELETING TIME-RECORD FOR TIME    44863.000
 DELETING TIME-RECORD FOR TIME    48959.000
 DELETING TIME-RECORD FOR TIME    53055.000
 DELETING TIME-RECORD FOR TIME    61247.000
 DELETING TIME-RECORD FOR TIME    69439.000
 DELETING TIME-RECORD FOR TIME    77631.000
 DELETING TIME-RECORD FOR TIME    85823.000
 DELETING TIME-RECORD FOR TIME    94015.000
 DELETING TIME-RECORD FOR TIME    102207.00
 DELETING TIME-RECORD FOR TIME    110399.00
 DELETING TIME-RECORD FOR TIME    126783.00
 DELETING TIME-RECORD FOR TIME    143167.00
 DELETING TIME-RECORD FOR TIME    159551.00
 DELETING TIME-RECORD FOR TIME    175935.00
 DELETING TIME-RECORD FOR TIME    192319.00
 DELETING TIME-RECORD FOR TIME    208703.00
 DELETING TIME-RECORD FOR TIME    225087.00
 DELETING TIME-RECORD FOR TIME    241471.00
 DELETING TIME-RECORD FOR TIME    274239.00
 DELETING TIME-RECORD FOR TIME    307007.00

 KEEPING TIME-RECORD FOR TIME    339775.00
 AND FOR TIME                    360000.00
 WORKSPACE RECLAIMED
 -------------------------------------------------
 INTERPOLATION SCHEME USED THIS FRACTION OF
 THE ALLOCATED MEMORY:   2.459578209212064E-002
 EFFICIENCY FACTOR:    6.33533796374725
 -------------------------------------------------
 DEALLOCATING
 -------------------------------------------------

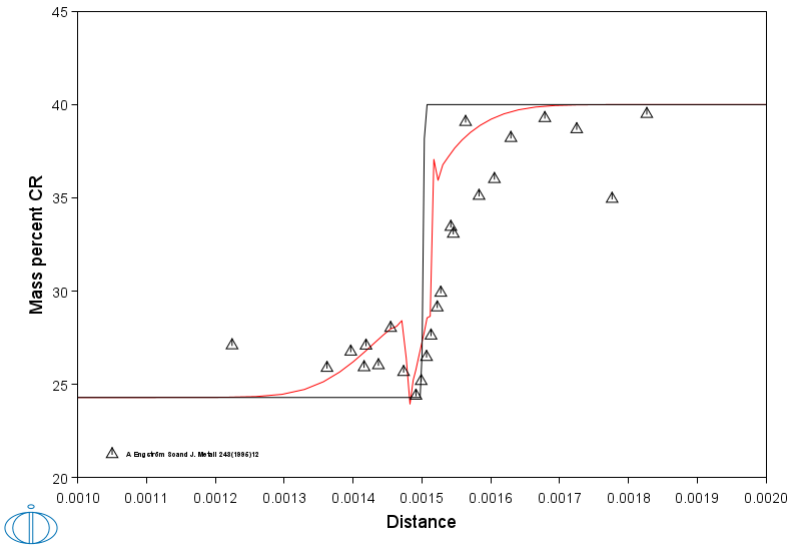
 TIMESTEP AT     360000.000     SELECTED

DIC>
DIC>
DIC> set-inter
 --OK---
DIC>
```

exd3-plot

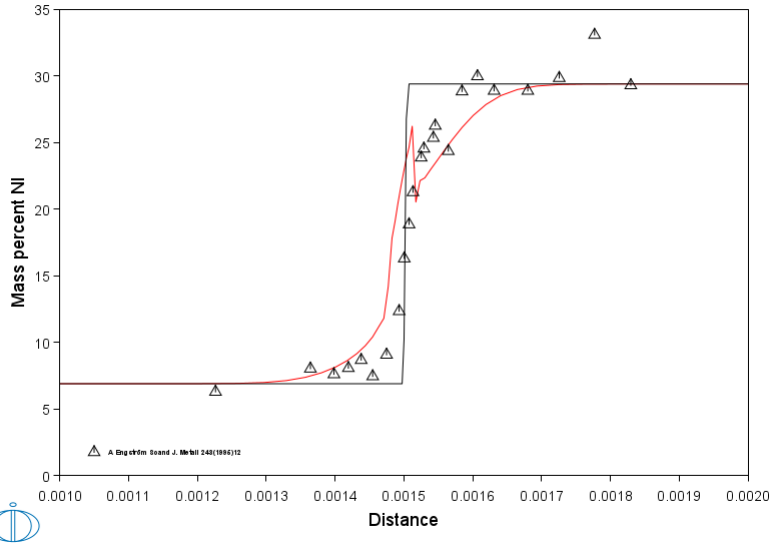
```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exd3\plot.DCM.test"
DIC>
DIC>
DIC> @@ exd3_plot.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR GENERATING GRAPHICAL OUTPUT FOR EXAMPLE d3
DIC> @@
DIC> @@ ENTER THE DICTRA MODULE AND SPECIFY THE STORE-RESULT FILE
DIC> @@
DIC>
DIC> go d-m
 TIME STEP AT TIME  3.60000E+05
DIC> read  exd3
 OK
DIC>
DIC> @@
DIC> @@ ENTER THE DICTRA POST PROCESSOR
DIC> @@
DIC> post
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1:
POST-1: @@
POST-1: @@ First study the composition profiles of Cr and Ni
POST-1: @@
POST-1: s-d-a x distance global
  INFO: Distance is set as independent variable
POST-1: s-d-a y w-p Cr
POST-1: s-p-c time 0 360000
POST-1: set-tit Figure D3.1
POST-1:
POST-1: app yes k5k7cr.exp 0; 1
POST-1:
POST-1: s-s-s x n 1e-3 2e-3
POST-1:
POST-1: s-s-s y n 20 45
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 3
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

Figure D3.1



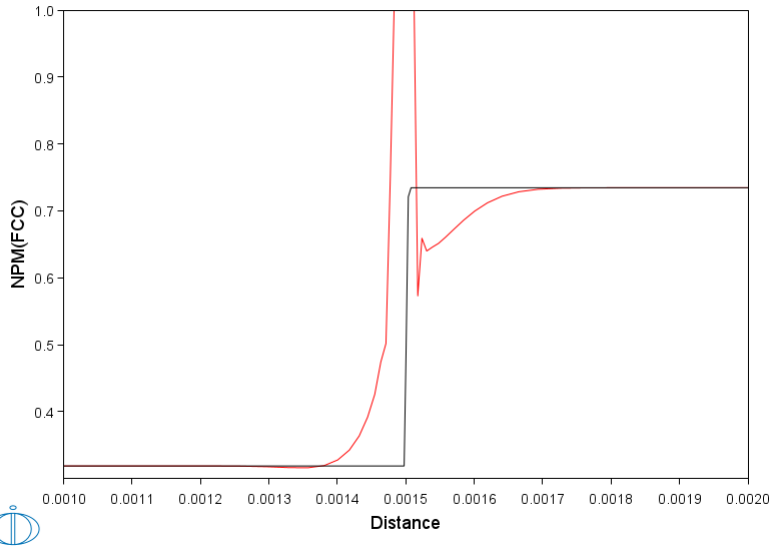

```
POST-1:
POST-1:
POST-1:@?<_hit_return_to_continue_>
POST-1: s-d-a y w-p Ni
POST-1: set-tit Figure D3.2
POST-1:
POST-1: app yes k5k7ni.exp 0; 1
POST-1:
POST-1: s-s-s y n 0 35
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 3
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

Figure D3.2



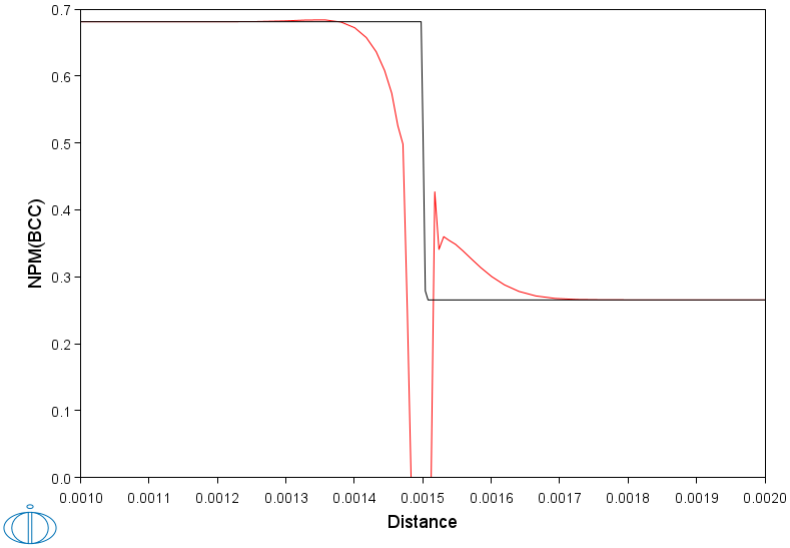

```
POST-1:
POST-1:@?<_hit_return_to_continue_>
POST-1: @@
POST-1: @@ Then study the amount of FCC and BCC
POST-1: @@
POST-1: app no
POST-1: s-d-a y npm(fcc)
POST-1: set-tit Figure D3.3
POST-1:
POST-1: SET_EXP_FILE_FORMAT 3
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

Figure D3.3



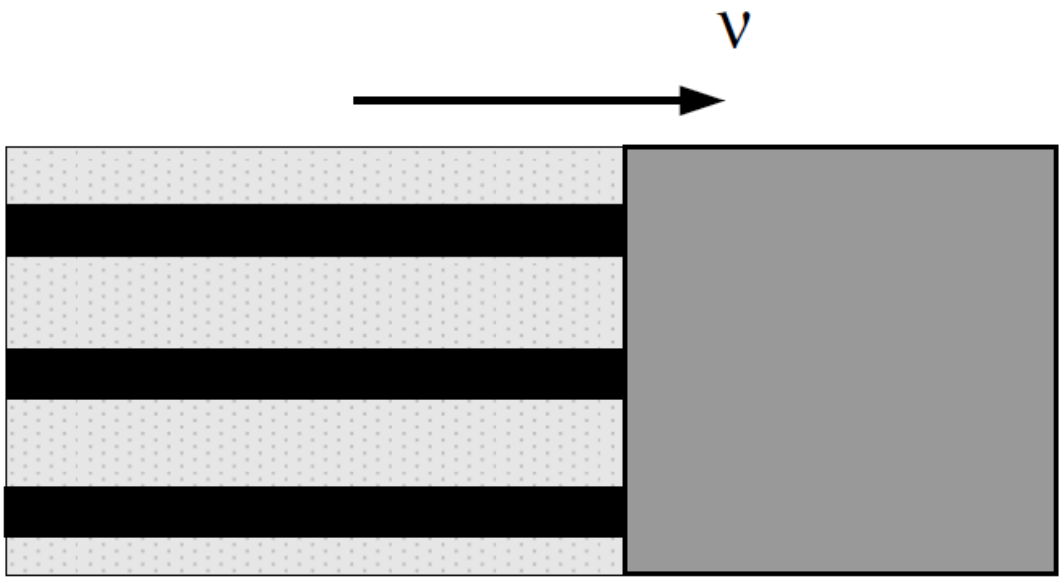

```
POST-1:
POST-1:@?<_hit_return_to_continue_>
POST-1: s-d-a y npm(bcc)
POST-1: set-tit Figure D3.4
POST-1:
POST-1: SET_EXP_FILE_FORMAT 3
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

Figure D3.4




```
POST-1:
POST-1:
POST-1: set-interactive
 --OK---
POST-1:
```

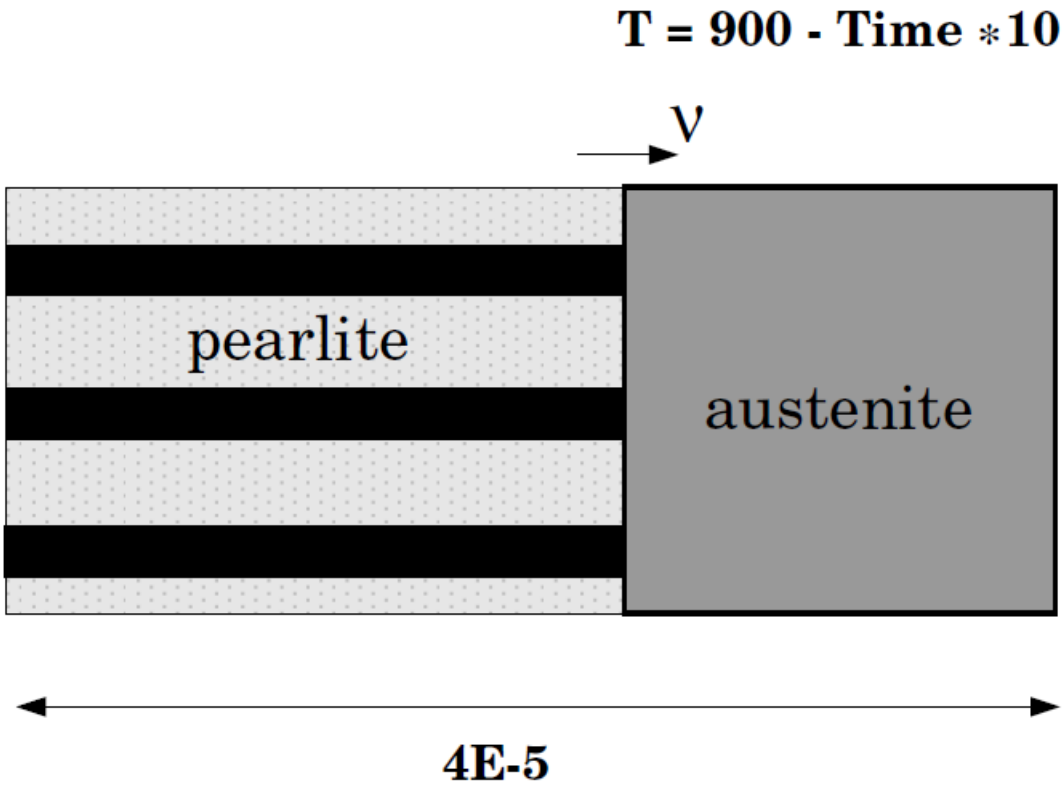
Cooperative Growth



Example exe1

Growth of pearlite in an Fe-Mn-C alloy

This is an example of pearlite growth in an Fe-0.50wt%C - 0.91wt%Mn steel.



exe1-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exe1\setup.DCM.test"
SYS: ï»¿@@
 NO SUCH COMMAND, USE HELP
SYS: @@ Cooperative growth.
SYS: @@ Growth of pearlite in an Fe-Mn-C alloy
SYS: @@ An example of pearlite growth in an Fe-0.50wt%C-0.91wt%Mn steel.
SYS: @@----------------------------------------------------------------------
SYS:
SYS: @@ exe1_setup.DCM
SYS:
SYS:
SYS: @@
SYS: @@ RETRIEVE DATA FROM THE DATABASE
SYS: @@
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                     /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12: sw FEDEMO
 Current database: Iron Demo Database v6.0

 VA                     /-  DEFINED
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ DEFINE THE SYSTEM
TDB_FEDEMO: @@
TDB_FEDEMO: def-sys fe c mn
 FE                     C                      MN
   DEFINED
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ KEEP ONLY THE AUSTENITE, FERRITE AND CEMENTITE PHASES
TDB_FEDEMO: @@
TDB_FEDEMO: rej-ph /all
 GAS:G                  LIQUID:L               BCC_A2
 C14_LAVES              CBCC_A12               CEMENTITE_D011
 CUB_A13                DIAMOND_A4             FCC_A1
 GRAPHITE_A9            HCP_A3                 KSI_CARBIDE
 M23C6_D84              M5C2                   M7C3_D101
   REJECTED
TDB_FEDEMO: rest-ph fcc,bcc,cem
 FCC_A1                 BCC_A2                 CEMENTITE_D011
   RESTORED
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ GET THE THERMODYNAMIC DATA
TDB_FEDEMO: @@
TDB_FEDEMO: get
11:52:53,200 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ APPEND THE KINETIC DATA FROM THE MOBILITY DATABASE
TDB_FEDEMO: @@
TDB_FEDEMO: append mfedemo
 Current database: Fe-Alloys Mobility demo database v5.0

 VA  DEFINED
APP: def-sys fe c mn
 FE                     C                      MN
   DEFINED
APP: rej-ph /all
 BCC_A2                 FCC_A1                 CEMENTITE_D011
 LIQUID:L  REJECTED
APP: rest-ph bcc,fcc,cem
 BCC_A2                 FCC_A1                 CEMENTITE_D011
   RESTORED
APP: get
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
APP:
APP: @@
APP: @@ ALL THE THERMODYNAMIC AND KINETIC DATA HAVE BEEN RETRIEVED.
APP: @@ GO TO THE DICTRA MONITOR TO SET UP YOUR PROBLEM.
APP: @@
```

```
APP: go d-m
 NO TIME STEP DEFINED
DIC>
DIC> @@
DIC> @@ SET THE CONDITION FOR TEMPERATURE
DIC> @@
DIC> set-cond glob t 0 900-time*10; * n
DIC>
DIC> @@
DIC> @@ ENTER A REGION
DIC> @@
DIC> enter-reg pearlite
DIC>
DIC> @@
DIC> @@ ENTER A SMALL INITIAL SIZE OF THE GRID IN THE 'PEARLITE' REGION
DIC> @@
DIC> enter-grid pearlite 5e-10 lin 5
DIC>
DIC> @@
DIC> @@ ENTER INTO THE 'PEARLITE' REGION THE PHASES 'BCC' AND 'CEM' AND SPECIFY
DIC> @@ THAT ARE PRESENT IN THE FORM OF A 'LAMELLAR AGGREGATE. SET THE STATUS
DIC> @@ TO 'ACTIVE'. SEVERAL PROMPTS FOLLOW ABOUT THE VALUES OF THE PARAMETERS
DIC> @@ IN THE PEARLITE GROWTH MODEL, FOR EXAMPLE AS SURFACE TENSION, OPTIMUM
DIC> @@ GROWTH RATE FACTOR, AND BOUNDARY DIFFUSION COEFFICIENTS.
DIC> @@
DIC> @@ CARBON(C) IS TREATED IN A SPECIAL WAY. IF 'AUTOMATIC' IS ENTERED
DIC> @@ THE DIFFUSION OF C IS CALCULATED ACCORDING TO AN EQUATION FOR
DIC> @@ MIXED BOUNDARY AND VOLUME DIFFUSION. YOU CAN CHOOSE BETWEEN
DIC> @@ MANUAL OR AUTOMATIC START VALUES FOR ALL VARIABLES EXCEPT THE GROWTH
DIC> @@ RATE. IN THIS EXAMPLE WE WILL TRY 1E-6
DIC> @@
DIC> @@ FOR MORE INFORMATION ABOUT THE PEARLITE GROWTH MODEL SEE
DIC> @@ B. JÄ-NSSON: TRITA-MAC-0478, 1992 (ROYAL INSTITUTE OF TECHNOLOGY)
DIC> @@ STOCKHOLM, SWEDEN, 1992.
DIC> @@
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: active
REGION NAME : /PEARLITE/: pearlite
PHASE TYPE /MATRIX/: lam
      Eutectiod reaction is "GAMMA" ==> "ALPHA" + "BETA"
 Enter name of "ALPHA" phase /BCC_A2/: bcc_a2
 Enter name of "BETA" phase /CEMENTITE/: cementite
 Enter name of "GAMMA" phase /FCC_A1/: fcc_a1
 Enter "ALPHA"/"BETA" surface tension
LOW TIME LIMIT /0/: 0
 Surface tension(T,P,TIME)= 1;
HIGH TIME LIMIT /*/: 1000
ANY MORE RANGES /N/: N
 Enter "ALPHA"/"GAMMA" surface tension
LOW TIME LIMIT /0/: 0
 Surface tension(T,P,TIME)= 1;
HIGH TIME LIMIT /*/: 1000
ANY MORE RANGES /N/: N
 Enter "BETA"/"GAMMA" surface tension
LOW TIME LIMIT /0/: 0
 Surface tension(T,P,TIME)= 1;
HIGH TIME LIMIT /*/: 1000
ANY MORE RANGES /N/: N
 Optimum growth condition factor /2/: 2
 Name of dependent element /FE/: fe
 INPUT OF DIFFUSION DATA
   Growth model (VOLUME/BOUNDARY/KIRKALDY) for element C /BOUNDARY/: boundary
     DF(C) = /value/AUTOMATIC/MIXED/: auto
   Growth model (VOLUME/BOUNDARY/KIRKALDY) for element MN /BOUNDARY/: boundary
     DF(MN) = /value/MIXED/: 5.4e-14
     DQ(MN): 155000
 Automatic start values for the S0 determination /Y/: Y
 Growth rate V: 1E-6
 Automatic start values on other variables /Y/: Y
DIC>
DIC> @@
DIC> @@ INITIATE THE COMPOSITION RECORDS FOR THE 'PEARLITE'
DIC> @@
DIC> enter-composition
REGION NAME : /PEARLITE/: pearlite
DIC>
DIC> @@
DIC> @@ NOW CONTINUE BY DEFINING A MATRIX PHASE INTO WHICH THE PEARLITE
DIC> @@ WILL GROW. START BY ENTERING A REGION NAME, 'AUSTENITE'
DIC> @@
DIC> enter-region austenite
ATTACH TO REGION NAMED /PEARLITE/:
ATTACHED TO THE RIGHT OF PEARLITE /YES/:
DIC> @@
DIC> @@ SPECIFY WHAT PHASE 'FCC' WILL BE PRESENT IN THE 'AUSTENITE' REGION
DIC> @@ AND WHAT TYPE OF PHASE 'MATRIX' IT IS AND ITS INITIAL STATE 'ACTIVE'
DIC> @@
DIC> enter-phase act austenite matrix fcc
DIC>
DIC> @@
DIC> @@ WE ALSO NEED TO HAVE A SPATIAL GRID IN THE 'AUSTENITE' REGION.
DIC> @@ CHOSE SIZE '4E-5' GRIDTYPE 'GEOMETRICAL', '30' GRIDPOINTS AND '1.5'
DIC> @@ AS VALUES FOR THE GEOMETRICAL FACTOR OF THE GRID.
DIC> @@
DIC> enter-grid austenite 4e-5 geo 30 1.5
DIC>
DIC>
DIC>
DIC> @@
DIC> @@ ENTER THE INITIAL CONCENTRATION PROFILES IN THE 'FCC' PHASE OF THE
DIC> @@ 'AUSTENITE' REGION. CONCENTRATIONS MUST BE GIVEN IN Y-FRACTIONS.
DIC> @@
DIC> enter-composition
REGION NAME : /AUSTENITE/: austenite
PHASE NAME: /FCC_A1/: fcc
DEPENDENT COMPONENT ? /MN/: fe
COMPOSITION TYPE /MOLE_FRACTION/: site-fraction
 PROFILE FOR MN
TYPE /LINEAR/: lin 9.29232973E-3 9.29232973E-3
 PROFILE FOR C
```

```
TYPE /LINEAR/: lin 2.3384332E-2 2.3384332E-2
DIC>
DIC> @@
DIC> @@ THE MATRIX PHASE IS NOW COMPLETE.
DIC> @@
DIC>
DIC> @@
DIC> @@ SPECIFY A SPHERICAL '2' GEOMETRY
DIC> @@
DIC> enter-geo 2
DIC>
DIC> @@
DIC> @@ SET THE SIMULATION TIME
DIC> @@
DIC> set-simulation-time
END TIME FOR INTEGRATION /.1/: 5
AUTOMATIC TIMESTEP CONTROL /YES/: YES
MAX TIMESTEP DURING INTEGRATION /.5/: 0.1
INITIAL TIMESTEP : /1E-07/:
SMALLEST ACCEPTABLE TIMESTEP : /1E-07/:
DIC>
DIC> @@
DIC> @@ SAVE THE SET UP TO A NEW STORE FILE AND EXIT
DIC> @@
DIC> save exe1 Y
DIC>
DIC> set-inter
 --OK---
DIC>
```

exe1-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exe1\run.DCM.test"
DIC>
DIC>
DIC> @@ exe1_run.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR RUNNING EXAMPLE e1
DIC> @@
DIC>
DIC> @@
DIC> @@ ENTER THE DICTRA MONITOR
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  0.00000E+00
DIC>
DIC> @@
DIC> @@ READ SETUP FROM FILE
DIC> @@
DIC> read exe1
 OK
DIC>
DIC> @@
DIC> @@ START THE SIMULATION
DIC> @@
DIC> simulate
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 DEGREE OF IMPLICITY SET TO TRAPEZOIDAL RULE
  Trying old scheme                  4
 U-FRACTION IN SYSTEM:  C = .0233843320030518  FE = .990707670399293
                        MN = .0092923297312127
 TOTAL SIZE OF SYSTEM:  2.68092626329E-13 [m^3]
 U-FRACTION IN SYSTEM:  C = .0233843320030518  FE = .990707670399293
                        MN = .0092923297312127
 TOTAL SIZE OF SYSTEM:  2.68092626329E-13 [m^3]
  17  GRIDPOINT(S) ADDED   TO   CELL #1   REGION: AUSTENITE
 TIME =  0.10000000E-06 DT =  0.10000000E-06 SUM OF SQUARES =   0.0000000
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.77954874E-05 AND   0.77954874E-05
 POSITION OF INTERFACE PEARLITE / AUSTENITE IS   0.50077955E-09
 U-FRACTION IN SYSTEM:  C = .0233843320030518  FE = .990707670399295
                        MN = .00929232973121271
 TOTAL SIZE OF SYSTEM:  2.68092626329E-13 [m^3]
  11  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: AUSTENITE

  CPU time used in timestep                   1  seconds
  4  GRIDPOINT(S) ADDED   TO   CELL #1   REGION: AUSTENITE
 TIME =  0.10010000E-03 DT =  0.10000000E-03 SUM OF SQUARES =   0.0000000
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.77957281E-05 AND   0.77957281E-05
 POSITION OF INTERFACE PEARLITE / AUSTENITE IS   0.12803524E-08
 U-FRACTION IN SYSTEM:  C = .0233843320030518  FE = .990707670399295
                        MN = .00929232973121271
 TOTAL SIZE OF SYSTEM:  2.68092626329E-13 [m^3]
  CPU time used in timestep                   1  seconds
  3 GRIDPOINT(S) REMOVED FROM CELL#  1 REGION #  1
 TIME =  0.28379564E-02 DT =  0.27378564E-02 SUM OF SQUARES =   0.0000000
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.78023193E-05 AND   0.78023193E-05
 POSITION OF INTERFACE PEARLITE / AUSTENITE IS   0.22641982E-07
 U-FRACTION IN SYSTEM:  C = .0233843320030517  FE = .990707670399294
                        MN = .00929232973121271
 TOTAL SIZE OF SYSTEM:  2.68092626329E-13 [m^3]
  CPU time used in timestep                   0  seconds
  2 GRIDPOINT(S) REMOVED FROM CELL#  1 REGION #  1
 TIME =  0.83136692E-02 DT =  0.54757128E-02 SUM OF SQUARES =   0.0000000
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.78155078E-05 AND   0.78155078E-05
 POSITION OF INTERFACE PEARLITE / AUSTENITE IS   0.65437458E-07
 U-FRACTION IN SYSTEM:  C = .0233843320030517  FE = .990707670399294
                        MN = .0092923297312127
 TOTAL SIZE OF SYSTEM:  2.68092626329E-13 [m^3]
  CPU time used in timestep                   0  seconds
 TIME =  0.19265095E-01 DT =  0.10951426E-01 SUM OF SQUARES =   0.0000000
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.78419091E-05 AND   0.78419091E-05
 POSITION OF INTERFACE PEARLITE / AUSTENITE IS   0.15131754E-06
 U-FRACTION IN SYSTEM:  C = .0233843320030517  FE = .990707670399294
                        MN = .00929232973121269
 TOTAL SIZE OF SYSTEM:  2.68092626329E-13 [m^3]
  CPU time used in timestep                   0  seconds
 TIME =  0.41167946E-01 DT =  0.21902851E-01 SUM OF SQUARES =   0.0000000
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.78948085E-05 AND   0.78948085E-05
 POSITION OF INTERFACE PEARLITE / AUSTENITE IS   0.32423636E-06
 U-FRACTION IN SYSTEM:  C = .0233843320030517  FE = .990707670399294
                        MN = .00929232973121268
 TOTAL SIZE OF SYSTEM:  2.68092626329E-13 [m^3]
  CPU time used in timestep                   1  seconds
 TIME =  0.84973649E-01 DT =  0.43805702E-01 SUM OF SQUARES =   0.0000000
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.80009912E-05 AND   0.80009912E-05
 POSITION OF INTERFACE PEARLITE / AUSTENITE IS   0.67472540E-06
 U-FRACTION IN SYSTEM:  C = .0233843320030516  FE = .990707670399294
                        MN = .00929232973121268
 TOTAL SIZE OF SYSTEM:  2.68092626329E-13 [m^3]
  CPU time used in timestep                   0  seconds
  1 GRIDPOINT(S) REMOVED FROM CELL#  1 REGION #  1
 TIME =  0.17258505     DT =  0.87611405E-01 SUM OF SQUARES =   0.0000000
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.82148663E-05 AND   0.82148663E-05
 POSITION OF INTERFACE PEARLITE / AUSTENITE IS   0.13944414E-05
 U-FRACTION IN SYSTEM:  C = .0233843320030516  FE = .990707670399295
                        MN = .00929232973121267
 TOTAL SIZE OF SYSTEM:  2.68092626329E-13 [m^3]
  CPU time used in timestep                   0  seconds
 TIME =  0.27258505     DT =  0.10000000     SUM OF SQUARES =   0.0000000
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.84613797E-05 AND   0.84613797E-05
 POSITION OF INTERFACE PEARLITE / AUSTENITE IS   0.22405793E-05
 U-FRACTION IN SYSTEM:  C = .0233843320030516  FE = .990707670399295
                        MN = .00929232973121268
 TOTAL SIZE OF SYSTEM:  2.68092626329E-13 [m^3]
  CPU time used in timestep                   0  seconds
 TIME =  0.37258505     DT =  0.10000000     SUM OF SQUARES =   0.0000000
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.87103605E-05 AND   0.87103605E-05
 POSITION OF INTERFACE PEARLITE / AUSTENITE IS   0.31116154E-05
 U-FRACTION IN SYSTEM:  C = .0233843320030515  FE = .990707670399295
                        MN = .00929232973121271
```

```
 TOTAL SIZE OF SYSTEM:  2.68092626329E-13 [m^3]
  CPU time used in timestep                    0  seconds
  1 GRIDPOINT(S) REMOVED FROM CELL#  1 REGION #  1
 TIME =  0.47258505     DT =  0.10000000     SUM OF SQUARES =   0.0000000
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.89617178E-05 AND   0.89617178E-05
 POSITION OF INTERFACE PEARLITE / AUSTENITE IS   0.40077872E-05
 U-FRACTION IN SYSTEM:  C = .0233843320030515  FE = .990707670399294
                        MN = .00929232973121283
 TOTAL SIZE OF SYSTEM:  2.68092626329E-13 [m^3]
  CPU time used in timestep                    1  seconds
 TIME =  0.57258505     DT =  0.10000000     SUM OF SQUARES =   0.0000000


output ignored...



... output resumed

 WORKSPACE RECLAIMED
  INFO: CELL   1 REGION AUSTENITE   DELETED
 U-FRACTION IN SYSTEM:  C = .0233843320030517  FE = .99070767039931
                        MN = .0092923297311968
 TOTAL SIZE OF SYSTEM:  2.68082063572E-13 [m^3]
 U-FRACTION IN SYSTEM:  C = .0233843320030517  FE = .99070767039931
                        MN = .0092923297311968
 TOTAL SIZE OF SYSTEM:  2.68082063572E-13 [m^3]
 TIME =   3.2742064     DT =  0.10000000E-04 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0233843320030517  FE = .99070767039931
                        MN = .0092923297311968
 TOTAL SIZE OF SYSTEM:  2.68082063572E-13 [m^3]
  CPU time used in timestep                    0  seconds
 TIME =   3.2842064     DT =  0.10000000E-01 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0233843320030517  FE = .99070767039931
                        MN = .0092923297311968
 TOTAL SIZE OF SYSTEM:  2.68082063572E-13 [m^3]
  CPU time used in timestep                    0  seconds
 TIME =   3.3842064     DT =  0.10000000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0233843320030517  FE = .99070767039931
                        MN = .0092923297311968
 TOTAL SIZE OF SYSTEM:  2.68082063572E-13 [m^3]
  CPU time used in timestep                    0  seconds
 TIME =   3.4842064     DT =  0.10000000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0233843320030517  FE = .99070767039931
                        MN = .0092923297311968
 TOTAL SIZE OF SYSTEM:  2.68082063572E-13 [m^3]
  CPU time used in timestep                    0  seconds
 TIME =   3.5842064     DT =  0.10000000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0233843320030517  FE = .99070767039931
                        MN = .0092923297311968
 TOTAL SIZE OF SYSTEM:  2.68082063572E-13 [m^3]
  CPU time used in timestep                    0  seconds
 TIME =   3.6842064     DT =  0.10000000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0233843320030517  FE = .99070767039931
                        MN = .0092923297311968
 TOTAL SIZE OF SYSTEM:  2.68082063572E-13 [m^3]
  CPU time used in timestep                    0  seconds
 TIME =   3.7842064     DT =  0.10000000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0233843320030517  FE = .99070767039931
                        MN = .0092923297311968
 TOTAL SIZE OF SYSTEM:  2.68082063572E-13 [m^3]
  CPU time used in timestep                    0  seconds
 TIME =   3.8842064     DT =  0.10000000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0233843320030517  FE = .99070767039931
                        MN = .0092923297311968
 TOTAL SIZE OF SYSTEM:  2.68082063572E-13 [m^3]
  CPU time used in timestep                    0  seconds
 TIME =   3.9842064     DT =  0.10000000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0233843320030517  FE = .99070767039931
                        MN = .0092923297311968
 TOTAL SIZE OF SYSTEM:  2.68082063572E-13 [m^3]
  CPU time used in timestep                    0  seconds
 TIME =   4.0842064     DT =  0.10000000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0233843320030517  FE = .99070767039931
                        MN = .0092923297311968
 TOTAL SIZE OF SYSTEM:  2.68082063572E-13 [m^3]
  CPU time used in timestep                    0  seconds
 TIME =   4.1842064     DT =  0.10000000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0233843320030517  FE = .99070767039931
                        MN = .0092923297311968
 TOTAL SIZE OF SYSTEM:  2.68082063572E-13 [m^3]
  CPU time used in timestep                    0  seconds
 TIME =   4.2842064     DT =  0.10000000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0233843320030517  FE = .99070767039931
                        MN = .0092923297311968
 TOTAL SIZE OF SYSTEM:  2.68082063572E-13 [m^3]
  CPU time used in timestep                    0  seconds
 TIME =   4.3842064     DT =  0.10000000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0233843320030517  FE = .99070767039931
                        MN = .0092923297311968
 TOTAL SIZE OF SYSTEM:  2.68082063572E-13 [m^3]
  CPU time used in timestep                    0  seconds
 TIME =   4.4842064     DT =  0.10000000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0233843320030517  FE = .99070767039931
                        MN = .0092923297311968
 TOTAL SIZE OF SYSTEM:  2.68082063572E-13 [m^3]
  CPU time used in timestep                    0  seconds
 TIME =   4.5842064     DT =  0.10000000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0233843320030517  FE = .99070767039931
                        MN = .0092923297311968
 TOTAL SIZE OF SYSTEM:  2.68082063572E-13 [m^3]
  CPU time used in timestep                    0  seconds
 TIME =   4.6842064     DT =  0.10000000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0233843320030517  FE = .99070767039931
                        MN = .0092923297311968
 TOTAL SIZE OF SYSTEM:  2.68082063572E-13 [m^3]
  CPU time used in timestep                    0  seconds
 TIME =   4.7842064     DT =  0.10000000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0233843320030517  FE = .99070767039931
                        MN = .0092923297311968
 TOTAL SIZE OF SYSTEM:  2.68082063572E-13 [m^3]
  CPU time used in timestep                    0  seconds
 TIME =   4.8842064     DT =  0.10000000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .0233843320030517  FE = .99070767039931
                        MN = .0092923297311968
 TOTAL SIZE OF SYSTEM:  2.68082063572E-13 [m^3]
```

```
 CPU time used in timestep                    0  seconds
TIME =   4.9842064     DT =  0.10000000     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0233843320030517  FE = .99070767039931
                       MN = .0092923297311968
TOTAL SIZE OF SYSTEM:  2.68082063572E-13 [m^3]
 CPU time used in timestep                    0  seconds
TIME =   5.0000000     DT =  0.15793618E-01 SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  C = .0233843320030517  FE = .99070767039931
                       MN = .0092923297311968
TOTAL SIZE OF SYSTEM:  2.68082063572E-13 [m^3]
MUST SAVE WORKSPACE ON FILE
WORKSPACE SAVED ON FILE
RECLAIMING WORKSPACE
DELETING TIME-RECORD FOR TIME    3.2725851
DELETING TIME-RECORD FOR TIME    3.2741964
DELETING TIME-RECORD FOR TIME    3.2742064
DELETING TIME-RECORD FOR TIME    3.2842064
DELETING TIME-RECORD FOR TIME    3.3842064
DELETING TIME-RECORD FOR TIME    3.4842064
DELETING TIME-RECORD FOR TIME    3.5842064
DELETING TIME-RECORD FOR TIME    3.6842064
DELETING TIME-RECORD FOR TIME    3.7842064
DELETING TIME-RECORD FOR TIME    3.8842064
DELETING TIME-RECORD FOR TIME    3.9842064
DELETING TIME-RECORD FOR TIME    4.0842064
DELETING TIME-RECORD FOR TIME    4.1842064
DELETING TIME-RECORD FOR TIME    4.2842064
DELETING TIME-RECORD FOR TIME    4.3842064
DELETING TIME-RECORD FOR TIME    4.4842064
DELETING TIME-RECORD FOR TIME    4.5842064
DELETING TIME-RECORD FOR TIME    4.6842064
DELETING TIME-RECORD FOR TIME    4.7842064
DELETING TIME-RECORD FOR TIME    4.8842064

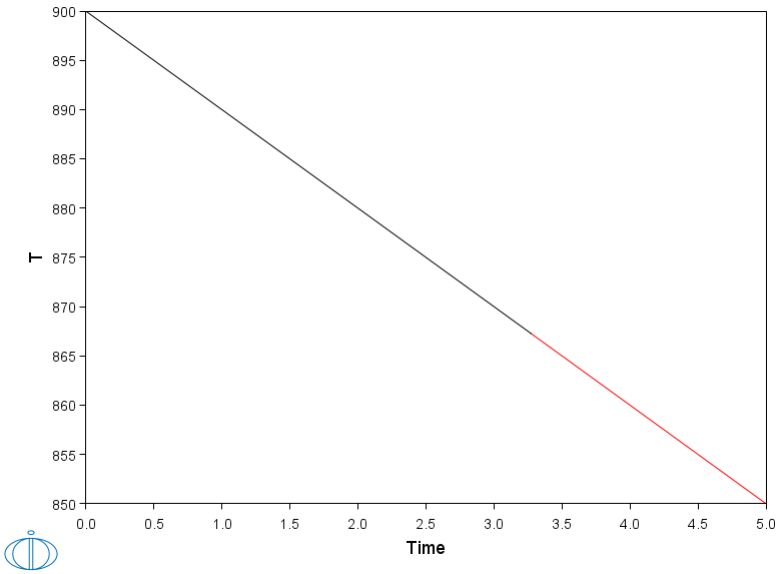
KEEPING TIME-RECORD FOR TIME    4.9842064
AND FOR TIME                    5.0000000
WORKSPACE RECLAIMED

TIMESTEP AT     5.00000000     SELECTED

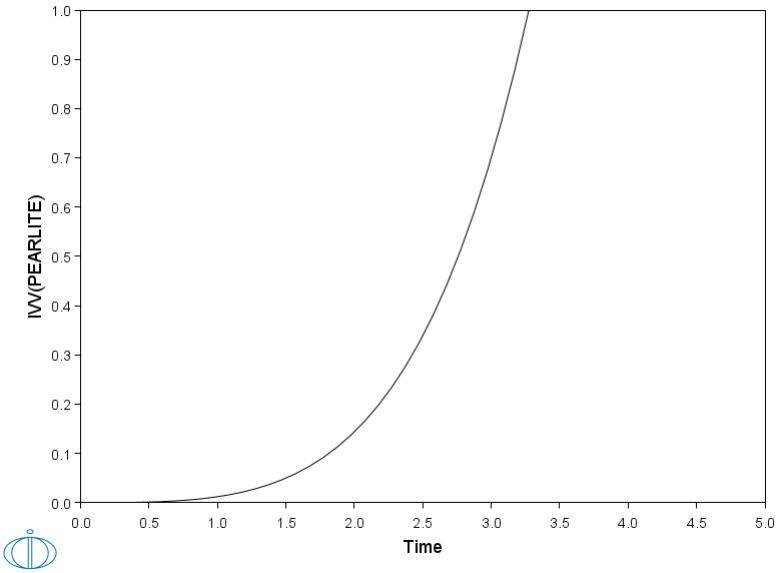
DIC>
DIC> @@
DIC> @@ THE SIMULATION IS FINISHED
DIC> @@
DIC>
DIC> set-inter
 --OK---
DIC>
```

exe1-plot

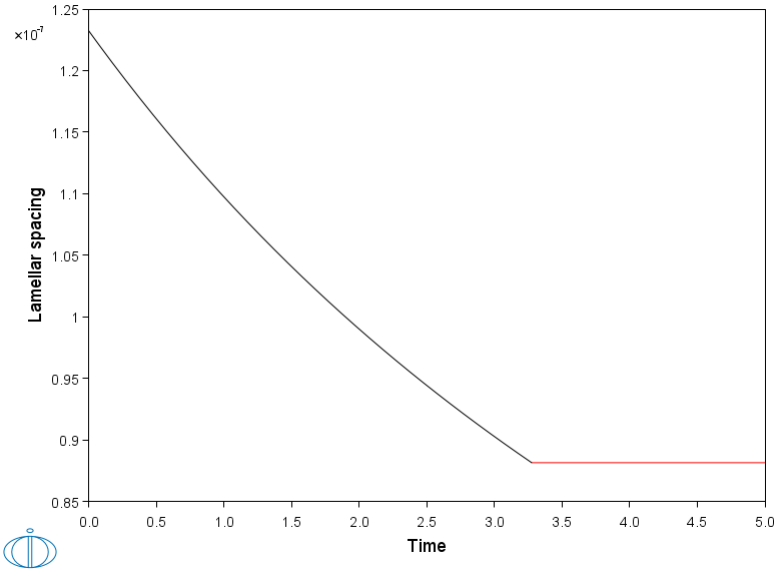
```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exe1\plot.DCM.test"
DIC>
DIC>
DIC> @@ exe1_plot.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR GENERATING GRAPHICAL OUTPUT FOR EXAMPLE e1
DIC> @@
DIC>
DIC> @@
DIC> @@ GO TO THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  5.00000E+00
DIC> read exe1
 OK
DIC>
DIC> @@
DIC> @@ GO TO THE POST PROCESSOR
DIC> @@
DIC> post
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1: @@
POST-1: @@ PLOT THE TEMPERATURE AS A FUNCTION OF TIME
POST-1: @@
POST-1: s-d-a x time
  INFO: Time is set as independent variable
POST-1: s-d-a y t
POST-1: s-p-c interface first
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 3
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
WORKING ...
WORKING ...           OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```



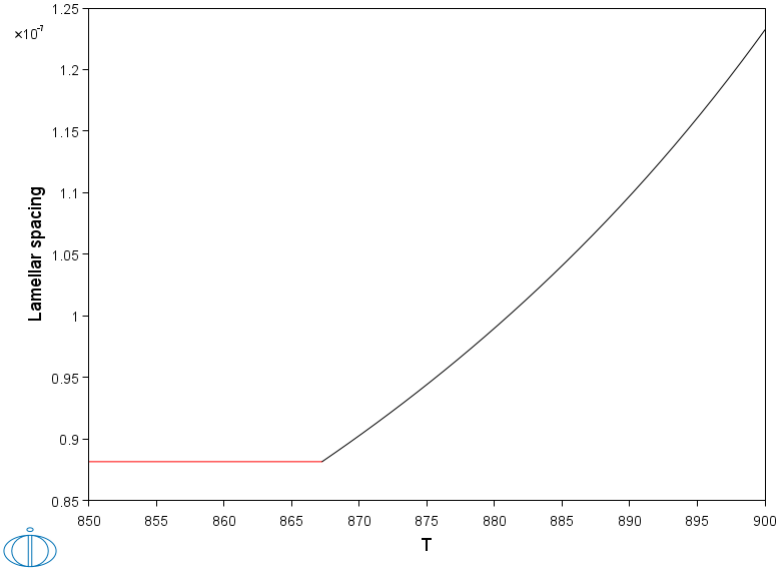

```
POST-1:
POST-1:
POST-1:
POST-1:Hit RETURN to continue
POST-1:
POST-1: @@
POST-1: @@ NOW PLOT THE FRACTION OF PEARLITE VS. TIME
POST-1: @@
POST-1: s-d-a y ivv(pearlite)
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 3
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
WORKING ...
WORKING ...           OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```



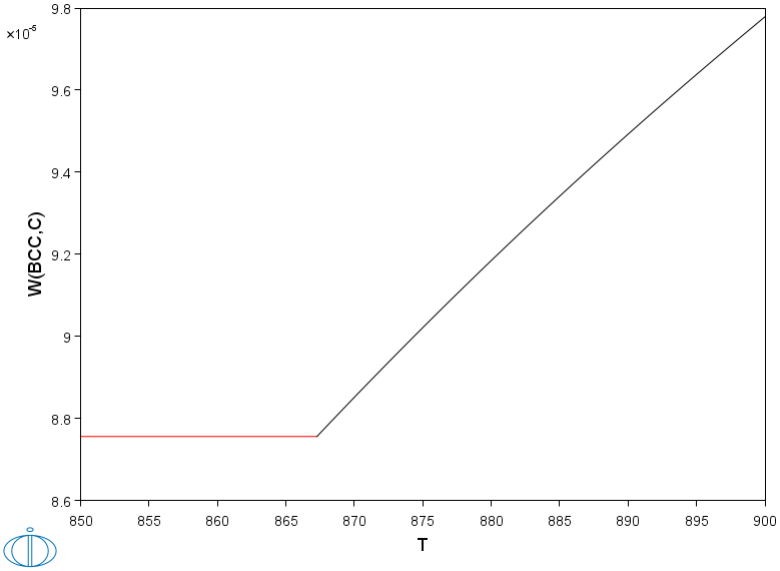

```
POST-1:
POST-1:
POST-1:
POST-1:Hit RETURN to continue
POST-1:
POST-1: @@
POST-1: @@ PLOT THE LAMELLAR SPACING AS A FUNCTION OF TIME
POST-1: @@
POST-1: s-d-a
AXIS (X, Y OR Z) : y
VARIABLE : lamellar-sp
IN REGION: /*/: pearlite
POST-1:
POST-1: s-p-c
CONDITION /INTEGRAL/: interface
INTERFACE : pearlite
UPPER OR LOWER INTERFACE OF REGION PEARLITE#1 /LOWER/: upper
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 3
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
WORKING ...
WORKING ...           OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```



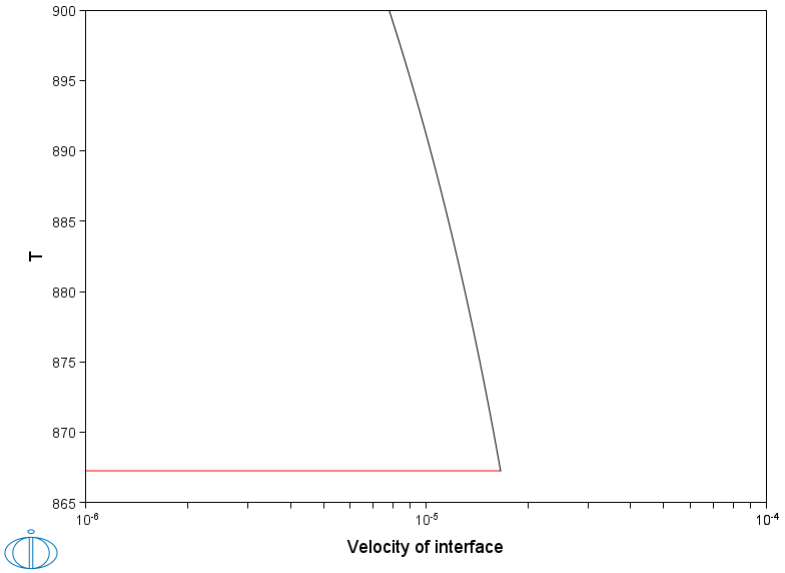

```
POST-1:
POST-1:
POST-1:
POST-1:Hit RETURN to continue
POST-1:
POST-1: @@
POST-1: @@ LET'S LOOK AT THE LAMELLAR SPACING VS. TEMPERATURE INSTEAD
POST-1: @@
POST-1: s-d-a x t
POST-1:
POST-1: s-p-c interface pearlite upper
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 3
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
WORKING ...
WORKING ...           OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```




```
POST-1:
POST-1:
POST-1:
POST-1:Hit RETURN to continue
POST-1:
POST-1: @@
POST-1: @@ AND THE C COMPOSITION IN THE FERRITE VS. TEMP
POST-1: @@
POST-1: s-d-a y w(bcc,c)
POST-1:
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 3
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
WORKING ...
WORKING ...           OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

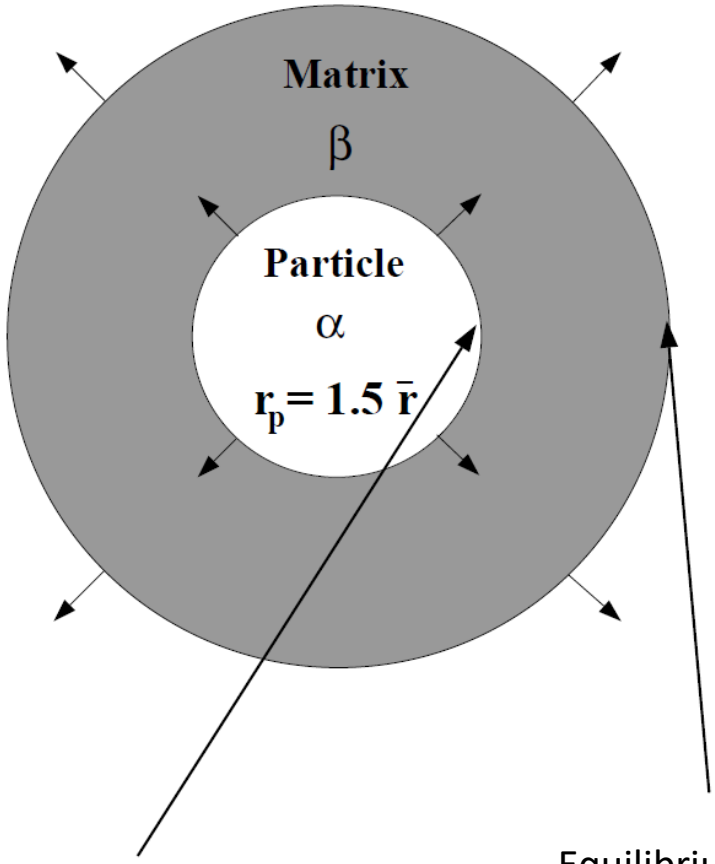



```
POST-1:
POST-1:
POST-1:
POST-1:Hit RETURN to continue
POST-1:
POST-1: @@
POST-1: @@ FINALLY, LET'S LOOK AT THE VELOCITY OF THE INTERFACE VS. TEMP
POST-1: @@
POST-1: s-d-a y t
POST-1: s-d-a x velocity
INTERFACE : pearlite
UPPER OR LOWER INTERFACE OF REGION PEARLITE#1 /LOWER/: upper
POST-1: set-ax-ty x log
POST-1: s-s-s x n 1e-6 1e-4
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 3
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
WORKING ...
WORKING ...           OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```




```
POST-1:
POST-1:
POST-1:
POST-1:Hit RETURN to continue
POST-1:
POST-1:
POST-1: set-inter
 --OK---
POST-1:
```

Coarsening



Moving phase interface with α and β in local equilibrium.

$\frac{2\sigma V_m}{r}$ Interfacial energy contribution for α phase

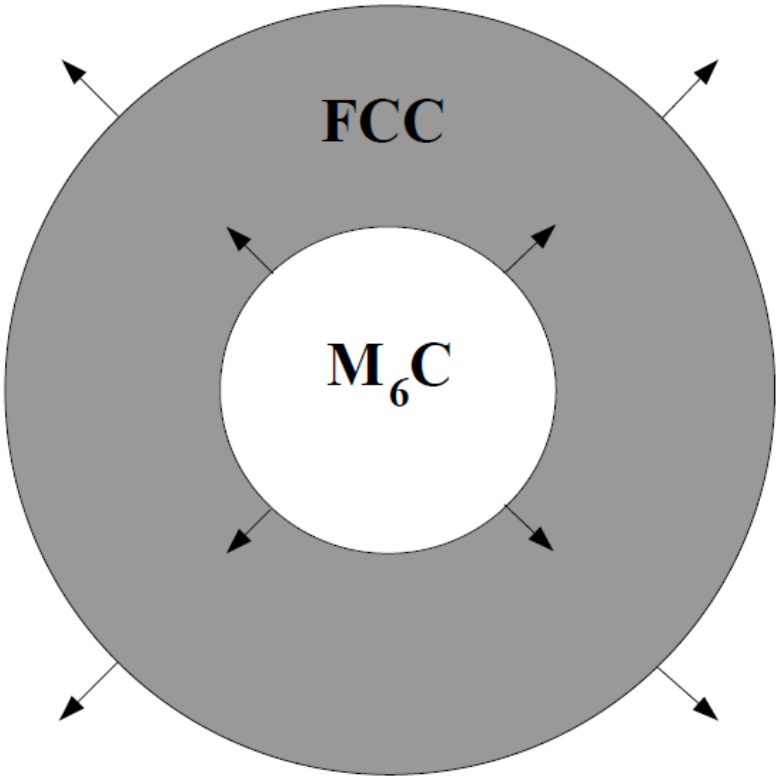
Equilibrium as defined by the average composition in the system.

$\frac{2\sigma V_m}{r_p}$ Interfacial energy contribution for α phase

Example exf1

Coarsening of an M_6C precipitate in an Fe-Mo-C alloy

This example calculates the Ostwald-ripening of a spherical M6C carbide in an austenite matrix.



T = 1173K **r_p = 0.228 μm**

exf1-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exf1\setup.DCM.test"
SYS: @@
SYS: @@ Coarsening problem.
SYS: @@ Coarsening of M6C precipitate in an Fe-Mo-C alloy
SYS: @@ This example calculates the Ostwald-ripening of a spherical
SYS: @@ M6C carbide in an austenite matrix.
SYS: @@------------------------------------------------------------------
SYS: @@
SYS: @@ RETRIEVE DATA FROM THE DATABASES
SYS: @@
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                       /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12: switch TCFE9
 Current database: Steels/Fe-Alloys  v9.3

 VA                       /-  DEFINED
 L12_FCC                  B2_BCC                   DICTRA_FCC_A1
   REJECTED
TDB_TCFE9: def-sys fe mo c
 FE                       MO                       C
   DEFINED
TDB_TCFE9: rej ph * all
 GAS:G                    LIQUID:L                 BCC_A2
 FCC_A1                   HCP_A3                   CBCC_A12
 CUB_A13                  DIAMOND_FCC_A4           GRAPHITE
 CEMENTITE                M23C6                    M7C3
 M6C                      M5C2                     M3C2
 MC_ETA                   MC_SHP                   KSI_CARBIDE
 Z_PHASE                  FE4N_LP1                 FECN_CHI
 SIGMA                    MU_PHASE                 P_PHASE
 R_PHASE                  CHI_A12                  LAVES_PHASE_C14
 AL5FE4  REJECTED
TDB_TCFE9: res ph fcc m6c
 FCC_A1                   M6C  RESTORED
TDB_TCFE9: get
11:55:56,082 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_TCFE9:
TDB_TCFE9: @@
TDB_TCFE9: @@ SWITCH TO A MOBILITY DATABASE TO RETRIEVE MOBILITY DATA
TDB_TCFE9: @@
TDB_TCFE9: app
 Use one of these databases

 TCFE12  =  Steels/Fe-Alloys  v12.0
 TCFE9   =  Steels/Fe-Alloys  v9.3
 SSUB6   =  SGTE Substances  v6.0
 FEDEMO  =  Iron Demo Database v6.0
 MOB2    =  Alloys Mobility  v2.7
 MOBFE7  =  Steels/Fe-Alloys Mobility  v7.1
 MOBFE4  =  Steels/Fe-Alloys Mobility  v4.0
 MOBFE2  =  Steels/Fe-Alloys Mobility  v2.0
 MFEDEMO =  Fe-Alloys Mobility demo database v5.0
 USER    =  User defined Database

DATABASE NAME /TCFE9/: mobfe4
 Current database: Steels/Fe-Alloys Mobility  v4.0

 VA  DEFINED
 B2_BCC  REJECTED
APP: def-sys fe mo c
 FE                       MO                       C
   DEFINED
APP: rej ph * all
 BCC_A2                   CEMENTITE                FCC_A1
 FE4N_LP1                 HCP_A3                   LIQUID:L
   REJECTED
APP: res ph fcc m6c
 *** ERROR M6C INPUT IGNORED
 FCC_A1  RESTORED
APP: get
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
APP:
```

```
APP:
APP: @@
APP: @@ ENTER THE DICTRA MONITOR
APP: @@
APP: go d-m
 NO TIME STEP DEFINED
 *** ENTERING M6C AS A DIFFUSION NONE PHASE
DIC>
DIC> @@
DIC> @@  ENTER THE GLOBAL CONDITION T
DIC> @@
DIC> s-cond glob t 0 1173; * N
DIC>
DIC> @@
DIC> @@ ENTER REGIONS part AND aus
DIC> @@
DIC> enter-region
REGION NAME : part
DIC> enter-region aus
ATTACH TO REGION NAMED /PART/:
ATTACHED TO THE RIGHT OF PART /YES/:
DIC> @@
DIC> @@ ENTER GEOMTRICAL GRIDS INTO THE REGIONS
DIC> @@
DIC>
DIC> @@
DIC> @@ THE INITIAL SIZE OF THE CARBIDE PARTICLE IS ASSUMED TO BE KNOWN
DIC> @@ (IN THIS CASE THE VALUE IS FROM NISHIZAWA ET. AL.).  THE
DIC> @@ AVERAGE PARTICLE SIZE IS ASSUMED TO BE 0.152E-6 METERS. HOWEVER, THE
DIC> @@ CALCULATIONS ARE PERFORMED ON A MAXIMUM SIZE PARTICLE, WHICH IS ASSUMED
DIC> @@ TO BE 1.5 TIMES THE AVERAGE SIZE. THE SURROUNDING AUSTENITIC MATRIX
DIC> @@ SIZE IS CHOOSEN TO MAINTAIN THE AVERAGE COMPOSITION.
DIC> @@
DIC> enter-grid
REGION NAME : /PART/: part
WIDTH OF REGION /1/: 0.228E-6
TYPE /AUTO/: AUTO
DIC>
DIC> enter-grid
REGION NAME : /AUS/: aus
WIDTH OF REGION /1/: 4.53147041E-7
TYPE /AUTO/: AUTO
DIC>
DIC> @@
DIC> @@ ENTER PHASES INTO REGIONS
DIC> @@
DIC> enter-phase active part matrix m6c
DIC>
DIC> enter-phase active aus matrix fcc#1
DIC>
DIC>
DIC> @@
DIC> @@ ENTER THE INITIAL COMPOSITIONS IN THE PHASES
DIC> @@
DIC> enter-composition
REGION NAME : /PART/: part
PHASE NAME: /M6C/: m6c
DEPENDENT COMPONENT ? /MO/: fe
COMPOSITION TYPE /MOLE_FRACTION/: w-f
PROFILE FOR /MO/: mo lin 6.20117E-01 6.20117E-01
DIC>
DIC> ent-composition
REGION NAME : /AUS/: aus
PHASE NAME: /FCC_A1/: fcc#1
DEPENDENT COMPONENT ? /MO/: fe
COMPOSITION TYPE /MOLE_FRACTION/: w-f
PROFILE FOR /C/: mo lin 1.82099E-02 1.82099E-02
PROFILE FOR /MO/: c lin 2.83351E-03 2.83351E-03
DIC>
DIC>
DIC> @@
DIC> @@ SET A SPHERICAL GEOMETRY
DIC> @@
DIC> ent-geo 2
DIC>
DIC> @@
DIC> @@ ENTER THE SURFACE TENSION ENERGY CONTRIBUTION AS A FUNCTION OF
DIC> @@ THE INTERFACE POSITION (THE RADIUS OF THE PARTICLE).
DIC> @@ ALSO ENTER THE MOLAR VOLUME OF THE PHASE CORRECTED TO BE THE
DIC> @@ MOLAR VOLUME PER SUBSTITIONAL ATOM.
DIC> @@
DIC> @@ THE SURFACE TENSION IS 0.7, THE MOLAR VOLUME IS 0.71 AND THE
DIC> @@ TRANSFORMATION TO MOLAR VOLUME PER SUBSTITIONAL ATOM IS 7/6.
DIC> @@
DIC> set-surf 2*0.7*0.71*(7/6)/X;
 ENTERED FUNCTION :2*.7*.71*7/6/X FOR CELL #1
DIC>
DIC>
DIC> @@
DIC> @@ ENABLE THE SIMPLIFIED MODEL FOR THE COARSENING (OSTWALD-RIPENING)
DIC> @@
DIC> coarse  YES
DIC>
DIC>
DIC> @@
DIC> @@ SET THE SIMULATION TIME AND OTHER SIMULATION PARAMETERS
DIC> @@
DIC> set-simulation-time 1E6
AUTOMATIC TIMESTEP CONTROL /YES/:
MAX TIMESTEP DURING INTEGRATION /100000/:
INITIAL TIMESTEP : /1E-07/:
SMALLEST ACCEPTABLE TIMESTEP : /1E-07/:
DIC>
DIC> @@
DIC> @@ SAVE THE SET UP TO A NEW STORE FILE AND EXIT
DIC> @@
DIC> save exf1 Y
DIC>
DIC> set-inter
 --OK---
```

exf1-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exf1\run.DCM.test"
DIC> @@ exf1_run.DCM
DIC>
DIC> @@
DIC> @@ READ THE SETUP FROM FILE AND START THE SIMULATION
DIC> @@
DIC>
DIC> go d-m
 TIME STEP AT TIME  0.00000E+00
 *** ENTERING M6C AS A DIFFUSION NONE PHASE
DIC> read exf1
 OK
DIC> sim
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 Region: PART
 geometric   0.833333     dense at   0.228000E-06   58 points
 Region: AUS
 geometric    1.07691     dense at    0.00000       50 points
 DEGREE OF IMPLICITY SET TO TRAPEZOIDAL RULE
  Trying old scheme                    4
 GENERATING STARTING VALUES FOR CELL #  1 INTERFACE #  2
 DETERMINING INITIAL EQUILIBRIUM VALUES
CALCULATING STARTING VALUES:       9   EQUILIBRIUM CALCULATIONS               DONE     6 OUT OF     9
 U-FRACTION IN SYSTEM:  C = .0190652843033664  FE = .970761291162784
                        MO = .0292387089677228
 TOTAL SIZE OF SYSTEM:  1.32376603026E-18 [m^3]
 U-FRACTION IN SYSTEM:  C = .0190652843033664  FE = .970761291162784
                        MO = .0292387089677228
 TOTAL SIZE OF SYSTEM:  1.32376603026E-18 [m^3]
 0.610221288327387        0.610389365807388        0.610221228974406        2.564831197908535E-002        2.192546511327313E-
003        1.277067173609035E-004        1.110179678784779E-003        1.288571314577660E-004        5.087173160806686E-
007        1.902418902601689E-009        2.197612096648792E-009        3.389027474958636E-009        1.612546345243502E-
009        1.467797643373012E-009        1.198076639424611E-009        3.893970602319582E-009        7.387100278506106E-
010        1.480396199523241E-010        5.533841114156213E-014        2.946908552531375E-019       TIME =  0.10000000E-06 DT =  0.10000000E-
06 SUM OF SQUARES =  0.25862773E-18
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.55596623E-05 AND  -0.55596623E-05
 POSITION OF INTERFACE PART / AUS IS   0.22799944E-06
 U-FRACTION IN SYSTEM:  C = .0190660674474617  FE = .970759033395948
                        MO = .0292409667345599
 TOTAL SIZE OF SYSTEM:  1.32375634647E-18 [m^3]
  CPU time used in timestep                   2  seconds
 7.336609395702361E-005        7.338112766796937E-005        7.335957986077687E-005        2.670017337733632E-007        6.229897846113647E-
012        5.809106788242061E-018       SWITCHING ACTIVITIES FOR INTERFACE #2, CELL #1
 FROM: C  TO: MO
 TIME =  0.30749847E-05 DT =  0.29749847E-05 SUM OF SQUARES =  0.58069418E-17
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.36288005E-08 AND  -0.36288005E-08
 POSITION OF INTERFACE PART / AUS IS   0.22799943E-06
 U-FRACTION IN SYSTEM:  C = .0190666386348136  FE = .970759027533689
                        MO = .0292409725968181
 TOTAL SIZE OF SYSTEM:  1.32375615844E-18 [m^3]
  CPU time used in timestep                   1  seconds
 2.185695935725712E-008        2.186215702306940E-008        2.172147907502082E-008        1.720547891277043E-008        1.693387714353585E-
008        1.641226441241974E-008        1.534483978746597E-008        1.534396904060139E-008        1.336039376009682E-
008        9.769677426896860E-009        4.289657206738150E-009        5.954565828722822E-017       TIME =  0.90249540E-05 DT =  0.59499693E-
05 SUM OF SQUARES =  0.56030240E-16
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.51121791E-09 AND  -0.51121791E-09
 POSITION OF INTERFACE PART / AUS IS   0.22799943E-06
 U-FRACTION IN SYSTEM:  C = .0190673192325636  FE = .970759026939536
                        MO = .0292409731909705
 TOTAL SIZE OF SYSTEM:  1.32375610546E-18 [m^3]
  CPU time used in timestep                   0  seconds
 3.601337570877803E-010        3.602091327258309E-010        3.672599051884091E-010        3.345891508837517E-010        3.339467367055687E-
010        3.326641619246723E-010        3.300915214299178E-010        3.304658819517889E-010        3.249906224476215E-
010        3.148938676185336E-010        2.951917189226764E-010        2.957352342338880E-010        2.576845607481219E-
010        1.903221382053056E-010        8.615110006894059E-011        8.655671033214816E-011        6.450748759292848E-
014        3.067095562661328E-024       TIME =  0.20924893E-04 DT =  0.11899939E-04 SUM OF SQUARES =  0.30255168E-23
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.10405533E-09 AND  -0.10405533E-09
 POSITION OF INTERFACE PART / AUS IS   0.22799943E-06
 U-FRACTION IN SYSTEM:  C = .0190682117489446  FE = .970759027552711
                        MO = .0292409725777964
 TOTAL SIZE OF SYSTEM:  1.32375608389E-18 [m^3]
  CPU time used in timestep                   1  seconds
 1.729121848651809E-011        1.729401856378472E-011        1.960792127235298E-011        1.202596976194040E-011

output ignored...



... output resumed

 2.982907503705085E-011        3.070100906912093E-011        3.506346397923557E-011        5.477200960854970E-013        3.033021441276810E-
021       TIME =   602219.69     DT =   100000.00     SUM OF SQUARES =  0.30060556E-20
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.22957235E-13 AND   0.22957235E-13
 POSITION OF INTERFACE PART / AUS IS   0.24250043E-06
 U-FRACTION IN SYSTEM:  C = .0195537038826586  FE = .970691149042916
                        MO = .0293088510875911
 TOTAL SIZE OF SYSTEM:  1.59273758793E-18 [m^3]
  27  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: PART
  26  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: AUS

  CPU time used in timestep                   0  seconds
 1.412413308027950E-011        1.460649001349409E-011        1.765314931007403E-011        1.164458062680449E-012        2.808415536120668E-
013        2.617491004750589E-022       TIME =   702219.69     DT =   100000.00     SUM OF SQUARES =  0.16604447E-21
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.22527562E-13 AND   0.22527562E-13
 POSITION OF INTERFACE PART / AUS IS   0.24475319E-06
 U-FRACTION IN SYSTEM:  C = .0195562807190153  FE = .970693005116594
                        MO = .0293069950139138
 TOTAL SIZE OF SYSTEM:  1.63753938042E-18 [m^3]
  26  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: PART
  26  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: AUS

  CPU time used in timestep                   1  seconds
 6.794236263390057E-012        6.975596047060683E-012        9.014730015688252E-012        1.950630360650007E-012        1.138878651285509E-
012        1.211029582666416E-013        4.023363645261999E-
023       TIME =   802219.69     DT =   100000.00     SUM OF SQUARES =  0.22394910E-24
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.22117446E-13 AND   0.22117446E-13
 POSITION OF INTERFACE PART / AUS IS   0.24696493E-06
 U-FRACTION IN SYSTEM:  C = .0195587789271634  FE = .970694791840553
                        MO = .0293052082899544
 TOTAL SIZE OF SYSTEM:  1.68233528236E-18 [m^3]
```

```
  25  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: PART
  25  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: AUS

  CPU time used in timestep                    0  seconds
 4.233431109250027E-012        4.186413591946464E-012        5.474903643955341E-012        2.862043336936544E-012        2.318953080738556E-
012        1.318033326884503E-012        1.432733061627653E-013        9.446084666324366E-
023       TIME =   902219.69     DT =   100000.00     SUM OF SQUARES =  0.42337303E-22
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.21725491E-13 AND   0.21725491E-13
 POSITION OF INTERFACE PART / AUS IS   0.24913748E-06
 U-FRACTION IN SYSTEM:  C = .0195612044532944  FE = .970696534228341
                        MO = .0293034659021655
 TOTAL SIZE OF SYSTEM:  1.72712548288E-18 [m^3]
  25  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: PART
  25  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: AUS

  CPU time used in timestep                    0  seconds
 4.669176704370716E-012        4.334721962902462E-012        4.662041474632528E-012        4.229634314006473E-012        3.695912589217737E-
012        2.667649539940000E-012        1.007430824352458E-012        7.827563365531985E-
022       TIME =   1000000.0     DT =   97780.306     SUM OF SQUARES =  0.34467205E-22
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.21354620E-13 AND   0.21354620E-13
 POSITION OF INTERFACE PART / AUS IS   0.25122554E-06
 U-FRACTION IN SYSTEM:  C = .0195635706991602  FE = .970698209337135
                        MO = .0293017907933725
 TOTAL SIZE OF SYSTEM:  1.77091640814E-18 [m^3]
 MUST SAVE WORKSPACE ON FILE
 WORKSPACE SAVED ON FILE
 RECLAIMING WORKSPACE
 DELETING TIME-RECORD FOR TIME    0.0000000
 DELETING TIME-RECORD FOR TIME   0.10000000E-06
 DELETING TIME-RECORD FOR TIME   0.30749847E-05
 DELETING TIME-RECORD FOR TIME   0.90249540E-05
 DELETING TIME-RECORD FOR TIME   0.20924893E-04
 DELETING TIME-RECORD FOR TIME   0.44724770E-04
 DELETING TIME-RECORD FOR TIME   0.92324524E-04
 DELETING TIME-RECORD FOR TIME   0.18752403E-03
 DELETING TIME-RECORD FOR TIME   0.37792305E-03
 DELETING TIME-RECORD FOR TIME   0.75872109E-03
 DELETING TIME-RECORD FOR TIME   0.15203172E-02
 DELETING TIME-RECORD FOR TIME   0.30435093E-02
 DELETING TIME-RECORD FOR TIME   0.60898936E-02
 DELETING TIME-RECORD FOR TIME   0.12182662E-01
 DELETING TIME-RECORD FOR TIME   0.24368199E-01
 DELETING TIME-RECORD FOR TIME   0.48739274E-01
 DELETING TIME-RECORD FOR TIME   0.97481422E-01
 DELETING TIME-RECORD FOR TIME   0.19496572
 DELETING TIME-RECORD FOR TIME   0.38993431
 DELETING TIME-RECORD FOR TIME   0.77987150
 DELETING TIME-RECORD FOR TIME    1.5597459
 DELETING TIME-RECORD FOR TIME    3.1194946
 DELETING TIME-RECORD FOR TIME    6.2389921
 DELETING TIME-RECORD FOR TIME    12.477987
 DELETING TIME-RECORD FOR TIME    24.955977
 DELETING TIME-RECORD FOR TIME    49.911957
 DELETING TIME-RECORD FOR TIME    99.823917
 DELETING TIME-RECORD FOR TIME    199.64784
 DELETING TIME-RECORD FOR TIME    399.29568
 DELETING TIME-RECORD FOR TIME    798.59136
 DELETING TIME-RECORD FOR TIME    1597.1827
 DELETING TIME-RECORD FOR TIME    3194.3654
 DELETING TIME-RECORD FOR TIME    6388.7309
 DELETING TIME-RECORD FOR TIME    12777.462
 DELETING TIME-RECORD FOR TIME    25554.924
 DELETING TIME-RECORD FOR TIME    51109.847
 DELETING TIME-RECORD FOR TIME    102219.69
 DELETING TIME-RECORD FOR TIME    202219.69
 DELETING TIME-RECORD FOR TIME    302219.69
 DELETING TIME-RECORD FOR TIME    402219.69
 DELETING TIME-RECORD FOR TIME    502219.69
 DELETING TIME-RECORD FOR TIME    602219.69
 DELETING TIME-RECORD FOR TIME    702219.69
 DELETING TIME-RECORD FOR TIME    802219.69

 KEEPING TIME-RECORD FOR TIME    902219.69
 AND FOR TIME                    1000000.0
 WORKSPACE RECLAIMED

 TIMESTEP AT     1000000.00     SELECTED

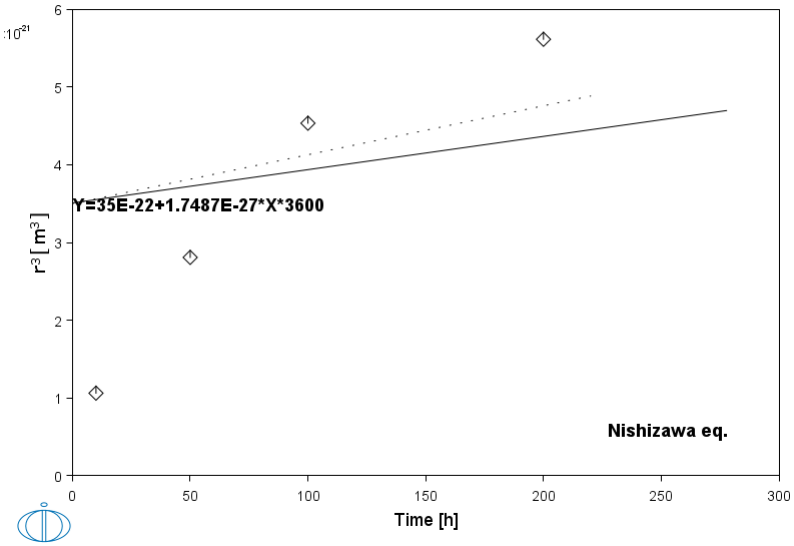
DIC>
DIC>
DIC> set-inter
 --OK---
DIC>
```

exf1-plot

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exf1\plot.DCM.test"
DIC> @@ exf1_plot.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR GENERATING GRAPHICAL OUTPUT FOR EXAMPLE f1
DIC> @@
DIC>
DIC> @@
DIC> @@ GO TO THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  1.00000E+06
 *** ENTERING M6C AS A DIFFUSION NONE PHASE
DIC> read exf1
 OK
DIC>
DIC> @@
DIC> @@ GO TO THE POST PROCESSOR
DIC> @@
DIC> post
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1: @@
POST-1: @@ PLOT THE AVERAGE PARTICLE SIZE (CUBED) AS THIS ASSUMED TO
POST-1: @@ SCALE LINEARLY WITH TIME. THEN A FUNCTION IS ENTERED SO
POST-1: @@ THIS QUANTITY CAN BE ACCESSED. WE ALSO WANT TO PLOT THIS
POST-1: @@ QUANTITY VERSUS TIME (IN HOURS) SO A FUNCTION IS ENTERED.
POST-1: @@
POST-1: enter-symbol func rr3=(poi(part,u)/1.5)**3;
POST-1: enter-symbol func hours=time/3600;
POST-1: s-d-a x hours
POST-1: s-d-a y rr3
POST-1:
POST-1: @@
POST-1: @@ AS WE ARE PLOTTING FUNCTIONS ON BOTH AXES WE MUST EXPLICITLY
POST-1: @@ DEFINE THE INDEPENDENT VARIABLE AND THE PLOT CONDITION
POST-1: @@
POST-1: s-ind time
POST-1: s-p-c inter
INTERFACE : part upper
POST-1:
POST-1:
POST-1: set-axis-text-status x n
AXIS TEXT : Time [h]
POST-1:
POST-1: @@
POST-1: @@ WHEN THIS IS PLOTTED, THIS AXIS TEXT NOTATION WORKS WELL FOR
POST-1: @@ THE AVERAGE RADIUS CUBED. FOR MORE INFORMATION ABOUT HOW TO
POST-1: @@ ADJUST TEXT IN THE POST PROCESSOR USING THE DATAPLOT LANGUAGE,
POST-1: @@ SEARCH THE ONLINE HELP (FROM THE MAIN MENU -> HELP > ONLINE HELP)
POST-1:
POST-1:
POST-1: set-axis-text-status y n
AXIS TEXT : \latex r^3\, [m^3]
POST-1:
POST-1:
POST-1: @@
POST-1: @@ COMPARE WITH EXPERIMENTAL DATA FROM NISHIZAWA ET AL.
POST-1: @@ TRANS. JPN. INST. MET. VOL. 22 1981 PP. 733-742.
POST-1: @@
POST-1:
POST-1: app y exf1.exp
PROLOGUE NUMBER: /0/: 0
DATASET NUMBER(s): /-1/: 1
POST-1:
POST-1: s-s-s y n 0 6e-21
POST-1:
POST-1: @@
POST-1: @@ SET A TITLE ON THE PLOT
POST-1: @@
POST-1: set-title Figure f1.1
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y

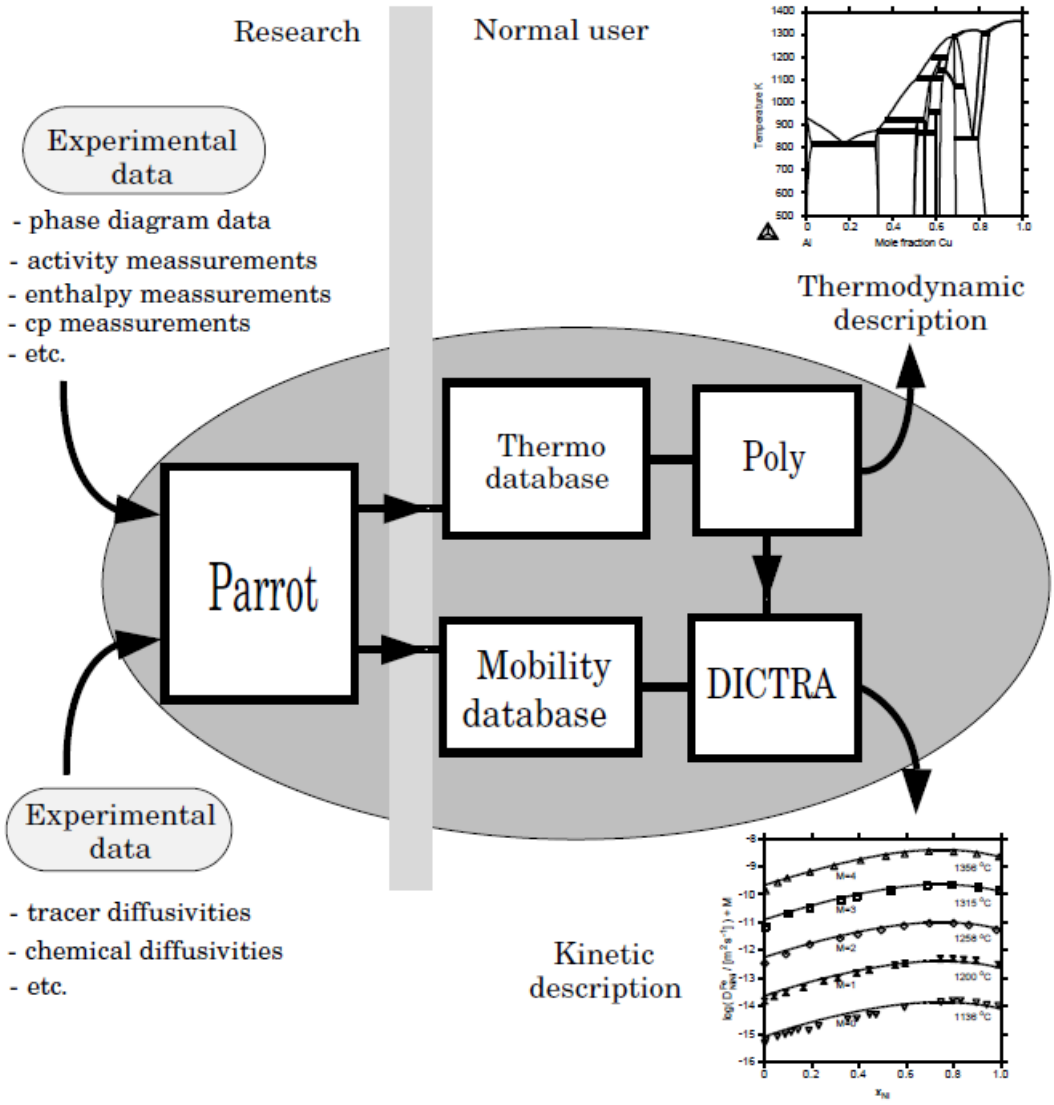
           OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

Figure f1.1




```
POST-1:
POST-1:@?<_hit_return_to_continue_>
POST-1: @@
POST-1: @@ THE DIFFENCE BETWEEN THE CALCULATION AND THE EQUATION USED BY
POST-1: @@ NISHIZAWA ET AL. IS MAINLY DUE TO DIFFERENT THERMODYNAMIC
POST-1: @@ DESCRIPTIONS AND DIFFUSIVITIES.
POST-1: @@
POST-1:
POST-1: set-inter
 --OK---
POST-1:
```

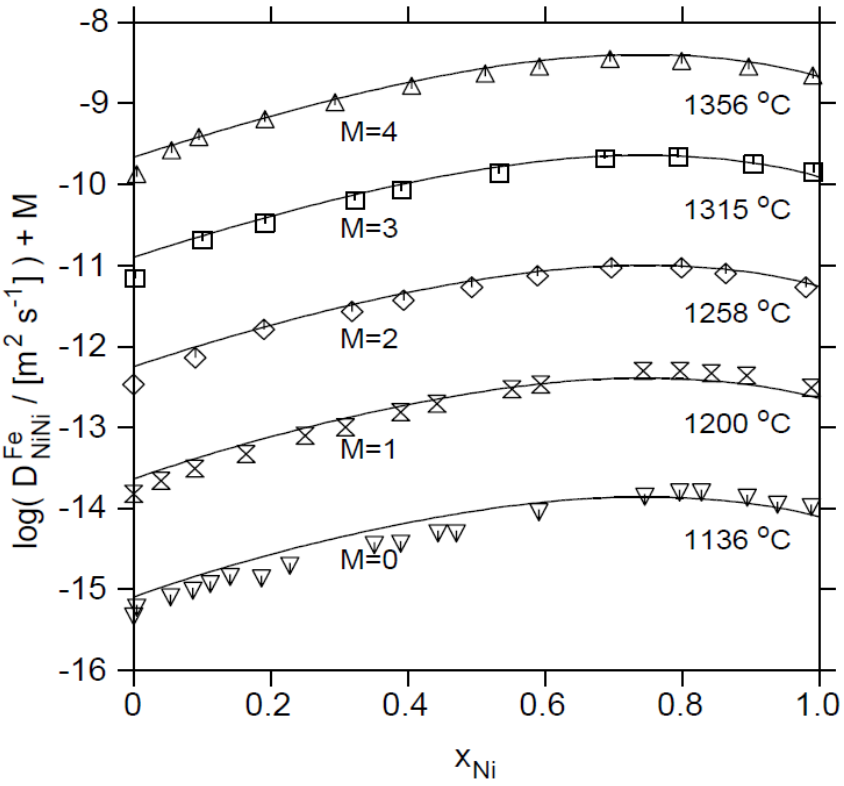
Kinetic Data



Example exg1

Checking diffusivities in an Fe-Ni alloy

This is an example file to check the mobilities and diffusivities in an Fe-Ni alloy.



exg1-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exg1\setup.DCM.test"
SYS: @@
SYS: @@ Kinetic data example.
SYS: @@ Checking mobilities and diffusivities in an Fe-Ni alloy
SYS: @@ This is an example file to check the mobilities and diffusivities
SYS: @@ in an Fe-Ni alloy.
SYS: @@----------------------------------------------------------------------
SYS:
SYS: @@ exg1_setup.DCM
SYS:
SYS: @@
SYS: @@ START BY GOING TO THE DATABASE MODULE
SYS: @@
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                       /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12:
TDB_TCFE12: @@
TDB_TCFE12: @@ SELECT A DATABASE FOR THERMODYNAMIC DATA
TDB_TCFE12: @@
TDB_TCFE12: sw fedemo
 Current database: Iron Demo Database v6.0

 VA                       /-  DEFINED
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ DEFINE THE SYSTEM TO WORK WITH
TDB_FEDEMO: @@
TDB_FEDEMO: def-sys fe ni
 FE                       NI  DEFINED
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ EXCLUDE THE THERMODYNAMIC DATA FOR THE PHASES THAT ARE NOT NEEDED
TDB_FEDEMO: @@
TDB_FEDEMO: rej ph * all
 GAS:G                    LIQUID:L                 BCC_A2
 C14_LAVES                CBCC_A12                 CUB_A13
 FCC_A1                   HCP_A3  REJECTED
TDB_FEDEMO: res ph fcc
 FCC_A1  RESTORED
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ RETRIEVE DATA FROM THE DATABASE FILE
TDB_FEDEMO: @@
TDB_FEDEMO: get
11:59:11,448 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ MOBILITY/DIFFUSIVITY DATA ARE STORED IN A SEPARATE DATABASE FILE.
TDB_FEDEMO: @@ SWITCH TO A MOBILITY DATABASE TO RETRIEVE DATA
TDB_FEDEMO: @@
TDB_FEDEMO: app
 Use one of these databases

 TCFE12  =  Steels/Fe-Alloys  v12.0
 TCFE9   =  Steels/Fe-Alloys  v9.3
 SSUB6   =  SGTE Substances  v6.0
 FEDEMO  =  Iron Demo Database v6.0
 MOB2    =  Alloys Mobility  v2.7
 MOBFE7  =  Steels/Fe-Alloys Mobility  v7.1
 MOBFE4  =  Steels/Fe-Alloys Mobility  v4.0
 MOBFE2  =  Steels/Fe-Alloys Mobility  v2.0
 MFEDEMO =  Fe-Alloys Mobility demo database v5.0
 USER    =  User defined Database

DATABASE NAME /FEDEMO/: mfedemo
 Current database: Fe-Alloys Mobility demo database v5.0

 VA  DEFINED
APP: def-sys fe ni
 FE                       NI  DEFINED
APP: rej ph * all
 BCC_A2                   FCC_A1                   LIQUID:L
   REJECTED
APP: res ph fcc
 FCC_A1  RESTORED
APP: get
 ELEMENTS .....
 SPECIES ......
 PHASES .......
```

```
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
APP:
APP: @@
APP: @@ ENTER THE DICTRA MONITOR WHERE THE SYSTEM IS SET UP
APP: @@
APP: go d-m
 NO TIME STEP DEFINED
DIC>
DIC> @@
DIC> @@ CHECK THE DIFFUSIVITES
DIC> @@
DIC> check-diffusion-matrix
OUTPUT TO SCREEN OR FILE /SCREEN/:
PHASE NAME : fcc
DEPENDENT COMPONENT ? /NI/: fe
CONCENTRATION OF NI IN U-FRACTION /1/: 0.3
Pressure /100000/: 101325
Temperature /298.15/: 1409
OPTION ( dlpbmx0ez or * ) /D/: dl

  Dkj (reduced n=FE)        [m2/s]
  k / j NI
  NI   +4.8614E-15

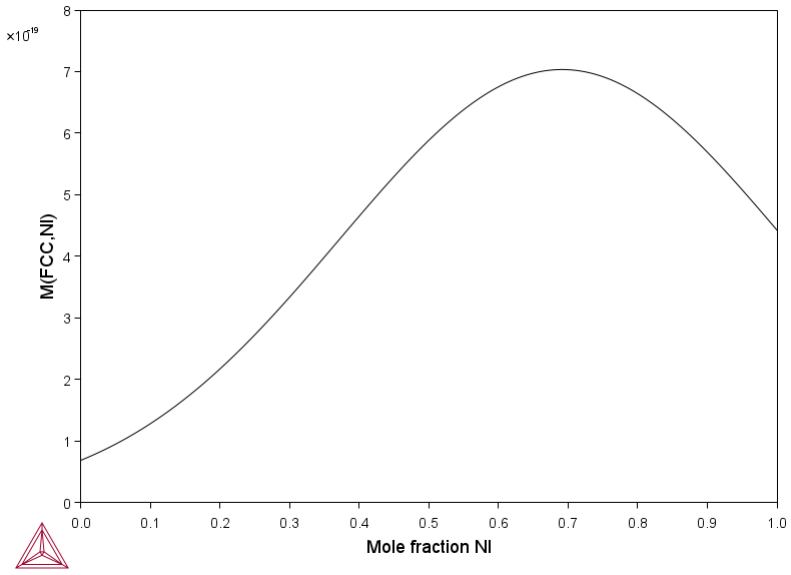
  L0kj        [(mole m2)/(J s)]
  k / j FE          NI
  FE   +3.7712E-19
  NI               +1.0011E-19


DIC>
DIC>
DIC>@?<Hit_return_to_continue>
DIC>
DIC> @@
DIC> @@ USE STEPPING IN POLY-3 TO CALCULATE THE DIFFUSIVITIES VS. COMPOSITION
DIC> @@
DIC> go p-3
POLY: s-c t=1409,p=101325,n=1,x(ni)=0.3
POLY: c-e
 Using global minimization procedure
Calculated           209 grid points in      0.024 s
Found the set of lowest grid points in       0.001 s
 Calculated solution in      0.029 s using 2 iterations. Total time      0.054  s
POLY:
POLY: s-a-v
Axis number: /1/: 1
Condition /NONE/: x(ni)
Min value /0/: 0
Max value /1/: 1
Increment /.025/: 1e-3
POLY:
POLY: step
Option? /NORMAL/: normal
 No initial equilibrium, using default
 Step will start from axis value   0.300000
...OK

 Phase Region from   0.300000     for:
    FCC_A1
 Global test at  3.08000E-01 .... OK
 Global test at  3.18000E-01 .... OK
 Global test at  3.28000E-01 .... OK
 Global test at  3.38000E-01 .... OK
 Global test at  3.48000E-01 .... OK
 Global test at  3.58000E-01 .... OK
 Global test at  3.68000E-01 .... OK
 Global test at  3.78000E-01 .... OK
 Global test at  3.88000E-01 .... OK
 Global test at  3.98000E-01 .... OK
 Global test at  4.08000E-01 .... OK
 Global test at  4.18000E-01 .... OK
 Global test at  4.28000E-01 .... OK
 Global test at  4.38000E-01 .... OK
 Global test at  4.48000E-01 .... OK
 Global test at  4.58000E-01 .... OK
 Global test at  4.68000E-01 .... OK
 Global test at  4.78000E-01 .... OK
 Global test at  4.88000E-01 .... OK
 Global test at  4.98000E-01 .... OK
 Global test at  5.08000E-01 .... OK
 Global test at  5.18000E-01 .... OK
 Global test at  5.28000E-01 .... OK
 Global test at  5.38000E-01 .... OK
 Global test at  5.48000E-01 .... OK
 Global test at  5.58000E-01 .... OK
 Global test at  5.68000E-01 .... OK
 Global test at  5.78000E-01 .... OK
 Global test at  5.88000E-01 .... OK
 Global test at  5.98000E-01 .... OK
 Global test at  6.08000E-01 .... OK
 Global test at  6.18000E-01 .... OK
 Global test at  6.28000E-01 .... OK
 Global test at  6.38000E-01 .... OK
 Global test at  6.48000E-01 .... OK
 Global test at  6.58000E-01 .... OK
 Global test at  6.68000E-01 .... OK
 Global test at  6.78000E-01 .... OK
 Global test at  6.88000E-01 .... OK
 Global test at  6.98000E-01 .... OK
 Global test at  7.08000E-01 .... OK
 Global test at  7.18000E-01 .... OK
 Global test at  7.28000E-01 .... OK
 Global test at  7.38000E-01 .... OK
 Global test at  7.48000E-01 .... OK
 Global test at  7.58000E-01 .... OK
 Global test at  7.68000E-01 .... OK
 Global test at  7.78000E-01 .... OK
 Global test at  7.88000E-01 .... OK
```

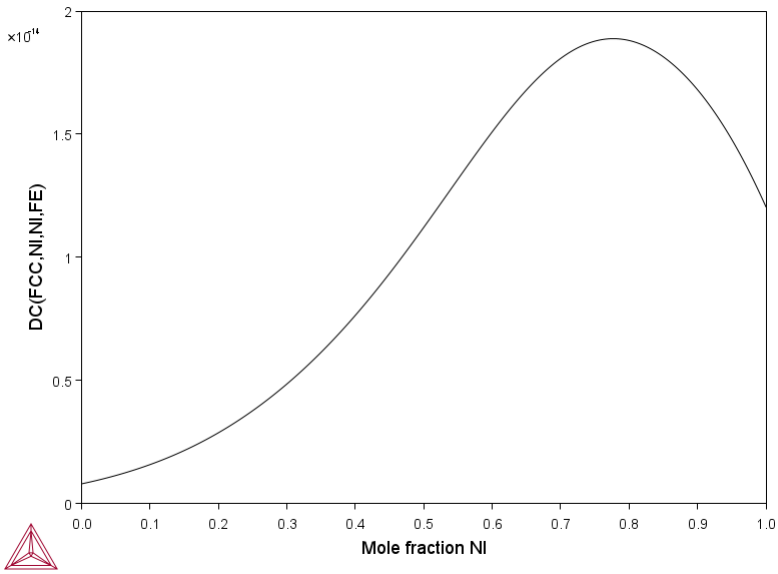
```
 Global test at  7.98000E-01 .... OK
 Global test at  8.08000E-01 .... OK
 Global test at  8.18000E-01 .... OK
 Global test at  8.28000E-01 .... OK
 Global test at  8.38000E-01 .... OK
 Global test at  8.48000E-01 .... OK
 Global test at  8.58000E-01 .... OK
 Global test at  8.68000E-01 .... OK
 Global test at  8.78000E-01 .... OK
 Global test at  8.88000E-01 .... OK
 Global test at  8.98000E-01 .... OK
 Global test at  9.08000E-01 .... OK
 Global test at  9.18000E-01 .... OK
 Global test at  9.28000E-01 .... OK
 Global test at  9.38000E-01 .... OK
 Global test at  9.48000E-01 .... OK
 Global test at  9.58000E-01 .... OK
 Global test at  9.68000E-01 .... OK
 Global test at  9.78000E-01 .... OK
 Global test at  9.88000E-01 .... OK
 Global test at  9.98000E-01 .... OK
 Terminating at    1.00000
 Calculated   703 equilibria

 Phase Region from   0.300000     for:
    FCC_A1
 Global test at  2.92000E-01 .... OK
 Global test at  2.82000E-01 .... OK
 Global test at  2.72000E-01 .... OK
 Global test at  2.62000E-01 .... OK
 Global test at  2.52000E-01 .... OK
 Global test at  2.42000E-01 .... OK
 Global test at  2.32000E-01 .... OK
 Global test at  2.22000E-01 .... OK
 Global test at  2.12000E-01 .... OK
 Global test at  2.02000E-01 .... OK
 Global test at  1.92000E-01 .... OK
 Global test at  1.82000E-01 .... OK
 Global test at  1.72000E-01 .... OK
 Global test at  1.62000E-01 .... OK
 Global test at  1.52000E-01 .... OK
 Global test at  1.42000E-01 .... OK
 Global test at  1.32000E-01 .... OK
 Global test at  1.22000E-01 .... OK
 Global test at  1.12000E-01 .... OK
 Global test at  1.02000E-01 .... OK
 Global test at  9.20000E-02 .... OK
 Global test at  8.20000E-02 .... OK
 Global test at  7.20000E-02 .... OK
 Global test at  6.20000E-02 .... OK
 Global test at  5.20000E-02 .... OK
 Global test at  4.20000E-02 .... OK
 Global test at  3.20000E-02 .... OK
 Global test at  2.20000E-02 .... OK
 Global test at  1.20000E-02 .... OK
 Global test at  2.00000E-03 .... OK
 Terminating at   0.100000E-11
 Calculated   303 equilibria
 *** Buffer saved on file: C:\Users\azureuser\AppData\Local\Temp\RESULT_002.POLY3
POLY:
POLY: @@
POLY: @@ ENTER THE POST PROCESSOR AND PLOT THE RESULT
POLY: @@
POLY: post
  POLY-3 POSTPROCESSOR VERSION 3.2
POST:
POST:
POST:
POST: @@
POST: @@ PLOT THE MOBILITY OF Ni VS. X(Ni)
POST: @@
POST: s-d-a y m(fcc,ni)
POST: s-d-a x m-f ni
POST:
POST:
POST: SET_EXP_FILE_FORMAT 5
POST: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST: SET_EXP_FILE_FORMAT 10
POST:
POST: plot
```

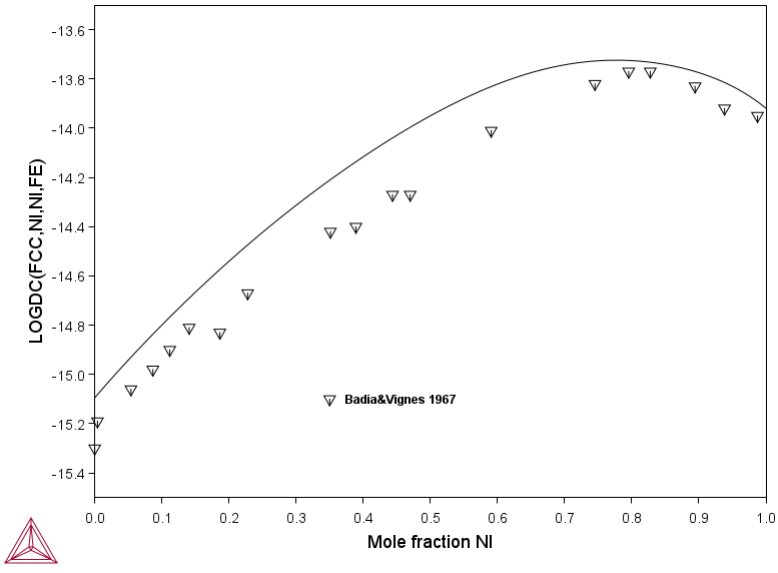



```
POST:
```

```
POST:
POST:
POST:@?<Hit_return_to_continue>
POST:
POST: @@
POST: @@ THEN PLOT THE DIFFUSIVITY OF Ni VS. X(Ni)
POST: @@
POST: s-d-a y dc(fcc,ni,ni,fe)
POST:
POST:
POST: SET_EXP_FILE_FORMAT 5
POST: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST: SET_EXP_FILE_FORMAT 10
POST:
POST: plot
```




```
POST:
POST:
POST:@?<Hit_return_to_continue>
POST:
POST: @@
POST: @@ PLOT THE LOGARITHM OF DC AND APPEND THE EXPERIMENTAL DATA
POST: @@
POST: s-d-a y logdc(fcc,ni,ni,fe)
POST:
POST: app y feni.exp
PROLOGUE NUMBER: /0/: 1
DATASET NUMBER(s): /-1/: 1
POST:
POST: s-s-s y n -15.5 -13.5
POST:
POST:
POST: SET_EXP_FILE_FORMAT 5
POST: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST: SET_EXP_FILE_FORMAT 10
POST:
POST: plot
```

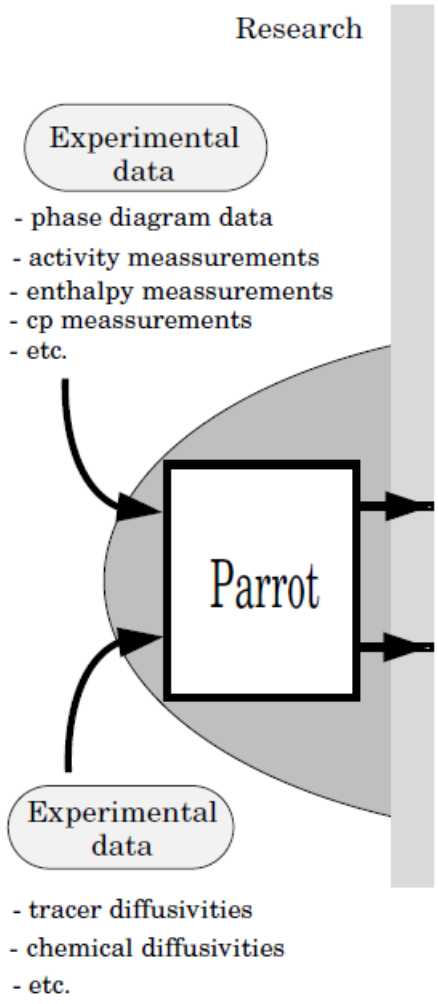



```
POST:
POST:
POST:@?<Hit_return_to_continue>
POST:
POST: set-inter
POST:
```

Example exg2

Optimization of mobilities in Ni-Al fcc alloys

A file for reading thermodynamic data and setting up the kinetic parameters which are needed for an optimization of the FCC phase in the binary Ni-Al system. See also A. Engström and J. Ågren: ("Assessment of Diffusional Mobilities in Face-Centered Cubic Ni-Cr-Al Alloys" in Z. METALLKUNDE, Feb. 1996).



exg2-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exg2\setup.DCM.test"
SYS: ï»¿@@
 NO SUCH COMMAND, USE HELP
SYS: @@ Kinetic data example.
SYS: @@ Optimization of mobilities in Ni-Al fcc alloys
SYS: @@ A file for reading thermodynamic data and setting up the kinetic
SYS: @@ parameters that are needed for an optimization of the FCC phase
SYS: @@ in the binary Ni-Al system.
SYS: @@ See also A. EngstrÃ¶m and J. Ã…gren: ("Assessment of Diffusional
SYS: @@ Mobilities in Face-Centered Cubic Ni-Cr-Al Alloys" in
SYS: @@ Z. Metallkunde, Feb. 1996).
SYS: @@----------------------------------------------------------------------
SYS:
SYS: @@ exg2_setup.DCM
SYS:
SYS:
SYS: @@
SYS: @@ EXPLICITLY SELECTING GES VERSION 5 BECAUSE PARAMETER OPTIMIZATION
SYS: @@ IS NOT SUPPORTED IN GES VERSION 6
SYS: @@
SYS: set-ges-version 5
SYS:
SYS: @@
SYS: @@ RETRIEVE THERMODYNAMIC DATA FROM A USER-DEFINED DATABASE
SYS: @@
SYS: go data
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                     /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12: sw us tdata.TDB
 Current database: User defined Database
This database does not support the DATABASE_INFORMATION command

 VA  DEFINED
TDB_USER: def-sys al ni
 AL                     NI  DEFINED
TDB_USER: rej ph *
 LIQUID                 B2_BCC                 BCC_A2
 FCC_A1                 GAMMA_PRIME  REJECTED
TDB_USER: rest ph fcc_a1
 FCC_A1  RESTORED
TDB_USER: get
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....
 -OK-
TDB_USER:
TDB_USER: @@
TDB_USER: @@ APPEND THE KINETIC DATA FROM THE MOBILITY DATABASE IN ORDER TO
TDB_USER: @@ HAVE SOME DUMMY PARAMETERS.
TDB_USER: @@
TDB_USER: app mob2
 Current database: Alloys Mobility  v2.7

 VA  DEFINED
 GAS:G  REJECTED
APP: def-sys al ni
 AL                     NI  DEFINED
APP: rej ph *
 BCC_A2                 FCC_A1                 M4N
 HCP_A3                 LIQUID:L  REJECTED
APP: res ph fcc_a1
 FCC_A1  RESTORED
APP: get
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
APP:
APP: @@
APP: @@ GO TO THE DICTRA MODULE AND DEFINE THE KINETIC PARAMETERS. THE
APP: @@ VARIABLES V1,V2,V3 AND V4 ARE TO BE OPTIMIZED. NOTE THAT IF
APP: @@ YOU ARE OPTIMIZING PARAMETERS FOR A PHASE WITH MAGNETIC
APP: @@ CONTRIBUTION. I.E. USING BOTH MF- AND MQ-PARAMETERS, YOU
APP: @@ MIGHT HAVE TO ENTER THE PARROT MODULE AND GO BACK BEFORE
APP: @@ ENTERING PARAMETERS CONTAINING VARIABLES.
APP: @@
APP: go dic_par
 PARROT  VERSION 5.3d RUNNING ON PC / WINDOWS NT
 Developed at the Division of Physical Metallurgy
 Royal Institute of Technology Stockholm, Sweden

PARROT:
PARROT:
```

```
PARROT: go d-m
 NO TIME STEP DEFINED
DIC>
DIC> @@ MOBILITY OF Al IN Al
DIC> ENTER-MOB-DATA
PARAMETER: MQ(FCC_A1&AL,AL:VA) 298.15 -142000+R*T*LN(1.71E-4); 6000 N
 MQ(FCC_A1&AL#1,AL:VA;0)
DIC>
DIC> @@ MOBILITY OF Al IN Ni
DIC> ENTER-MOB-DATA
PARAMETER: MQ(FCC_A1&AL,NI:VA) 298.15 -284000+R*T*LN(7.5E-4); 6000 N
 MQ(FCC_A1&AL#1,NI:VA;0)
DIC>
DIC> @@ MOBILITY OF Al INTERACTION BETWEEN Al AND Ni
DIC> ENTER-MOB-DATA
PARAMETER: MQ(FCC_A1&AL,AL,NI:VA;0) 298.15 V1+V2*T; 6000 N
 MQ(FCC_A1&AL#1,AL,NI:VA;0)
DIC>
DIC> @@ MOBILITY OF Ni IN Al
DIC> ENTER-MOB-DATA
PARAMETER: MQ(FCC_A1&NI,AL:VA) 298.15 -145900+R*T*LN(4.4E-4); 6000 N
 MQ(FCC_A1&NI#1,AL:VA;0)
DIC>
DIC> @@ MOBILITY OF Ni IN Ni
DIC> ENTER-MOB-DATA
PARAMETER: MQ(FCC_A1&NI,NI:VA) 298.15 -287000-69.8*T; 6000 N
 MQ(FCC_A1&NI#1,NI:VA;0)
DIC>
DIC> @@ MOBILITY OF Ni INTERACTION BETWEEN Ni AND Al
DIC> ENTER-MOB-DATA
PARAMETER: MQ(FCC_A1&NI,NI,AL:VA;0) 298.15 V3+V4*T; 6000 N
 MQ(FCC_A1&NI#1,AL,NI:VA;0)
DIC>
DIC> @@
DIC> @@ GO TO PARROT AND SAVE THE SET UP TO FILE
DIC> @@
DIC> go dic_parrot
 PARROT  VERSION 5.3d RUNNING ON PC / WINDOWS NT
PARROT: create-new-store-file opt
PARROT:
PARROT: set-inter
 --OK---
PARROT:
```

exg2-run

```
PARROT:About
 NO SUCH COMMAND, USE HELP
PARROT:PARROT:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exg2\run.DCM.test"
PARROT: @@ exg2_run.DCM
PARROT:
PARROT: @@--------------------------------------------------------------------
PARROT: @@ FILE FOR DOING THE OPTIMIZATION IN PARROT
PARROT: @@--------------------------------------------------------------------
PARROT:
PARROT: @@
PARROT: @@ GO TO PARROT AND READ THE SETUP
PARROT: @@
PARROT: go dic_parrot
 PARROT  VERSION 5.3d RUNNING ON PC / WINDOWS NT
PARROT: set-store-file opt
PARROT:
PARROT:
PARROT: @@
PARROT: @@ COMPILE THE EXPERIMENTAL DATA IN exp.DOP INTO STRUCTURED BINARY DATA.
PARROT: @@
PARROT: compile-experiments exp
OUTPUT TO SCREEN OR FILE /SCREEN/:
INITIATE STORE FILE: /Y/:

 $-------------------------------------------------------------------------
 $ DOP-FILE CONTAINING EXPERIMENTAL INFORMATION USED DURING THE
 $ OTIMIZATION IN PARROT (COMPARE WITH POP-FILE USED WHEN EVALUATING
 $ THERMODYNAMIC DATA). THE EXPERIMENTAL DATA HERE STEAM FROM A STUDY BY
 $ YAMAMOTO ET AL. TRANS. JPN. INST. MET. VOL. 21,NO. 9 (1980), P. 601.
 $
 $ CONSULT THE THERMO-CALC USER'S GUIDE TO LEARN MORE ABOUT SYNTAXES
 $ FOR OPTIMIZATION OF THERMODYNAMIC DATA.
 $-------------------------------------------------------------------------

 ENTER CONST P0=101325

 TABLE_HEAD 10
 CREATE_NEW 0010,1
 C-S PH FCC=ENT 1
 S-C T=1573,N=1,P=P0
 S-C X(AL)=.01055
 EXPERIMENT LOGDC(FCC_A1,AL,AL,NI)=-12.6:.1
 CREATE_NEW 0011,1
 C-S PH FCC=ENT 1
 S-C T=1573,N=1,P=P0
 S-C X(AL)=.02032
 EXPERIMENT LOGDC(FCC_A1,AL,AL,NI)=-12.56:.1
 CREATE_NEW 0012,1
 C-S PH FCC=ENT 1
 S-C T=1573,N=1,P=P0
 S-C X(AL)=.02957
 EXPERIMENT LOGDC(FCC_A1,AL,AL,NI)=-12.65:.1
 CREATE_NEW 0013,1
 C-S PH FCC=ENT 1
 S-C T=1573,N=1,P=P0
 S-C X(AL)=.03884
 EXPERIMENT LOGDC(FCC_A1,AL,AL,NI)=-12.52:.1
 CREATE_NEW 0014,1
 C-S PH FCC=ENT 1
 S-C T=1573,N=1,P=P0
 S-C X(AL)=.03884
 EXPERIMENT LOGDC(FCC_A1,AL,AL,NI)=-12.52:.1
 CREATE_NEW 0015,1
 C-S PH FCC=ENT 1
 S-C T=1573,N=1,P=P0
 S-C X(AL)=.04927
 EXPERIMENT LOGDC(FCC_A1,AL,AL,NI)=-12.48:.1
 CREATE_NEW 0016,1
 C-S PH FCC=ENT 1
 S-C T=1573,N=1,P=P0
 S-C X(AL)=.06062
 EXPERIMENT LOGDC(FCC_A1,AL,AL,NI)=-12.43:.1
 CREATE_NEW 0017,1
 C-S PH FCC=ENT 1
 S-C T=1573,N=1,P=P0
 S-C X(AL)=.07029
 EXPERIMENT LOGDC(FCC_A1,AL,AL,NI)=-12.41:.1
 CREATE_NEW 0018,1
 C-S PH FCC=ENT 1
 S-C T=1573,N=1,P=P0
 S-C X(AL)=.08113
 EXPERIMENT LOGDC(FCC_A1,AL,AL,NI)=-12.37:.1
 CREATE_NEW 0019,1
 C-S PH FCC=ENT 1
 S-C T=1573,N=1,P=P0
 S-C X(AL)=.09166
 EXPERIMENT LOGDC(FCC_A1,AL,AL,NI)=-12.32:.1
 CREATE_NEW 0020,1
 C-S PH FCC=ENT 1
 S-C T=1573,N=1,P=P0
 S-C X(AL)=.09945
 EXPERIMENT LOGDC(FCC_A1,AL,AL,NI)=-12.28:.1
 CREATE_NEW 0021,1
 C-S PH FCC=ENT 1
 S-C T=1573,N=1,P=P0
 S-C X(AL)=.1099
 EXPERIMENT LOGDC(FCC_A1,AL,AL,NI)=-12.24:.1
 CREATE_NEW 0022,1
 C-S PH FCC=ENT 1
 S-C T=1573,N=1,P=P0
 S-C X(AL)=.1207
 EXPERIMENT LOGDC(FCC_A1,AL,AL,NI)=-12.2:.1
 CREATE_NEW 0023,1
 C-S PH FCC=ENT 1
 S-C T=1573,N=1,P=P0
 S-C X(AL)=.129
 EXPERIMENT LOGDC(FCC_A1,AL,AL,NI)=-12.18:.1
 CREATE_NEW 0024,1
 C-S PH FCC=ENT 1
 S-C T=1573,N=1,P=P0
 S-C X(AL)=.1392
 EXPERIMENT LOGDC(FCC_A1,AL,AL,NI)=-12.16:.1
```

```
 CREATE_NEW 0025,1
 C-S PH FCC=ENT 1
 S-C T=1573,N=1,P=P0
 S-C X(AL)=.1503
 EXPERIMENT LOGDC(FCC_A1,AL,AL,NI)=-12.1:.1
 CREATE_NEW 0026,1
 C-S PH FCC=ENT 1
 S-C T=1573,N=1,P=P0
 S-C X(AL)=.1589
 EXPERIMENT LOGDC(FCC_A1,AL,AL,NI)=-12.08:.1
 CREATE_NEW 0027,1
 C-S PH FCC=ENT 1
 S-C T=1573,N=1,P=P0


output ignored...



... output resumed


 == OPTIMIZING VARIABLES ==

 AVAILABLE VARIABLES ARE V1  TO V50

 VAR.   VALUE             START VALUE       SCALING FACTOR    REL.STAND.DEV
 V1     -3.51365596E+04   -3.51365596E+04   -3.51365596E+04    2.46939568E+00
 V2     -9.53952154E+01   -9.53952154E+01   -9.53952154E+01    6.29664194E-01
 V3     -1.32972461E+05   -1.32959165E+05   -1.32959165E+05    3.97449926E+00
 V4      7.81857790E+01    7.81857790E+01    7.81857790E+01    4.46532149E+00

 NUMBER OF OPTIMIZING VARIABLES :   4
 ALL OTHER VARIABLES ARE FIX WITH THE VALUE ZERO
 THE SUM OF SQUARES HAS CHANGED FROM   2.02977003E+01 TO   2.02976923E+01
 DEGREES OF FREEDOM  113.  REDUCED SUM OF SQUARES   1.79625595E-01


 Sorry, LIST-DATA disabled for this database

 ======  BLOCK NUMBER  1

 DEFINED CONSTANTS
    P0=101325
10 LOGDC(F...,AL,NI)=-12.6       -12.56      0.10      4.3827E-02  0.4383
11 LOGDC(F...,AL,NI)=-12.56      -12.55      0.10      1.2341E-02  0.1234
12 LOGDC(F...,AL,NI)=-12.65      -12.53      0.10      0.1167       1.167
13 LOGDC(F...,AL,NI)=-12.52      -12.51      0.10      5.8843E-03  5.8843E-02
14 LOGDC(F...,AL,NI)=-12.52      -12.51      0.10      5.8843E-03  5.8843E-02
15 LOGDC(F...,AL,NI)=-12.48      -12.49      0.10     -8.4123E-03 -8.4123E-02
16 LOGDC(F...,AL,NI)=-12.43      -12.46      0.10     -2.6851E-02 -0.2685
17 LOGDC(F...,AL,NI)=-12.41      -12.43      0.10     -1.7821E-02 -0.1782
18 LOGDC(F...,AL,NI)=-12.37      -12.39      0.10     -2.3493E-02 -0.2349
19 LOGDC(F...,AL,NI)=-12.32      -12.36      0.10     -3.8626E-02 -0.3863
20 LOGDC(F...,AL,NI)=-12.28      -12.33      0.10     -5.1933E-02 -0.5193
21 LOGDC(F...,AL,NI)=-12.24      -12.29      0.10     -5.4919E-02 -0.5492
22 LOGDC(F...,AL,NI)=-12.2       -12.26      0.10     -5.5128E-02 -0.5513
23 LOGDC(F...,AL,NI)=-12.18      -12.22      0.10     -4.3400E-02 -0.4340
24 LOGDC(F...,AL,NI)=-12.16      -12.18      0.10     -2.2927E-02 -0.2293
25 LOGDC(F...,AL,NI)=-12.1       -12.14      0.10     -3.6888E-02 -0.3689
26 LOGDC(F...,AL,NI)=-12.08      -12.10      0.10     -1.9703E-02 -0.1970
27 LOGDC(F...,AL,NI)=-12.02      -12.04      0.10     -2.2272E-02 -0.2227
28 LOGDC(F...,AL,NI)=-11.98      -11.99      0.10     -9.0917E-03 -9.0917E-02
29 LOGDC(F...,AL,NI)=-11.94      -11.95      0.10     -9.1618E-03 -9.1618E-02
30 LOGDC(F...,AL,NI)=-13         -12.86      0.10      0.1360       1.360
31 LOGDC(F...,AL,NI)=-12.96      -12.85      0.10      0.1059       1.059
32 LOGDC(F...,AL,NI)=-12.92      -12.84      0.10      8.4799E-02  0.8480
33 LOGDC(F...,AL,NI)=-12.9       -12.82      0.10      8.2549E-02  0.8255
34 LOGDC(F...,AL,NI)=-12.77      -12.79      0.10     -1.5173E-02 -0.1517
35 LOGDC(F...,AL,NI)=-12.74      -12.75      0.10     -1.1192E-02 -0.1119
36 LOGDC(F...,AL,NI)=-12.82      -12.72      0.10      9.5223E-02  0.9522
37 LOGDC(F...,AL,NI)=-12.82      -12.72      0.10      9.5223E-02  0.9522
38 LOGDC(F...,AL,NI)=-12.69      -12.68      0.10      5.7856E-03  5.7856E-02
39 LOGDC(F...,AL,NI)=-12.65      -12.65      0.10      2.6229E-03  2.6229E-02
40 LOGDC(F...,AL,NI)=-12.64      -12.62      0.10      1.9222E-02  0.1922
41 LOGDC(F...,AL,NI)=-12.61      -12.58      0.10      2.8492E-02  0.2849
42 LOGDC(F...,AL,NI)=-12.55      -12.54      0.10      9.2091E-03  9.2091E-02
43 LOGDC(F...,AL,NI)=-12.53      -12.51      0.10      2.1034E-02  0.2103
44 LOGDC(F...,AL,NI)=-12.47      -12.47      0.10      2.0402E-03  2.0402E-02
45 LOGDC(F...,AL,NI)=-12.41      -12.42      0.10     -1.0621E-02 -0.1062
46 LOGDC(F...,AL,NI)=-12.38      -12.38      0.10     -1.6323E-04 -1.6323E-03
47 LOGDC(F...,AL,NI)=-12.36      -12.32      0.10      3.6256E-02  0.3626
48 LOGDC(F...,AL,NI)=-12.36      -12.32      0.10      3.6256E-02  0.3626
49 LOGDC(F...,AL,NI)=-12.3       -12.27      0.10      3.0494E-02  0.3049
50 LOGDC(F...,AL,NI)=-13.23      -13.19      0.10      3.8416E-02  0.3842
51 LOGDC(F...,AL,NI)=-13.23      -13.19      0.10      3.8416E-02  0.3842
52 LOGDC(F...,AL,NI)=-13.19      -13.18      0.10      1.3209E-02  0.1321
53 LOGDC(F...,AL,NI)=-13.15      -13.16      0.10     -5.5530E-03 -5.5530E-02
54 LOGDC(F...,AL,NI)=-13.12      -13.13      0.10     -1.4736E-02 -0.1474
55 LOGDC(F...,AL,NI)=-13.09      -13.10      0.10     -1.2913E-02 -0.1291
56 LOGDC(F...,AL,NI)=-13.06      -13.07      0.10     -6.9397E-03 -6.9397E-02
57 LOGDC(F...,AL,NI)=-13.02      -13.04      0.10     -1.5971E-02 -0.1597
58 LOGDC(F...,AL,NI)=-12.99      -13.00      0.10     -1.0672E-02 -0.1067
59 LOGDC(F...,AL,NI)=-12.96      -12.96      0.10      8.0069E-04  8.0069E-03
60 LOGDC(F...,AL,NI)=-12.91      -12.93      0.10     -2.0470E-02 -0.2047
61 LOGDC(F...,AL,NI)=-12.88      -12.89      0.10     -7.3947E-03 -7.3947E-02
62 LOGDC(F...,AL,NI)=-12.86      -12.85      0.10      1.4312E-02  0.1431
63 LOGDC(F...,AL,NI)=-12.86      -12.85      0.10      1.4312E-02  0.1431
64 LOGDC(F...,AL,NI)=-12.83      -12.81      0.10      1.7076E-02  0.1708
65 LOGDC(F...,AL,NI)=-12.8       -12.77      0.10      2.9558E-02  0.2956
66 LOGDC(F...,AL,NI)=-12.75      -12.72      0.10      2.5293E-02  0.2529
67 LOGDC(F...,AL,NI)=-12.71      -12.68      0.10      2.6861E-02  0.2686
68 LOGDC(F...,AL,NI)=-12.67      -12.63      0.10      4.4033E-02  0.4403
70 LOGDC(F...,AL,NI)=-13.5       -13.54      0.10     -4.2456E-02 -0.4246
71 LOGDC(F...,AL,NI)=-13.47      -13.53      0.10     -5.5160E-02 -0.5516
72 LOGDC(F...,AL,NI)=-13.45      -13.50      0.10     -5.0384E-02 -0.5038
73 LOGDC(F...,AL,NI)=-13.42      -13.48      0.10     -5.6139E-02 -0.5614
74 LOGDC(F...,AL,NI)=-13.39      -13.44      0.10     -5.3034E-02 -0.5303
75 LOGDC(F...,AL,NI)=-13.36      -13.40      0.10     -4.3865E-02 -0.4386
76 LOGDC(F...,AL,NI)=-13.34      -13.37      0.10     -3.0943E-02 -0.3094
77 LOGDC(F...,AL,NI)=-13.31      -13.33      0.10     -2.0539E-02 -0.2054
78 LOGDC(F...,AL,NI)=-13.24      -13.29      0.10     -5.0311E-02 -0.5031
79 LOGDC(F...,AL,NI)=-13.22      -13.26      0.10     -4.1318E-02 -0.4132
80 LOGDC(F...,AL,NI)=-13.19      -13.22      0.10     -2.6230E-02 -0.2623
81 LOGDC(F...,AL,NI)=-13.13      -13.17      0.10     -4.3098E-02 -0.4310
82 LOGDC(F...,AL,NI)=-13.12      -13.14      0.10     -1.9773E-02 -0.1977
```

```
83 LOGDC(F...,AL,NI)=-13.08      -13.09      0.10     -1.4457E-02 -0.1446
84 LOGDC(F...,AL,NI)=-13.04      -13.05      0.10     -9.4618E-03 -9.4618E-02
85 LOGDC(F...,AL,NI)=-13.03      -13.01      0.10      2.2404E-02  0.2240
90 LOGDC(F...,AL,NI)=-13.97      -13.92      0.10      5.1241E-02  0.5124
91 LOGDC(F...,AL,NI)=-13.92      -13.90      0.10      2.0497E-02  0.2050
92 LOGDC(F...,AL,NI)=-13.88      -13.87      0.10      9.3920E-03  9.3920E-02
93 LOGDC(F...,AL,NI)=-13.85      -13.84      0.10      5.2264E-03  5.2264E-02
94 LOGDC(F...,AL,NI)=-13.82      -13.81      0.10      1.1044E-02  0.1104
95 LOGDC(F...,AL,NI)=-13.78      -13.77      0.10      1.3352E-02  0.1335
96 LOGDC(F...,AL,NI)=-13.9       -13.74      0.10      0.1640       1.640
97 LOGDC(F...,AL,NI)=-13.85      -13.69      0.10      0.1576       1.576
98 LOGDC(F...,AL,NI)=-13.65      -13.65      0.10      1.5604E-03  1.5604E-02
99 LOGDC(F...,AL,NI)=-13.62      -13.62      0.10      4.9052E-03  4.9052E-02
100 LOGDC(F...,AL,NI)=-13.57     -13.57      0.10     -9.5589E-04 -9.5589E-03
101 LOGDC(F...,AL,NI)=-13.52     -13.53      0.10     -5.4819E-03 -5.4819E-02
102 LOGDC(F...,AL,NI)=-13.47     -13.49      0.10     -2.0262E-02 -0.2026
103 LOGDC(F...,AL,NI)=-13.45     -13.45      0.10      4.9628E-03  4.9628E-02
104 LOGDC(F...,AL,NI)=-13.4      -13.40      0.10      2.8073E-03  2.8073E-02
110 LOGDC(F...,AL,NI)=-14.32     -14.32      0.10     -3.9760E-03 -3.9760E-02
111 LOGDC(F...,AL,NI)=-14.32     -14.30      0.10      1.9307E-02  0.1931
112 LOGDC(F...,AL,NI)=-14.28     -14.27      0.10      1.0664E-02  0.1066
113 LOGDC(F...,AL,NI)=-14.25     -14.24      0.10      8.9412E-03  8.9412E-02
114 LOGDC(F...,AL,NI)=-14.22     -14.20      0.10      1.8329E-02  0.1833
115 LOGDC(F...,AL,NI)=-14.17     -14.16      0.10      1.2994E-02  0.1299
116 LOGDC(F...,AL,NI)=-14.15     -14.12      0.10      3.0489E-02  0.3049
117 LOGDC(F...,AL,NI)=-14.1      -14.07      0.10      2.5593E-02  0.2559
118 LOGDC(F...,AL,NI)=-14.03     -14.03      0.10     -1.4483E-03 -1.4483E-02
119 LOGDC(F...,AL,NI)=-14        -14.00      0.10      2.7074E-03  2.7074E-02
120 LOGDC(F...,AL,NI)=-13.95     -13.95      0.10     -1.9282E-03 -1.9282E-02
121 LOGDC(F...,AL,NI)=-13.9      -13.91      0.10     -5.2349E-03 -5.2349E-02
122 LOGDC(F...,AL,NI)=-13.85     -13.87      0.10     -1.6645E-02 -0.1665
130 LOGDC(F...,AL,NI)=-14.73     -14.76      0.10     -3.0493E-02 -0.3049
131 LOGDC(F...,AL,NI)=-14.71     -14.73      0.10     -2.3757E-02 -0.2376
132 LOGDC(F...,AL,NI)=-14.68     -14.70      0.10     -1.9446E-02 -0.1945
133 LOGDC(F...,AL,NI)=-14.66     -14.67      0.10     -8.5997E-03 -8.5997E-02
134 LOGDC(F...,AL,NI)=-14.61     -14.63      0.10     -1.5314E-02 -0.1531
135 LOGDC(F...,AL,NI)=-14.61     -14.63      0.10     -1.5314E-02 -0.1531
136 LOGDC(F...,AL,NI)=-14.58     -14.58      0.10      3.4408E-03  3.4408E-02
137 LOGDC(F...,AL,NI)=-14.54     -14.54      0.10      3.3897E-03  3.3897E-02
138 LOGDC(F...,AL,NI)=-14.5      -14.49      0.10      9.2113E-03  9.2113E-02
139 LOGDC(F...,AL,NI)=-14.46     -14.44      0.10      1.5390E-02  0.1539
140 LOGDC(F...,AL,NI)=-14.41     -14.41      0.10      1.6005E-03  1.6005E-02
141 LOGDC(F...,AL,NI)=-14.35     -14.36      0.10     -1.1351E-02 -0.1135
142 LOGDC(F...,AL,NI)=-14.27     -14.31      0.10     -4.1487E-02 -0.4149
143 LOGDC(F...,AL,NI)=-14.2      -14.27      0.10     -7.4774E-02 -0.7477


PARROT:
PARROT:
PARROT: set-inter
 --OK---
PARROT:
```

exg2-plot

```
PARROT:About
 NO SUCH COMMAND, USE HELP
PARROT:PARROT:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exg2\plot.DCM.test"
PARROT: @@ exg2_plot.DCM
PARROT:
PARROT: @@--------------------------------------------------------------------
PARROT: @@ FILE FOR PLOTTING THE RESULT AFTER THE OPTIMIZATION. HERE
PARROT: @@ DIFFUSIVITIES CALCULATED FROM THE OPTIMIZED VARIABLES ARE
PARROT: @@ COMPARED WITH EXPERIMENTALLY MEASURED ONES.
PARROT: @@--------------------------------------------------------------------
PARROT:
PARROT: @@
PARROT: @@ GO TO PARROT AND READ THE FILE CONTAINING THE RESULT FROM
PARROT: @@ THE OPTIMIZATION.
PARROT: @@
PARROT: go dic_parrot
 PARROT  VERSION 5.3d RUNNING ON PC / WINDOWS NT
PARROT: set-store-file opt
PARROT:
PARROT: @@
PARROT: @@ GO TO POLY3 AND STEP IN X(AL)
PARROT: @@
PARROT: go p-3
POLY: s-c n=1,p=101325,t=1573
POLY: s-c x(al)=.1
POLY: c-e,,,,
 Using global minimization procedure
Calculated           209 grid points in      0.001 s
Found the set of lowest grid points in       0.000 s
 Calculated solution in      0.002 s using 2 iterations. Total time      0.003  s
POLY: add,,
POLY:
POLY: s-a-v 1 x(al) 0.0001 .20 0.001,,,,
POLY: step
Option? /NORMAL/:
 Step will start from axis value   0.100000
...OK

 Phase Region from   0.100000     for:
     FCC_A1
 Global test at  1.08000E-01 .... OK
 Global test at  1.18000E-01 .... OK
 Global test at  1.28000E-01 .... OK
 Global test at  1.38000E-01 .... OK
 Global test at  1.48000E-01 .... OK
 Global test at  1.58000E-01 .... OK
 Global test at  1.68000E-01 .... OK
 Global test at  1.78000E-01 .... OK
 Global test at  1.88000E-01 .... OK
 Global test at  1.98000E-01 .... OK
 Terminating at   0.200000
 Calculated   103 equilibria

 Phase Region from   0.100000     for:
     FCC_A1
 Global test at  9.20000E-02 .... OK
 Global test at  8.20000E-02 .... OK
 Global test at  7.20000E-02 .... OK
 Global test at  6.20000E-02 .... OK
 Global test at  5.20000E-02 .... OK
 Global test at  4.20000E-02 .... OK
 Global test at  3.20000E-02 .... OK
 Global test at  2.20000E-02 .... OK
 Global test at  1.20000E-02 .... OK
 Global test at  2.00000E-03 .... OK
 Terminating at   0.100000E-03
 Calculated   103 equilibria
 *** Buffer saved on file: C:\Users\azureuser\AppData\Local\Temp\RESULT_002.POLY3
POLY: @@
POLY: @@ REPEATE THE PROCEDURE FOR SOME OTHER TEMPERATURES
POLY: @@
POLY: s-c t=1523,x(al)=.1
POLY: c-e,,,,,,,
 Using global minimization procedure
Calculated           209 grid points in      0.000 s
Found the set of lowest grid points in       0.000 s
 Calculated solution in      0.002 s using 2 iterations. Total time      0.002  s
POLY: s-a-v 1 x(al) 0.0001 .20 0.001,,,,
POLY: step
Option? /NORMAL/:
 Step will start from axis value   0.100000
...OK

 Phase Region from   0.100000     for:
     FCC_A1
 Global test at  1.08000E-01 .... OK
 Global test at  1.18000E-01 .... OK
 Global test at  1.28000E-01 .... OK
 Global test at  1.38000E-01 .... OK
 Global test at  1.48000E-01 .... OK
 Global test at  1.58000E-01 .... OK
 Global test at  1.68000E-01 .... OK
 Global test at  1.78000E-01 .... OK
 Global test at  1.88000E-01 .... OK
 Global test at  1.98000E-01 .... OK
 Terminating at   0.200000
 Calculated   103 equilibria

 Phase Region from   0.100000     for:
     FCC_A1
 Global test at  9.20000E-02 .... OK
 Global test at  8.20000E-02 .... OK
 Global test at  7.20000E-02 .... OK
 Global test at  6.20000E-02 .... OK
 Global test at  5.20000E-02 .... OK
 Global test at  4.20000E-02 .... OK
 Global test at  3.20000E-02 .... OK
 Global test at  2.20000E-02 .... OK
 Global test at  1.20000E-02 .... OK
 Global test at  2.00000E-03 .... OK
 Terminating at   0.100000E-03
```

```
 Calculated   103 equilibria
 *** Buffer saved on file: C:\Users\azureuser\AppData\Local\Temp\RESULT_002.POLY3
POLY: s-c t=1473,x(al)=.1
POLY: c-e,,,,,,,
 Using global minimization procedure
Calculated           209 grid points in      0.001 s
Found the set of lowest grid points in       0.000 s
 Calculated solution in      0.002 s using 2 iterations. Total time      0.003  s
POLY: s-a-v 1 x(al) 0.0001 .20 0.001,,,,
POLY: step
Option? /NORMAL/:
 Step will start from axis value   0.100000
...OK

 Phase Region from   0.100000     for:
     FCC_A1
 Global test at  1.08000E-01 .... OK
 Global test at  1.18000E-01 .... OK
 Global test at  1.28000E-01 .... OK
 Global test at  1.38000E-01 .... OK
 Global test at  1.48000E-01 .... OK
 Global test at  1.58000E-01 .... OK
 Global test at  1.68000E-01 .... OK
 Global test at  1.78000E-01 .... OK
 Global test at  1.88000E-01 .... OK
 Global test at  1.98000E-01 .... OK
 Terminating at   0.200000
 Calculated   103 equilibria

 Phase Region from   0.100000     for:
     FCC_A1
 Global test at  9.20000E-02 .... OK
 Global test at  8.20000E-02 .... OK
 Global test at  7.20000E-02 .... OK
 Global test at  6.20000E-02 .... OK
 Global test at  5.20000E-02 .... OK
 Global test at  4.20000E-02 .... OK
 Global test at  3.20000E-02 .... OK
 Global test at  2.20000E-02 .... OK
 Global test at  1.20000E-02 .... OK
 Global test at  2.00000E-03 .... OK
 Terminating at   0.100000E-03
 Calculated   103 equilibria
 *** Buffer saved on file: C:\Users\azureuser\AppData\Local\Temp\RESULT_002.POLY3
POLY: s-c t=1423,x(al)=.1
POLY: c-e,,,,,,,
 Using global minimization procedure
Calculated           209 grid points in      0.001 s
Found the set of lowest grid points in       0.000 s
 Calculated solution in      0.002 s using 2 iterations. Total time      0.003  s
POLY: s-a-v 1 x(al) 0.0001 .20 0.001,,,,
POLY: step
Option? /NORMAL/:
 Step will start from axis value   0.100000
...OK

 Phase Region from   0.100000     for:
     FCC_A1
 Global test at  1.08000E-01 .... OK
 Global test at  1.18000E-01 .... OK
 Global test at  1.28000E-01 .... OK
 Global test at  1.38000E-01 .... OK
 Global test at  1.48000E-01 .... OK
 Global test at  1.58000E-01 .... OK
 Global test at  1.68000E-01 .... OK
 Global test at  1.78000E-01 .... OK
 Global test at  1.88000E-01 .... OK
 Global test at  1.98000E-01 .... OK
 Terminating at   0.200000
 Calculated   103 equilibria

 Phase Region from   0.100000     for:
     FCC_A1
 Global test at  9.20000E-02 .... OK
 Global test at  8.20000E-02 .... OK
 Global test at  7.20000E-02 .... OK
 Global test at  6.20000E-02 .... OK
 Global test at  5.20000E-02 .... OK
 Global test at  4.20000E-02 .... OK
 Global test at  3.20000E-02 .... OK
 Global test at  2.20000E-02 .... OK
 Global test at  1.20000E-02 .... OK
 Global test at  2.00000E-03 .... OK
 Terminating at   0.100000E-03
 Calculated   103 equilibria
 *** Buffer saved on file: C:\Users\azureuser\AppData\Local\Temp\RESULT_002.POLY3
POLY: s-c t=1373,x(al)=.1
POLY: c-e,,,,,,,
 Using global minimization procedure
Calculated           209 grid points in      0.000 s
Found the set of lowest grid points in       0.001 s
 Calculated solution in      0.001 s using 2 iterations. Total time      0.002  s
POLY: s-a-v 1 x(al) 0.0001 .20 0.001,,,,
POLY: step
Option? /NORMAL/:
 Step will start from axis value   0.100000
...OK

 Phase Region from   0.100000     for:
     FCC_A1
 Global test at  1.08000E-01 .... OK
 Global test at  1.18000E-01 .... OK
 Global test at  1.28000E-01 .... OK
 Global test at  1.38000E-01 .... OK
 Global test at  1.48000E-01 .... OK
 Global test at  1.58000E-01 .... OK
 Global test at  1.68000E-01 .... OK
 Global test at  1.78000E-01 .... OK
 Global test at  1.88000E-01 .... OK
 Global test at  1.98000E-01 .... OK
 Terminating at   0.200000
 Calculated   103 equilibria

 Phase Region from   0.100000     for:
     FCC_A1
```

```
 Global test at  9.20000E-02 .... OK
 Global test at  8.20000E-02 .... OK
 Global test at  7.20000E-02 .... OK
 Global test at  6.20000E-02 .... OK
 Global test at  5.20000E-02 .... OK
 Global test at  4.20000E-02 .... OK
 Global test at  3.20000E-02 .... OK
 Global test at  2.20000E-02 .... OK
 Global test at  1.20000E-02 .... OK
 Global test at  2.00000E-03 .... OK
 Terminating at   0.100000E-03
 Calculated   103 equilibria
 *** Buffer saved on file: C:\Users\azureuser\AppData\Local\Temp\RESULT_002.POLY3
POLY: s-c t=1323,x(al)=.1
POLY: c-e,,,,,,,
 Using global minimization procedure
Calculated           209 grid points in      0.001 s
Found the set of lowest grid points in       0.000 s
 Calculated solution in      0.001 s using 2 iterations. Total time      0.002  s
POLY: s-a-v 1 x(al) 0.0001 .20 0.001,,,,
POLY: step
Option? /NORMAL/:
 Step will start from axis value   0.100000
...OK

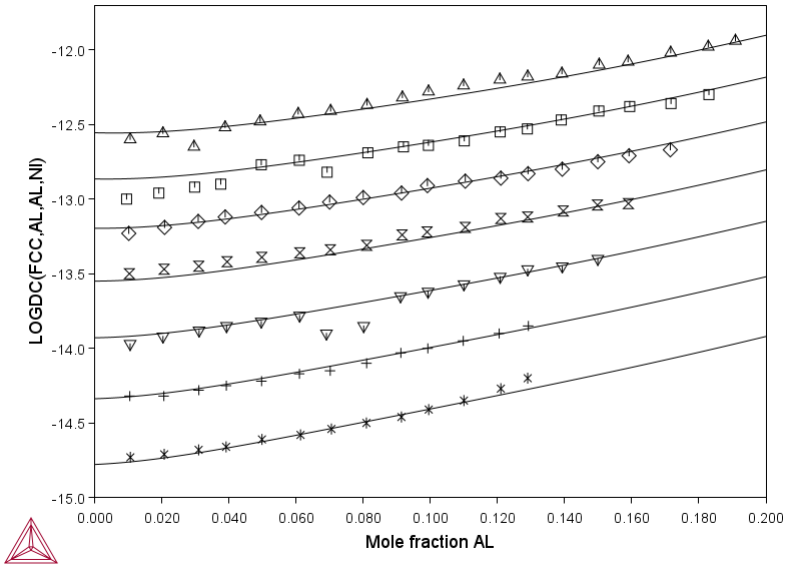
 Phase Region from   0.100000     for:
     FCC_A1
 Global test at  1.08000E-01 .... OK
 Global test at  1.18000E-01 .... OK
 Global test at  1.28000E-01 .... OK
 Global test at  1.38000E-01 .... OK
 Global test at  1.48000E-01 .... OK
 Global test at  1.58000E-01 .... OK
 Global test at  1.68000E-01 .... OK
 Global test at  1.78000E-01 .... OK
 Global test at  1.88000E-01 .... OK
 Global test at  1.98000E-01 .... OK
 Terminating at   0.200000
 Calculated   103 equilibria

 Phase Region from   0.100000     for:
     FCC_A1
 Global test at  9.20000E-02 .... OK
 Global test at  8.20000E-02 .... OK
 Global test at  7.20000E-02 .... OK
 Global test at  6.20000E-02 .... OK
 Global test at  5.20000E-02 .... OK
 Global test at  4.20000E-02 .... OK
 Global test at  3.20000E-02 .... OK
 Global test at  2.20000E-02 .... OK
 Global test at  1.20000E-02 .... OK
 Global test at  2.00000E-03 .... OK
 Terminating at   0.100000E-03
 Calculated   103 equilibria
 *** Buffer saved on file: C:\Users\azureuser\AppData\Local\Temp\RESULT_002.POLY3
POLY: s-c t=1273,x(al)=.1
POLY: c-e,,,,,,,
 Using global minimization procedure
Calculated           209 grid points in      0.001 s
Found the set of lowest grid points in       0.000 s
 Calculated solution in      0.001 s using 2 iterations. Total time      0.002  s
POLY: s-a-v 1 x(al) 0.0001 .20 0.001,,,,
POLY: step
Option? /NORMAL/:
 Step will start from axis value   0.100000
...OK

 Phase Region from   0.100000     for:
     FCC_A1
 Global test at  1.08000E-01 .... OK
 Global test at  1.18000E-01 .... OK
 Global test at  1.28000E-01 .... OK
 Global test at  1.38000E-01 .... OK
 Global test at  1.48000E-01 .... OK
 Global test at  1.58000E-01 .... OK
 Global test at  1.68000E-01 .... OK
 Global test at  1.78000E-01 .... OK
 Global test at  1.88000E-01 .... OK
 Global test at  1.98000E-01 .... OK
 Terminating at   0.200000
 Calculated   103 equilibria

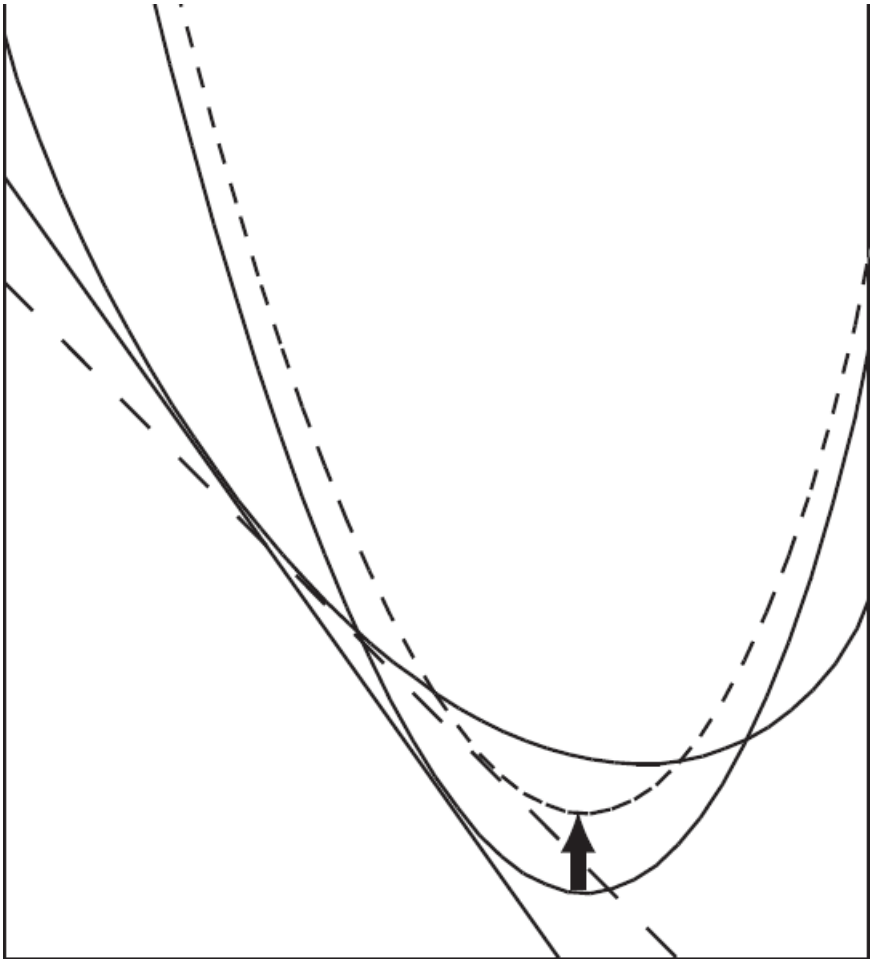
 Phase Region from   0.100000     for:
     FCC_A1
 Global test at  9.20000E-02 .... OK
 Global test at  8.20000E-02 .... OK
 Global test at  7.20000E-02 .... OK
 Global test at  6.20000E-02 .... OK
 Global test at  5.20000E-02 .... OK
 Global test at  4.20000E-02 .... OK
 Global test at  3.20000E-02 .... OK
 Global test at  2.20000E-02 .... OK
 Global test at  1.20000E-02 .... OK
 Global test at  2.00000E-03 .... OK
 Terminating at   0.100000E-03
 Calculated   103 equilibria
 *** Buffer saved on file: C:\Users\azureuser\AppData\Local\Temp\RESULT_002.POLY3
POLY: @@
POLY: @@ ENTER THE POST MODULE, PLOT THE DIFFUSIVITY ON THE Y-AXIS
POLY: @@ AND MOLE-FRACTION Al ON THE X-AXIS.
POLY: @@
POLY: post
  POLY-3 POSTPROCESSOR VERSION 3.2
POST:
POST: s-d-a x m-f al
POST: s-d-a y logdc(fcc,al,al,ni)
POST:
POST: app y yama.exp
PROLOGUE NUMBER: /0/: 1
DATASET NUMBER(s): /-1/: 1 2 3 4 5 6 7
POST:
POST:
POST: s-t-m-s y
 COMMAND NOT SUPPORTED IN THIS PLOT DRIVER
```

```
POST: s-s-s y n -15 -11.7
POST: s-t-m-s y
 COMMAND NOT SUPPORTED IN THIS PLOT DRIVER
POST:
POST: SET_EXP_FILE_FORMAT 5
POST: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST: SET_EXP_FILE_FORMAT 10
POST:
POST: plot
```




```
POST:
POST:@?<Hit_return_to_continue>
POST:
POST: set-inter
POST:
```

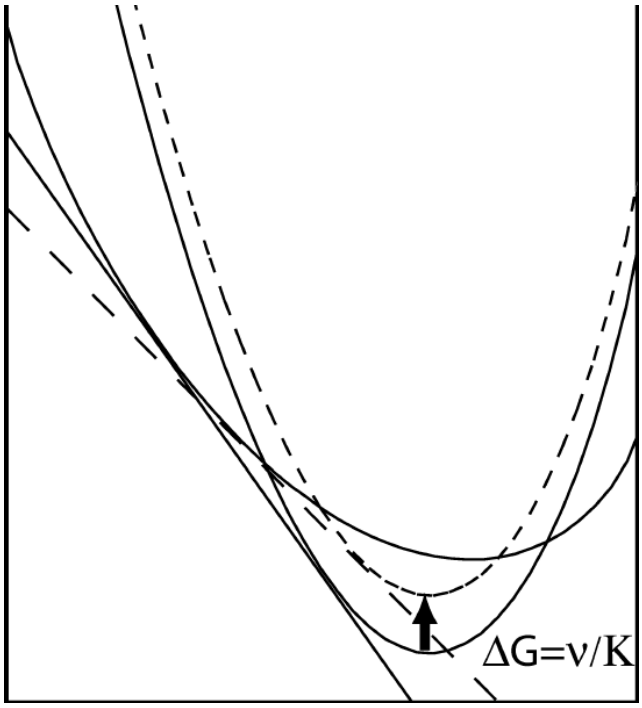
Deviation From Local Equilibrium



Example exh1

α/γ diffusion couple with limited interface mobility

This example calculates the growth of ferrite (α) into austenite (γ) with a limited interface mobility. This is achieved by adding a Gibbs-energy contribution to the ferrite using the SET-SURFACE-ENERGY command.



exh1-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exh1\setup.DCM.test"
SYS: @@
SYS: @@ Deviation from local equilibrium.
SYS: @@ Ferrite/austenite diffusion couple with interface mobility
SYS: @@ This example calculates the growth of ferrite into austenite with
SYS: @@ a limited interface mobility. this is done by adding a Gibbs-energy
SYS: @@ contribution to the ferrite using the SET-SURFACE-ENERGY command.
SYS: @@------------------------------------------------------------------
SYS:
SYS: @@
SYS: @@ RETRIEVE DATA FROM THE DATABASE
SYS: @@
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                        /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12:
TDB_TCFE12: @@
TDB_TCFE12: @@ USE A THERMODYNAMIC DATABASE TO RETRIEVE THE DATA
TDB_TCFE12: @@
TDB_TCFE12: sw FEDEMO
 Current database: Iron Demo Database v6.0

 VA                        /-  DEFINED
TDB_FEDEMO: def-sys fe c
 FE                        C  DEFINED
TDB_FEDEMO: rej ph * all
 GAS:G                     LIQUID:L                  BCC_A2
 C14_LAVES                 CBCC_A12                  CEMENTITE_D011
 CUB_A13                   DIAMOND_A4                FCC_A1
 GRAPHITE_A9               HCP_A3                    KSI_CARBIDE
 M23C6_D84                 M5C2                      M7C3_D101
   REJECTED
TDB_FEDEMO: res ph bcc fcc
 BCC_A2                    FCC_A1  RESTORED
TDB_FEDEMO: get
12:03:10,449 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ SWITCH TO A MOBILITY DATABASE TO RETRIEVE MOBILITY DATA
TDB_FEDEMO: @@
TDB_FEDEMO: app mfedemo
 Current database: Fe-Alloys Mobility demo database v5.0

 VA  DEFINED
APP: def-sys fe c
 FE                        C  DEFINED
APP: rej ph * all
 BCC_A2                    FCC_A1                    CEMENTITE_D011
 LIQUID:L  REJECTED
APP: res ph bcc fcc
 BCC_A2                    FCC_A1  RESTORED
APP: get
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
APP:
APP: @@
APP: @@ ENTER THE DICTRA MONITOR
APP: @@
APP: go d-m
 NO TIME STEP DEFINED
DIC>
DIC> @@
DIC> @@ ENTER THE GLOBAL CONDITION T
DIC> @@
DIC> set-cond glob T 0 1000; * N
DIC>
DIC> @@
DIC> @@ START BY ENTERING THE REGIONS ferrite AND austenite WHERE
DIC> @@ THE BCC AND FCC PHASES ARE PUT, RESPECTIVELY. THE FERRITE REGION IS
DIC> @@ ASSUMED INITIALLY TO BE VERY THIN, 1E-9 METERS.
DIC> @@
DIC> enter-region
REGION NAME : ferrite
```

```
DIC>
DIC> enter-region
REGION NAME : austenite
ATTACH TO REGION NAMED /FERRITE/:
ATTACHED TO THE RIGHT OF FERRITE /YES/:
DIC>
DIC> @@
DIC> @@ ENTER GRIDS INTO THE REGIONS
DIC> @@
DIC> enter-grid
REGION NAME : /FERRITE/: ferrite
WIDTH OF REGION /1/: 1e-9
TYPE /AUTO/: AUTO
DIC>
DIC> enter-grid austenite
WIDTH OF REGION /1/: 0.999e-6
TYPE /AUTO/: AUTO
DIC>
DIC> @@
DIC> @@ ENTER THE active PHASES INTO THE REGIONS
DIC> @@
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: active
REGION NAME : /FERRITE/: ferrite
PHASE TYPE /MATRIX/: matrix
PHASE NAME: /NONE/: bcc
DIC>
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: active
REGION NAME : /AUSTENITE/: austenite
PHASE TYPE /MATRIX/: matrix
PHASE NAME: /NONE/: fcc#1
DIC>
DIC>
DIC>
DIC> @@
DIC> @@ ENTER THE INITIAL COMPOSITION INTO BCC
DIC> @@
DIC> enter-composition
REGION NAME : /FERRITE/: ferrite
PHASE NAME: /BCC_A2/: bcc
COMPOSITION TYPE /MOLE_FRACTION/: w-p
PROFILE FOR /C/: C
TYPE /LINEAR/: linear
VALUE OF FIRST POINT : 0.019091893
VALUE OF LAST POINT : /1.9091893E-2/: 0.019091893
DIC>
DIC> @@
DIC> @@ ENTER THE INITIAL COMPOSITION INTO FCC
DIC> @@
DIC> enter-composition
REGION NAME : /AUSTENITE/: austenite
PHASE NAME: /FCC_A1/: fcc#1
COMPOSITION TYPE /MOLE_FRACTION/: w-p
PROFILE FOR /C/: C
TYPE /LINEAR/: linear
VALUE OF FIRST POINT : 0.0191
VALUE OF LAST POINT : /1.91E-2/: 0.0191
DIC>
DIC> @@
DIC> @@ SAVE THE SET UP TO A NEW STORE FILE AND EXIT
DIC> @@
DIC> save exh1 y
DIC>
DIC> set-inter
 --OK---
DIC>
```

exh1-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exh1\run.DCM.test"
DIC>
DIC>
DIC> @@
DIC> @@ READ THE SETUP FROM FILE AND START THE SIMULATION
DIC> @@
DIC>
DIC> go d-m
 TIME STEP AT TIME  0.00000E+00
DIC>
DIC> read exh1
 OK
DIC>
DIC> @@
DIC> @@ SET THE SIMULATION TIME
DIC> @@
DIC> set-sim-time
END TIME FOR INTEGRATION /.1/: 2.5E-3
AUTOMATIC TIMESTEP CONTROL /YES/: YES
MAX TIMESTEP DURING INTEGRATION /2.5E-04/:
INITIAL TIMESTEP : /1E-07/: 1E-7
SMALLEST ACCEPTABLE TIMESTEP : /1E-07/: 1E-7
DIC>
DIC>
DIC> @@
DIC> @@ START THE SIMULATION
DIC> @@
DIC> sim
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 Region: FERRITE
 geometric   0.964174     dense at   0.100000E-08   51 points
 Region: AUSTENITE
 geometric    1.20000     dense at    0.00000       57 points
 DEGREE OF IMPLICITY SET TO TRAPEZOIDAL RULE
  Trying old scheme                        3
 U-FRACTION IN SYSTEM:  C = 8.88253285685629E-04  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-06 [m]
 U-FRACTION IN SYSTEM:  C = 8.88253285685629E-04  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-06 [m]
 6.129174537659537E-004        6.128943047003572E-004         20.3423679232232        6.062437353814954E-004        6.029205751764839E-
004        6.012624196099474E-004        5.996065472035967E-004        5.979331738336693E-004        5.945934417197160E-
004        5.879420347394491E-004        5.747514520154408E-004        5.488192219758681E-004        4.987505814876858E-
004        4.057965014776165E-004        2.486211534522674E-004        4.920170270007913E-
005         20.3420783723051        4.904901983029824E-005        4.897276737211813E-005        4.893466338715906E-
005        4.891561695582411E-005        4.889657423170352E-005        4.887683398418529E-005        4.883736544564391E-
005        4.875847619481457E-005


     ERROR RETURN FROM NS01A BECAUSE THERE HAVE BEEN   25 CALLS OF CALFUN
  RESCALING
 5.523048285069478E-007        5.519778703812132E-007        0.203420783672109        5.504891949101719E-007        5.495824990801473E-
007        5.491294314075348E-007        5.488034146754972E-007        5.484774947496821E-007        5.481380356991294E-
007        5.474594328382697E-007        5.461034880773690E-007        5.433966424004828E-007        5.380031264214500E-
007        5.272967959669258E-007        5.062069410695829E-007        4.653184553198548E-007        3.887063800058052E-
007        5.691236797553241E-003        3.875078361397619E-007        3.869092582039349E-007        3.866101427354237E-
007        3.863365989928855E-007        3.860631520567343E-007        3.857798753328794E-007        3.852136337843677E-007


     ERROR RETURN FROM NS01A BECAUSE THERE HAVE BEEN   25 CALLS OF CALFUN
 *** ERROR  1890 IN DCNS01: ERROR RETURN FROM NS01A
 3.852136337843677E-007        3.852135908235614E-007        3.852136337843677E-007        0.203421591827670        3.852136337843677E-
007        3.841556255321940E-007        3.841555826145985E-007        3.841556255321940E-007        3.836271670063930E-
007        3.836271670063930E-007        3.825713411561884E-007        3.825713411561884E-007        3.804640542594430E-
007        3.804640542594430E-007        3.762669396810266E-007

output ignored...



... output resumed

 1.962025198975442E-007        1.959102902196957E-007        3.432961073906042E-009        1.449257128414354E-010        6.181027321592069E-
013        1.244825784890624E-017       TIME =  0.24605715E-02 DT =  0.21825635E-04 SUM OF SQUARES =  0.12448258E-16
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.32335508E-03 AND   0.32335508E-03
 POSITION OF INTERFACE FERRITE / AUSTENITE IS   0.70188790E-06
 U-FRACTION IN SYSTEM:  C = 9.16126010458359E-04  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-06 [m]
  CPU time used in timestep                    0  seconds
 3.359654251512357E-007        3.354817092726576E-007        7.174832030711180E-009        1.343879974221032E-010        6.541437887722555E-
014        6.513306204958121E-019       TIME =  0.24754479E-02 DT =  0.14876355E-04 SUM OF SQUARES =  0.65133062E-18
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.36964318E-03 AND   0.36964318E-03
 POSITION OF INTERFACE FERRITE / AUSTENITE IS   0.70738685E-06
 U-FRACTION IN SYSTEM:  C = 9.16284230511638E-04  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-06 [m]
  CPU time used in timestep                    0  seconds
 4.480824841810942E-007        4.473970704295982E-007        3.532271957713549E-009        4.125275023600657E-011        6.019509661976300E-
015        1.076906499891585E-020       TIME =  0.24857463E-02 DT =  0.10298459E-04 SUM OF SQUARES =  0.10769065E-19
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.41477474E-03 AND   0.41477474E-03
 POSITION OF INTERFACE FERRITE / AUSTENITE IS   0.71165839E-06
 U-FRACTION IN SYSTEM:  C = 9.1695895786688E-04  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-06 [m]
  CPU time used in timestep                    0  seconds
 7.433870682511251E-007        7.422538887675034E-007        5.180439508320737E-009        5.117681232280809E-011        5.371522465424346E-
015        5.803518179457897E-021       TIME =  0.24926481E-02 DT =  0.69017408E-05 SUM OF SQUARES =  0.58035182E-20
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.46518765E-03 AND   0.46518765E-03
 POSITION OF INTERFACE FERRITE / AUSTENITE IS   0.71486899E-06
 U-FRACTION IN SYSTEM:  C = 9.16975497122159E-04  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-06 [m]
  CPU time used in timestep                    1  seconds
 1.502608164374188E-006        1.500645011500603E-006        6.643470397057504E-009        3.748471921331202E-011        1.322133600008516E-
015        2.694768711500598E-022       TIME =  0.24970907E-02 DT =  0.44426453E-05 SUM OF SQUARES =  0.26947687E-21
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.53102356E-03 AND   0.53102356E-03
 POSITION OF INTERFACE FERRITE / AUSTENITE IS   0.71722814E-06
 U-FRACTION IN SYSTEM:  C = 9.17612807091724E-04  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-06 [m]
  CPU time used in timestep                    0  seconds
 2.702550154910963E-008        2.699115968916376E-008        8.819804300352050E-011        3.645503558776434E-013        6.411839505507341E-
018       TIME =  0.24997240E-02 DT =  0.26333071E-05 SUM OF SQUARES =  0.64118395E-17
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.60758572E-03 AND   0.60758572E-03
```

```
 POSITION OF INTERFACE FERRITE / AUSTENITE IS   0.71882810E-06
 U-FRACTION IN SYSTEM:  C = 9.18427804299815E-04  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-06 [m]
  CPU time used in timestep                    0  seconds
 1.191723590417681E-006        1.191408793300165E-006        1.881599553681577E-009        3.489617124379390E-012        1.216770543076059E-
017       TIME =  0.25000000E-02 DT =  0.27597876E-06 SUM OF SQUARES =  0.12167705E-16
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.10657228E-02 AND   0.10657228E-02
 POSITION OF INTERFACE FERRITE / AUSTENITE IS   0.71912222E-06
 U-FRACTION IN SYSTEM:  C = 9.19856765262792E-04  FE = 1
 TOTAL SIZE OF SYSTEM:  1E-06 [m]
 MUST SAVE WORKSPACE ON FILE
 WORKSPACE SAVED ON FILE
 RECLAIMING WORKSPACE
 DELETING TIME-RECORD FOR TIME    0.0000000
 DELETING TIME-RECORD FOR TIME   0.10000000E-06
 DELETING TIME-RECORD FOR TIME   0.30000000E-06
 DELETING TIME-RECORD FOR TIME   0.70000000E-06
 DELETING TIME-RECORD FOR TIME   0.15000000E-05
 DELETING TIME-RECORD FOR TIME   0.31000000E-05
 DELETING TIME-RECORD FOR TIME   0.63000000E-05
 DELETING TIME-RECORD FOR TIME   0.75544080E-05
 DELETING TIME-RECORD FOR TIME   0.10063224E-04
 DELETING TIME-RECORD FOR TIME   0.15080856E-04
 DELETING TIME-RECORD FOR TIME   0.25023807E-04
 DELETING TIME-RECORD FOR TIME   0.44909710E-04
 DELETING TIME-RECORD FOR TIME   0.80648021E-04
 DELETING TIME-RECORD FOR TIME   0.13180785E-03
 DELETING TIME-RECORD FOR TIME   0.19798464E-03
 DELETING TIME-RECORD FOR TIME   0.27942201E-03
 DELETING TIME-RECORD FOR TIME   0.37639362E-03
 DELETING TIME-RECORD FOR TIME   0.48934339E-03
 DELETING TIME-RECORD FOR TIME   0.61915242E-03
 DELETING TIME-RECORD FOR TIME   0.76215067E-03
 DELETING TIME-RECORD FOR TIME   0.90545598E-03
 DELETING TIME-RECORD FOR TIME   0.10492878E-02
 DELETING TIME-RECORD FOR TIME   0.11937426E-02
 DELETING TIME-RECORD FOR TIME   0.13387337E-02
 DELETING TIME-RECORD FOR TIME   0.14842001E-02
 DELETING TIME-RECORD FOR TIME   0.16306187E-02
 DELETING TIME-RECORD FOR TIME   0.17788612E-02
 DELETING TIME-RECORD FOR TIME   0.19290777E-02
 DELETING TIME-RECORD FOR TIME   0.20812340E-02
 DELETING TIME-RECORD FOR TIME   0.22089892E-02
 DELETING TIME-RECORD FOR TIME   0.22991889E-02
 DELETING TIME-RECORD FOR TIME   0.23623992E-02
 DELETING TIME-RECORD FOR TIME   0.24071859E-02
 DELETING TIME-RECORD FOR TIME   0.24387459E-02
 DELETING TIME-RECORD FOR TIME   0.24605715E-02
 DELETING TIME-RECORD FOR TIME   0.24754479E-02
 DELETING TIME-RECORD FOR TIME   0.24857463E-02
 DELETING TIME-RECORD FOR TIME   0.24926481E-02
 DELETING TIME-RECORD FOR TIME   0.24970907E-02

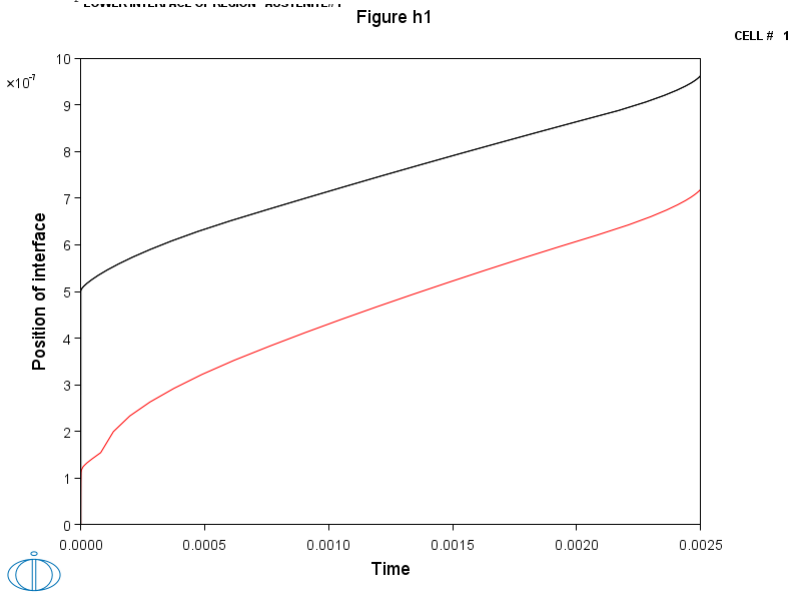
 KEEPING TIME-RECORD FOR TIME   0.24997240E-02
 AND FOR TIME                   0.25000000E-02
 WORKSPACE RECLAIMED

 TIMESTEP AT    0.250000000E-02 SELECTED

DIC>
DIC>
DIC> set-inter
 --OK---
DIC>
```

exh1-plot

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exh1\plot.DCM.test"
DIC>
DIC> @@
DIC> @@ GO TO THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  2.50000E-03
DIC>
DIC> read exh1
 OK
DIC>
DIC> @@
DIC> @@ GO TO THE POST PROCESSOR
DIC> @@
DIC> post
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1: @@
POST-1: @@ SET THE DATA APPENDED FROM THE "EXP" FILE TO BE READ
POST-1: @@
POST-1: set-col for for red
 COMMAND NOT SUPPORTED IN THIS PLOT DRIVER
POST-1:
POST-1: @@
POST-1: @@ COMPARE THE POSITION OF THE INTERFACE AS A FUNCTION OF TIME
POST-1: @@
POST-1: s-d-a x time
  INFO: Time is set as independent variable
POST-1: s-d-a y posi aus low
POST-1:
POST-1: @@
POST-1: @@ APPEND THE SIMULATION (WITHOUT THE ENERGY CONTRIBUTION) FROM FILE
POST-1: @@
POST-1: app y noadd.exp 1; 1
POST-1:
POST-1: @@
POST-1: @@ SET A TITLE ON THE PLOT
POST-1: @@
POST-1: set-title Figure h1
POST-1:
POST-1: @@
POST-1: @@ PLOT THE RESULTS
POST-1: @@
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
WORKING ...
WORKING ...           OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

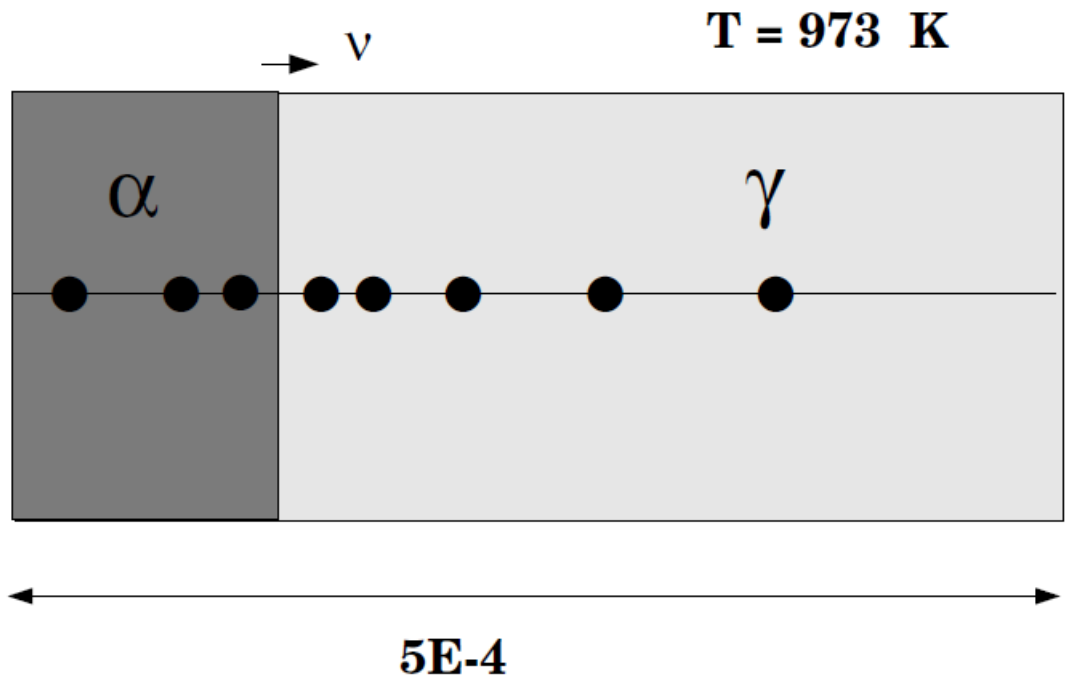



```
POST-1:
POST-1:
POST-1: set-inter
 --OK---
POST-1:
```

Example exh2

α/γ para-equilibrium in an Fe-Ni-C alloy

This example calculates the growth of ferrite (α) into austenite (γ) in an Fe-2.02%Ni-0.0885%C alloy using the para-equilibrium model. The results are compared with experimental information from Hutchinson, C. R., A. Fuchsmann, and Yves Brechet. "The diffusional formation of ferrite from austenite in Fe-C-Ni alloys." Met. Mat. Trans A 35.4 (2004): 1211-1221.



exh2-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exh2\setup.DCM.test"
SYS: @@
SYS: @@ Deviation from local equilibrium.
SYS: @@ Ferrite/austenite para-equilibrium in an Fe-Ni-C alloy
SYS: @@ This example calculates the growth of ferrite into austenite
SYS: @@ in an Fe-2.02%Ni-0.0885%C alloy using the para-equilibrium model.
SYS: @@ The results are compared with experimental information from
SYS: @@ Hutchinson, C. R., A. Fuchsmann, and Yves Brechet. "The diffusional
SYS: @@ formation of ferrite from austenite in Fe-C-Ni alloys." Metall.
SYS: @@  Mat. Trans. A 35.4 (2004): 1211-1221.
SYS: @@----------------------------------------------------------------------
SYS:
SYS: @@
SYS: @@ RETRIEVE DATA FROM THE DATABASE
SYS: @@
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                       /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12:
TDB_TCFE12: @@
TDB_TCFE12: @@ SELECT A DATABASE FOR THERMODYNAMIC DATA
TDB_TCFE12: @@
TDB_TCFE12: sw fedemo
 Current database: Iron Demo Database v6.0

 VA                       /-  DEFINED
TDB_FEDEMO: def-sys fe ni c
 FE                       NI                       C
   DEFINED
TDB_FEDEMO: rej ph * all
 GAS:G                    LIQUID:L                 BCC_A2
 C14_LAVES                CBCC_A12                 CEMENTITE_D011
 CUB_A13                  DIAMOND_A4               FCC_A1
 GRAPHITE_A9              HCP_A3                   KSI_CARBIDE
 M23C6_D84                M5C2                     M7C3_D101
   REJECTED
TDB_FEDEMO: res ph bcc fcc
 BCC_A2                   FCC_A1  RESTORED
TDB_FEDEMO: get
12:06:37,741 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ SWITCH TO A MOBILITY DATABASE TO RETRIEVE MOBILITY DATA
TDB_FEDEMO: @@
TDB_FEDEMO: app mfedemo
 Current database: Fe-Alloys Mobility demo database v5.0

 VA  DEFINED
APP: def-sys fe ni c
 FE                       NI                       C
   DEFINED
APP: rej ph * all
 BCC_A2                   FCC_A1                   CEMENTITE_D011
 LIQUID:L  REJECTED
APP: res ph bcc fcc
 BCC_A2                   FCC_A1  RESTORED
APP: get
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
APP:
APP: @@
APP: @@ ENTER THE DICTRA MONITOR
APP: @@
APP: go d-m
 NO TIME STEP DEFINED
DIC>
DIC> @@
DIC> @@ ENTER THE GLOBAL CONDITION T
DIC> @@
DIC> set-cond glob T 0 973; * N
DIC>
DIC> @@
DIC> @@ START BY ENTERING THE REGIONS ferrite AND austenite WHERE THE
```

```
DIC> @@ BCC AND FCC PHASES ARE PUT, RESPECTIVELY. THE FERRITE REGION IS
DIC> @@ ASSUMED INITIALLY TO BE VERY THIN, 1E-9 METERS.
DIC> @@
DIC> enter-region
REGION NAME : ferrite
DIC>
DIC> enter-region
REGION NAME : austenite
ATTACH TO REGION NAMED /FERRITE/:
ATTACHED TO THE RIGHT OF FERRITE /YES/:
DIC>
DIC> @@
DIC> @@ ENTER GRIDS INTO THE REGIONS
DIC> @@
DIC> enter-grid
REGION NAME : /FERRITE/: ferrite
WIDTH OF REGION /1/: 1e-9
TYPE /AUTO/: AUTO
DIC>
DIC> enter-grid austenite
WIDTH OF REGION /1/: 50e-6
TYPE /AUTO/: AUTO
DIC>
DIC> @@
DIC> @@ ENTER active PHASES INTO THE REGIONS
DIC> @@
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: active
REGION NAME : /FERRITE/: ferrite
PHASE TYPE /MATRIX/: matrix
PHASE NAME: /NONE/: bcc
DIC>
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: active
REGION NAME : /AUSTENITE/: austenite
PHASE TYPE /MATRIX/: matrix
PHASE NAME: /NONE/: fcc#1
DIC>
DIC>
DIC>
DIC> @@
DIC> @@ ENTER THE INITIAL COMPOSITION INTO BCC
DIC> @@
DIC> enter-composition
REGION NAME : /FERRITE/: ferrite
PHASE NAME: /BCC_A2/: bcc
DEPENDENT COMPONENT ? /NI/: fe
COMPOSITION TYPE /MOLE_FRACTION/: w-p
PROFILE FOR /C/: c
TYPE /LINEAR/: linear
VALUE OF FIRST POINT : 0.0885
VALUE OF LAST POINT : /8.85E-2/: 0.0885
PROFILE FOR /NI/: ni
TYPE /LINEAR/: linear
VALUE OF FIRST POINT : 2.02
VALUE OF LAST POINT : /2.02/: 2.02
DIC>
DIC> @@
DIC> @@ ENTER THE INITIAL COMPOSITION INTO FCC
DIC> @@
DIC> enter-composition
REGION NAME : /AUSTENITE/: austenite
PHASE NAME: /FCC_A1/: fcc#1
DEPENDENT COMPONENT ? /NI/: fe
COMPOSITION TYPE /MOLE_FRACTION/: w-p
PROFILE FOR /C/: c
TYPE /LINEAR/: linear
VALUE OF FIRST POINT : 0.0885
VALUE OF LAST POINT : /8.85E-2/: 0.0885
PROFILE FOR /NI/: ni
TYPE /LINEAR/: linear
VALUE OF FIRST POINT : 2.02
VALUE OF LAST POINT : /2.02/: 2.02
DIC>
DIC>
DIC> @@
DIC> @@ SAVE THE SET UP TO A NEW STORE FILE AND EXIT
DIC> @@
DIC> save exh2 y
DIC>
DIC> set-inter
 --OK---
DIC>
```

exh2-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exh2\run.DCM.test"
DIC>
DIC>
DIC>
DIC> @@
DIC> @@ FILE TO RUN EXAMPLE exh2
DIC> @@
DIC>
DIC> @@
DIC> @@ READ THE SETUP FROM FILE
DIC> @@
DIC>
DIC> go d-m
 TIME STEP AT TIME  0.00000E+00
DIC>
DIC> read exh2
 OK
DIC>
DIC> @@
DIC> @@ SET THE SIMULATION TIME
DIC> @@
DIC> set-sim-time 50,,,,,,,,,
DIC>
DIC>
DIC>
DIC> @@
DIC> @@ ENABLE THE PARA-EQUILIBRIUM MODEL
DIC> @@
DIC> para
ENABLE PARAEQ : /NO/: YES
U-FRACTION OF COMPONENT FE /AUTO/: AUTO
U-FRACTION OF COMPONENT NI /AUTO/: AUTO
DIC>
DIC> @@
DIC> @@ START THE SIMULATION
DIC> @@
DIC> sim
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 Region: FERRITE
 geometric   0.964171     dense at   0.100000E-08   51 points
 Region: AUSTENITE
 geometric    1.20000     dense at    0.00000       57 points
 DEGREE OF IMPLICITY SET TO TRAPEZOIDAL RULE
  Trying old scheme                      4
 GENERATING STARTING VALUES FOR CELL #  1 INTERFACE #  2
 DETERMINING INITIAL EQUILIBRIUM VALUES
CALCULATING STARTING VALUES:       9   EQUILIBRIUM CALCULATIONS              DONE     6 OUT OF     9
 DETERMINED ACTIVITIES  ACR(C)  .161541295585
  UNABLE TO OBTAIN GOOD STARTING VALUE USING THE OLD SCHEME
  Trying new scheme
 GENERATING STARTING VALUES FOR CELL #  1 INTERFACE #  2
 DETERMINING INITIAL EQUILIBRIUM VALUES
CALCULATING STARTING VALUES:      18   EQUILIBRIUM CALCULATIONS              DONE       1 OUT OF      18
 U-FRACTION IN SYSTEM:  C = .00412262676333  FE = .980742621143593
                        NI = .0192573788564064
 TOTAL SIZE OF SYSTEM:  5.0001E-05 [m]
 U-FRACTION IN SYSTEM:  C = .00412262676333  FE = .980742621143593
                        NI = .0192573788564064
 TOTAL SIZE OF SYSTEM:  5.0001E-05 [m]
  2232.10933123601         2232.10933123118         2228.18553675641         2.32388314928639        1.991496426446273E-
003        8.452960099771964E-003        4.785304810655034E-005        1.932479770378503E-003        4.194261193685144E-
005        3.202374887548627E-005        1.619456673150708E-005        1.959968179465662E-003        5.697674549899568E-
007        1.328945618892549E-017       TIME =  0.10000000E-06 DT =  0.10000000E-06 SUM OF SQUARES =  0.42881043E-20
 CELL # 1 VELOCITY AT INTERFACE # 2 IS    3.1432820     AND    3.1432820
 POSITION OF INTERFACE FERRITE / AUSTENITE IS   0.31532820E-06
 U-FRACTION IN SYSTEM:  C = .00413396129130636  FE = .980742621143594
                        NI = .0192573788564064
 TOTAL SIZE OF SYSTEM:  5.0001E-05 [m]
  46  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: FERRITE

  CPU time used in timestep                    3  seconds
  2189.02053454150         2189.02053456980         2185.12797661083         2.22502445772034        1.912761745800095E-
003        7.928642173764768E-003        7.405444038852032E-005        1.965446429817397E-003

output ignored...



... output resumed

  1192.63240703101         1189.62544886548        0.586696638545274        2.470345208986976E-004        1.628948379719393E-
006        7.424235330307716E-010        2.065845559790816E-003        5.084320359545113E-
019       TIME =   36.593206     DT =   5.0000000     SUM OF SQUARES =  0.50843153E-18
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.20310173E-06 AND   0.20310173E-06
 POSITION OF INTERFACE FERRITE / AUSTENITE IS   0.11911120E-04
 U-FRACTION IN SYSTEM:  C = .00414772184447735  FE = .980742621143593
                        NI = .0192573788564067
 TOTAL SIZE OF SYSTEM:  5.0001E-05 [m]
  20  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: FERRITE

  CPU time used in timestep                    1  seconds
  1169.39662305032         1169.39662305223         1166.41547026096        0.562252748964268        2.317822579808669E-
004        1.486139663754339E-006        6.540072287920605E-010        2.068868732339013E-003        4.878910704123769E-
019       TIME =   41.593206     DT =   5.0000000     SUM OF SQUARES =  0.48789098E-18
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.19170532E-06 AND   0.19170532E-06
 POSITION OF INTERFACE FERRITE / AUSTENITE IS   0.12869647E-04
 U-FRACTION IN SYSTEM:  C = .00414851113638844  FE = .980742621143593
                        NI = .0192573788564067
 TOTAL SIZE OF SYSTEM:  5.0001E-05 [m]
  15  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: FERRITE

  CPU time used in timestep                    1  seconds
  1146.60821566302         1146.60821566340         1143.65269377647        0.538840294099288        2.174785349378767E-
004        1.441568849099777E-006        6.240080177561884E-010        2.071959967181790E-003        4.777796568753878E-
019       TIME =   46.593206     DT =   5.0000000     SUM OF SQUARES =  0.47777952E-18
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.18195627E-06 AND   0.18195627E-06
 POSITION OF INTERFACE FERRITE / AUSTENITE IS   0.13779428E-04
 U-FRACTION IN SYSTEM:  C = .00414912963525125  FE = .980742621143593
                        NI = .0192573788564067
```

```
 TOTAL SIZE OF SYSTEM:  5.0001E-05 [m]
  10  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: FERRITE

  CPU time used in timestep                    1  seconds
  1124.25873624323         1124.25873624031         1121.32867092848        0.516415094017740        2.040662887025250E-
004        7.872234679590309E-005        3.067898117565920E-008        2.162134064338327E-011        2.058540750034059E-
003        1.529953261058165E-020       TIME =   49.384484     DT =   2.7912777     SUM OF SQUARES =  0.15299533E-19
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.20010318E-06 AND   0.20010318E-06
 POSITION OF INTERFACE FERRITE / AUSTENITE IS   0.14337972E-04
 U-FRACTION IN SYSTEM:  C = .00415071769735891  FE = .980742621143593
                        NI = .0192573788564068
 TOTAL SIZE OF SYSTEM:  5.0001E-05 [m]
  8  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: FERRITE

  CPU time used in timestep                    1  seconds
  1102.33989364269         1102.33989364416         1099.43511073552        0.494935036536964        1.915026073437086E-
004        8.105440426900372E-004        2.829100764335205E-008        2.063250973221209E-003        2.484685044519068E-
009        7.341481014364588E-016       TIME =   50.000000     DT =  0.61551595     SUM OF SQUARES =  0.18428261E-16
 CELL # 1 VELOCITY AT INTERFACE # 2 IS   0.25861680E-06 AND   0.25861680E-06
 POSITION OF INTERFACE FERRITE / AUSTENITE IS   0.14497155E-04
 U-FRACTION IN SYSTEM:  C = .00415225389931968  FE = .980742621143593
                        NI = .0192573788564068
 TOTAL SIZE OF SYSTEM:  5.0001E-05 [m]
 MUST SAVE WORKSPACE ON FILE
 WORKSPACE SAVED ON FILE
 RECLAIMING WORKSPACE
 DELETING TIME-RECORD FOR TIME    0.0000000
 DELETING TIME-RECORD FOR TIME   0.10000000E-06
 DELETING TIME-RECORD FOR TIME   0.20000000E-06
 DELETING TIME-RECORD FOR TIME   0.39649286E-06
 DELETING TIME-RECORD FOR TIME   0.78947858E-06
 DELETING TIME-RECORD FOR TIME   0.15754500E-05
 DELETING TIME-RECORD FOR TIME   0.31473929E-05
 DELETING TIME-RECORD FOR TIME   0.62912787E-05
 DELETING TIME-RECORD FOR TIME   0.12579050E-04
 DELETING TIME-RECORD FOR TIME   0.25154593E-04
 DELETING TIME-RECORD FOR TIME   0.50305679E-04
 DELETING TIME-RECORD FOR TIME   0.10060785E-03
 DELETING TIME-RECORD FOR TIME   0.20121220E-03
 DELETING TIME-RECORD FOR TIME   0.40242089E-03
 DELETING TIME-RECORD FOR TIME   0.80483826E-03
 DELETING TIME-RECORD FOR TIME   0.16096730E-02
 DELETING TIME-RECORD FOR TIME   0.32193425E-02
 DELETING TIME-RECORD FOR TIME   0.64386816E-02
 DELETING TIME-RECORD FOR TIME   0.12877360E-01
 DELETING TIME-RECORD FOR TIME   0.25754716E-01
 DELETING TIME-RECORD FOR TIME   0.51509428E-01
 DELETING TIME-RECORD FOR TIME   0.10301885
 DELETING TIME-RECORD FOR TIME   0.20603770
 DELETING TIME-RECORD FOR TIME   0.41207540
 DELETING TIME-RECORD FOR TIME   0.82415080
 DELETING TIME-RECORD FOR TIME    1.6483016
 DELETING TIME-RECORD FOR TIME    3.2966032
 DELETING TIME-RECORD FOR TIME    6.5932063
 DELETING TIME-RECORD FOR TIME    11.593206
 DELETING TIME-RECORD FOR TIME    16.593206
 DELETING TIME-RECORD FOR TIME    21.593206
 DELETING TIME-RECORD FOR TIME    26.593206
 DELETING TIME-RECORD FOR TIME    31.593206
 DELETING TIME-RECORD FOR TIME    36.593206
 DELETING TIME-RECORD FOR TIME    41.593206
 DELETING TIME-RECORD FOR TIME    46.593206

 KEEPING TIME-RECORD FOR TIME    49.384484
 AND FOR TIME                    50.000000
 WORKSPACE RECLAIMED

 TIMESTEP AT     50.0000000     SELECTED

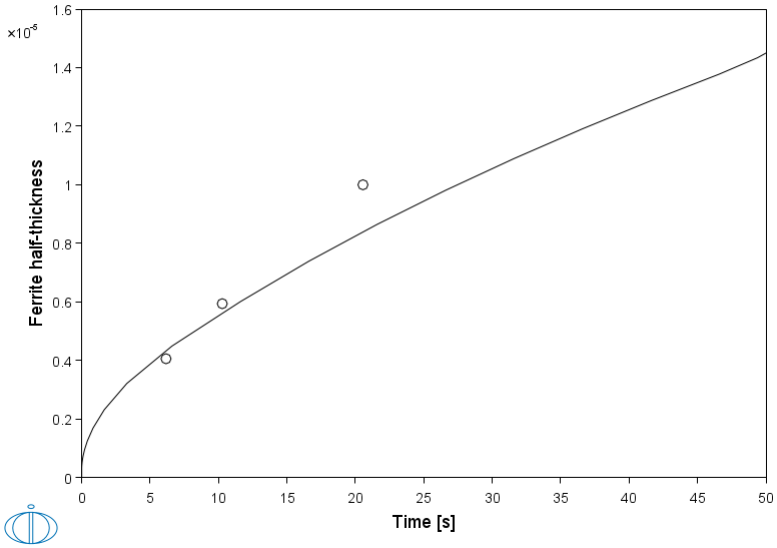
DIC>
DIC>
DIC> set-inter
 --OK---
DIC>
```

exh2-plot

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exh2\plot.DCM.test"
DIC>
DIC> @@
DIC> @@ GO TO THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  5.00000E+01
DIC>
DIC> read exh2
 OK
DIC>
DIC> @@
DIC> @@ GO TO THE POST PROCESSOR
DIC> @@
DIC> post
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1:
POST-1: @@
POST-1: @@ WE WANT TO PLOT THE POSITION OF THE INTERFACE AS A FUNCTION OF TIME
POST-1: @@ I.E. THE FERRITE HALF-THICKNESS
POST-1: @@
POST-1: s-d-a x time
  INFO: Time is set as independent variable
POST-1: s-d-a y posi aus low
POST-1:
POST-1: @@
POST-1: @@ APPEND THE EXPERIMENTAL INFORMATION
POST-1: @@
POST-1: app y exh2.exp 1; 1
POST-1:
POST-1: @@
POST-1: @@ SET A TITLE ON THE PLOT
POST-1: @@
POST-1: set-title Figure h2
POST-1:
POST-1: @@
POST-1: @@ RENAME THE AXIS LABELS
POST-1: @@
POST-1: set-axis-text-status
AXIS (X, Y OR Z) : x
AUTOMATIC AXIS TEXT  (Y OR N) /N/: NO
AXIS TEXT : Time [s]
POST-1:
POST-1: set-axis-text-status
AXIS (X, Y OR Z) : y
AUTOMATIC AXIS TEXT  (Y OR N) /N/: NO
AXIS TEXT : Ferrite half-thickness
POST-1:
POST-1: @@
POST-1: @@ PLOT THE RESULTS
POST-1: @@
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y

           OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

Figure h2



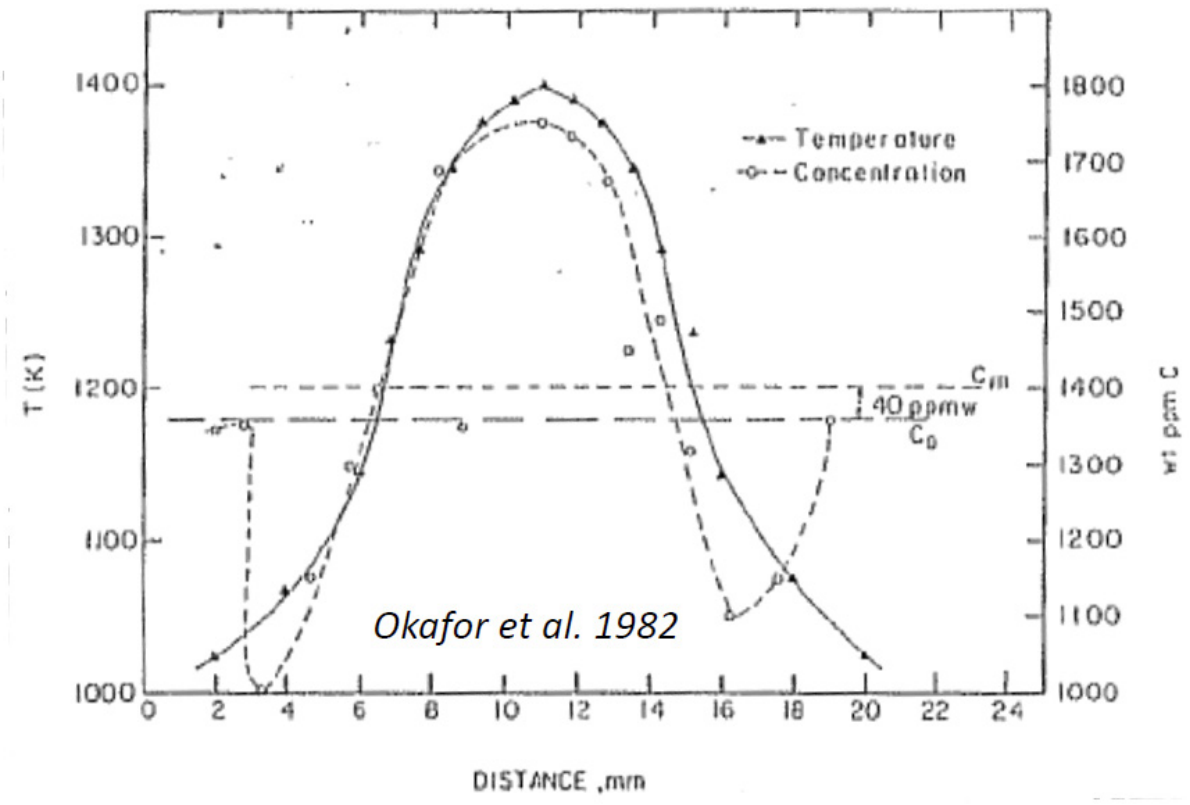

```
POST-1:
POST-1:
POST-1:
POST-1: set-inter
 --OK---
POST-1:
```

Example exh3

Diffusion induced by a temperature gradient (thermomigration)

This calculation shows how a temperature gradient induces diffusion.

$$J_C = -\frac{u_C}{V_s} y_{Va} M_{CVa} \left(\frac{\partial \mu_C}{\partial x} + \frac{Q_C^*}{T} \frac{\partial T}{\partial x} \right)$$



exh3-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exh3\setup.DCM.test"
SYS: @@
SYS: @@ Deviation from local equilibrium.
SYS: @@ Diffusion induced by a temperature gradient (thermomigration)
SYS: @@ This calculation shows how a temperature gradient induces
SYS: @@ diffusion.
SYS: @@------------------------------------------------------------------
SYS:
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                     /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12: sw fedemo
 Current database: Iron Demo Database v6.0

 VA                     /-  DEFINED
TDB_FEDEMO: def-sys fe ni c
 FE                     NI                     C
   DEFINED
TDB_FEDEMO: rej ph * all
 GAS:G                  LIQUID:L               BCC_A2
 C14_LAVES              CBCC_A12               CEMENTITE_D011
 CUB_A13                DIAMOND_A4             FCC_A1
 GRAPHITE_A9            HCP_A3                 KSI_CARBIDE
 M23C6_D84              M5C2                   M7C3_D101
   REJECTED
TDB_FEDEMO: res ph fcc graph
 FCC_A1                 GRAPHITE_A9  RESTORED
TDB_FEDEMO: get
12:09:59,549 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_FEDEMO: app mfedemo
 Current database: Fe-Alloys Mobility demo database v5.0

 VA  DEFINED
APP: def-sys fe ni c
 FE                     NI                     C
   DEFINED
APP: rej ph * all
 BCC_A2                 FCC_A1                 CEMENTITE_D011
 LIQUID:L  REJECTED
APP: res ph fcc
 FCC_A1  RESTORED
APP: get
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
APP:
APP: go d-m
 NO TIME STEP DEFINED
 *** ENTERING GRAPHITE_A9 AS A DIFFUSION NONE PHASE
DIC>
DIC> @@ ENTER A GAUSSIAN-SHAPED TEMPERATURE GRADIENT
DIC> set-cond glob T 0 1000+400*exp(-3.35074E4*(x-11e-3)**2); * N
DIC>
DIC> set-ref C grap,,,,,,,,,,
DIC>
DIC> ent-reg aus,,,,,,
DIC>
DIC> ent-grid aus 25e-3 auto
DIC>
DIC> ent-pha act aus matrix fcc#1
DIC>
DIC> ent-comp aus fcc#1 fe w-p
PROFILE FOR /C/: c lin 0.14 0.14
PROFILE FOR /NI/: ni lin 32.5 32.5
DIC>
DIC> s-s-time 5E7,,,,,,,,,,,
DIC>
DIC> @@ ENTER THE HEAT OF TRANSFER PARAMETER FOR CARBON
DIC> ent-heat-tra-p
HEAT TRANSFER PARAMETER FOR PHASE: fcc
ELEMENT: C
PARAMETER /0/: -42000
DIC>
DIC>
```

```
DIC> save exh3 y
DIC>
DIC> set-inter
 --OK---
DIC>
```

exh3-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exh3\run.DCM.test"
DIC>
DIC> go d-m
 TIME STEP AT TIME  0.00000E+00
 *** ENTERING GRAPHITE_A9 AS A DIFFUSION NONE PHASE
DIC>
DIC> read exh3
 OK
DIC>
DIC> sim
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 Region: AUS
 linear    50 points
 DEGREE OF IMPLICITY SET TO TRAPEZOIDAL RULE
 U-FRACTION IN SYSTEM:  C = .00662305741857946  FE = .685349154604931
                        NI = .31465084539507
 TOTAL SIZE OF SYSTEM:  .025 [m]
 U-FRACTION IN SYSTEM:  C = .00662305741857946  FE = .685349154604931
                        NI = .31465084539507
 TOTAL SIZE OF SYSTEM:  .025 [m]
 TIME =  0.10000000E-06 DT =  0.10000000E-06 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00662305741857946  FE = .685349154604931
                        NI = .31465084539507
 TOTAL SIZE OF SYSTEM:  .025 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.10010000E-03 DT =  0.10000000E-03 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00662305741857946  FE = .685349154604931
                        NI = .31465084539507
 TOTAL SIZE OF SYSTEM:  .025 [m]
  CPU time used in timestep                    0  seconds
 TIME =  0.40010010     DT =  0.40000000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00662305741857947  FE = .685349154604931
                        NI = .31465084539507
 TOTAL SIZE OF SYSTEM:  .025 [m]
  CPU time used in timestep                    1  seconds
 TIME =   1627.0525     DT =   1626.6524     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00662305741857947  FE = .68534915460493
                        NI = .31465084539507
 TOTAL SIZE OF SYSTEM:  .025 [m]
  CPU time used in timestep                    0  seconds
 TIME =   170014.89     DT =   168387.83     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00662305741834655  FE = .685349154604931
                        NI = .31465084539507
 TOTAL SIZE OF SYSTEM:  .025 [m]
  CPU time used in timestep                    1  seconds
 TIME =   506790.55     DT =   336775.67     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00662305741835073  FE = .685349154604931
                        NI = .31465084539507
 TOTAL SIZE OF SYSTEM:  .025 [m]
  CPU time used in timestep                    0  seconds
 TIME =   1180341.9     DT =   673551.33     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00662305741835076  FE = .68534915460493
                        NI = .31465084539507
 TOTAL SIZE OF SYSTEM:  .025 [m]
  CPU time used in timestep                    0  seconds
 TIME =   2527444.6     DT =   1347102.7     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00662305741835495  FE = .68534915460493
                        NI = .31465084539507
 TOTAL SIZE OF SYSTEM:  .025 [m]
  CPU time used in timestep                    1  seconds
 TIME =   5221649.9     DT =   2694205.3     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00662305741836956  FE = .68534915460493
                        NI = .31465084539507
 TOTAL SIZE OF SYSTEM:  .025 [m]
  CPU time used in timestep                    0  seconds
 TIME =   10221650.     DT =   5000000.0     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00662305741846215  FE = .68534915460493
                        NI = .31465084539507
 TOTAL SIZE OF SYSTEM:  .025 [m]
  CPU time used in timestep                    0  seconds
 TIME =   14360595.     DT =   4138945.1     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00662305741847918  FE = .68534915460493
                        NI = .31465084539507
 TOTAL SIZE OF SYSTEM:  .025 [m]
  CPU time used in timestep                    0  seconds
 TIME =   18263542.     DT =   3902946.9     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00662305741849128  FE = .68534915460493
                        NI = .314650845395069
 TOTAL SIZE OF SYSTEM:  .025 [m]
  CPU time used in timestep                    1  seconds
 TIME =   22078920.     DT =   3815377.7     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00662305741849863  FE = .685349154604931
                        NI = .31465084539507
 TOTAL SIZE OF SYSTEM:  .025 [m]
  CPU time used in timestep                    0  seconds
 TIME =   25858793.     DT =   3779873.2     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00662305741850394  FE = .68534915460493
                        NI = .314650845395069
 TOTAL SIZE OF SYSTEM:  .025 [m]
  CPU time used in timestep                    0  seconds
 TIME =   29624578.     DT =   3765785.5     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00662305741807207  FE = .68534915460493
                        NI = .31465084539507
 TOTAL SIZE OF SYSTEM:  .025 [m]
  CPU time used in timestep                    0  seconds
 TIME =   33385416.     DT =   3760837.2     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00662305741776046  FE = .685349154604931
                        NI = .31465084539507
 TOTAL SIZE OF SYSTEM:  .025 [m]
  CPU time used in timestep                    0  seconds
 TIME =   37145195.     DT =   3759779.4     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00662305741702901  FE = .68534915460493
                        NI = .31465084539507
 TOTAL SIZE OF SYSTEM:  .025 [m]
  CPU time used in timestep                    1  seconds
 TIME =   40905511.     DT =   3760316.4     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00662305741643541  FE = .68534915460493
                        NI = .31465084539507
 TOTAL SIZE OF SYSTEM:  .025 [m]
  CPU time used in timestep                    0  seconds
```

```
 TIME =   44294168.     DT =   3388657.1     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00662305741601727  FE = .68534915460493
                        NI = .31465084539507
 TOTAL SIZE OF SYSTEM:  .025 [m]
  CPU time used in timestep                    0  seconds
 TIME =   46438546.     DT =   2144377.3     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00662305741583866  FE = .68534915460493
                        NI = .31465084539507
 TOTAL SIZE OF SYSTEM:  .025 [m]
  CPU time used in timestep                    0  seconds
 TIME =   47961210.     DT =   1522664.7     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00662305741574719  FE = .68534915460493
                        NI = .31465084539507
 TOTAL SIZE OF SYSTEM:  .025 [m]
  CPU time used in timestep                    0  seconds
 TIME =   49233541.     DT =   1272330.7     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00662305741568699  FE = .68534915460493
                        NI = .31465084539507
 TOTAL SIZE OF SYSTEM:  .025 [m]
  CPU time used in timestep                    1  seconds
 TIME =   49869706.     DT =   636165.36     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00662305741567134  FE = .68534915460493
                        NI = .31465084539507
 TOTAL SIZE OF SYSTEM:  .025 [m]
  CPU time used in timestep                    0  seconds
 TIME =   50000000.     DT =   130293.61     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  C = .00662305741567247  FE = .68534915460493
                        NI = .314650845395069
 TOTAL SIZE OF SYSTEM:  .025 [m]
 MUST SAVE WORKSPACE ON FILE
 WORKSPACE SAVED ON FILE
 RECLAIMING WORKSPACE
 DELETING TIME-RECORD FOR TIME    0.0000000
 DELETING TIME-RECORD FOR TIME   0.10000000E-06
 DELETING TIME-RECORD FOR TIME   0.10010000E-03
 DELETING TIME-RECORD FOR TIME   0.40010010
 DELETING TIME-RECORD FOR TIME    1627.0525
 DELETING TIME-RECORD FOR TIME    170014.89
 DELETING TIME-RECORD FOR TIME    506790.55
 DELETING TIME-RECORD FOR TIME    1180341.9
 DELETING TIME-RECORD FOR TIME    2527444.6
 DELETING TIME-RECORD FOR TIME    5221649.9
 DELETING TIME-RECORD FOR TIME    10221650.
 DELETING TIME-RECORD FOR TIME    14360595.
 DELETING TIME-RECORD FOR TIME    18263542.
 DELETING TIME-RECORD FOR TIME    22078920.
 DELETING TIME-RECORD FOR TIME    25858793.
 DELETING TIME-RECORD FOR TIME    29624578.
 DELETING TIME-RECORD FOR TIME    33385416.
 DELETING TIME-RECORD FOR TIME    37145195.
 DELETING TIME-RECORD FOR TIME    40905511.
 DELETING TIME-RECORD FOR TIME    44294168.
 DELETING TIME-RECORD FOR TIME    46438546.
 DELETING TIME-RECORD FOR TIME    47961210.
 DELETING TIME-RECORD FOR TIME    49233541.

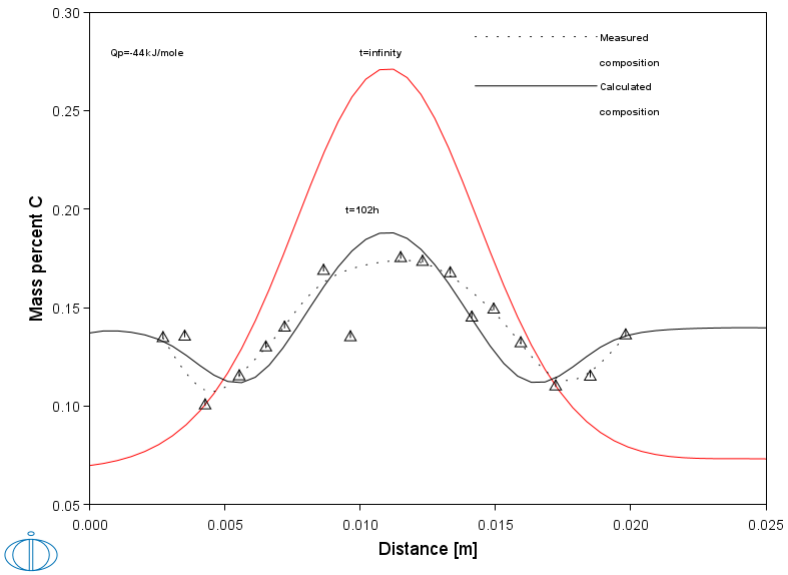
 KEEPING TIME-RECORD FOR TIME    49869706.
 AND FOR TIME                    50000000.
 WORKSPACE RECLAIMED

 TIMESTEP AT     50000000.0     SELECTED

DIC>
DIC> set-inter
 --OK---
DIC>
```

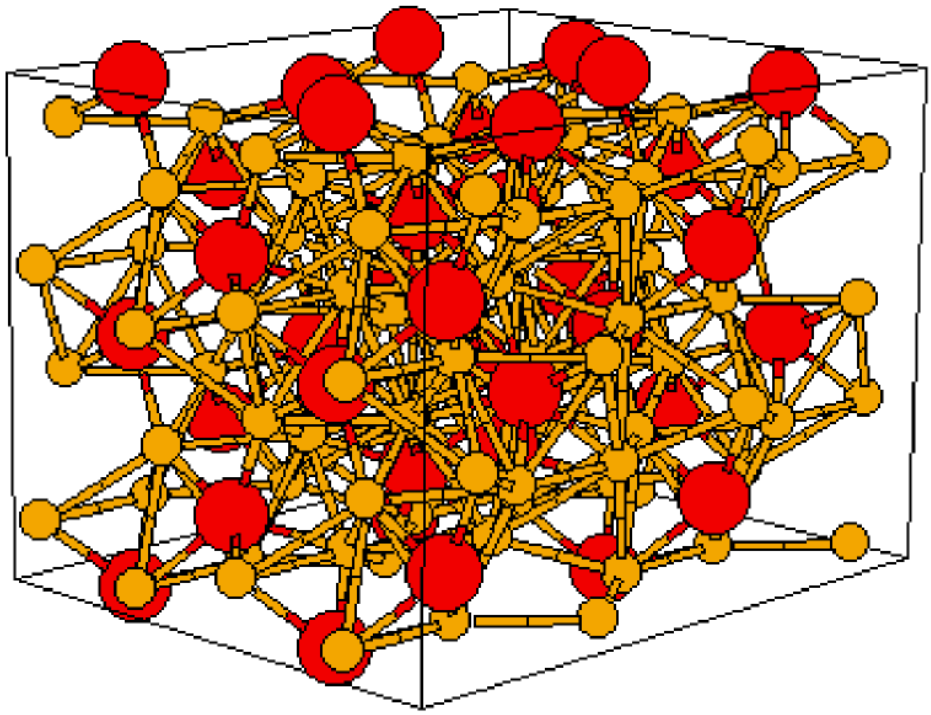
exh3-plot

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exh3\plot.DCM.test"
DIC> go d-m
 TIME STEP AT TIME  5.00000E+07
 *** ENTERING GRAPHITE_A9 AS A DIFFUSION NONE PHASE
DIC>
DIC>
DIC> read exh3
 OK
DIC>
DIC> post
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1: s-d-a x dist glob
  INFO: Distance is set as independent variable
POST-1: s-d-a y w-p c
POST-1: s-p-c time 367200 5E7
POST-1: s-s-s y n 0.1 0.18
POST-1: s-s-s y y
POST-1: app y exh3.exp 0; 1 3;
POST-1: s-p-o n y y n y n n,,,,,,,,
POST-1:
POST-1: set-ax-text-st x
AUTOMATIC AXIS TEXT  (Y OR N) /N/: n
AXIS TEXT : Distance [m]
POST-1:
POST-1: set-ax-text-st y
AUTOMATIC AXIS TEXT  (Y OR N) /N/: n
AXIS TEXT : Mass percent C
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```




```
POST-1:
POST-1:
POST-1:
POST-1:
POST-1: set-inter
 --OK---
POST-1:
```

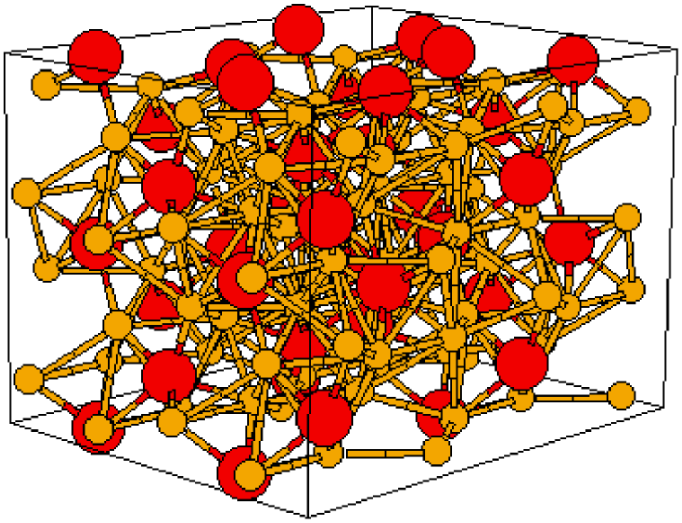
Diffusion in Complex Phases



Example exi1

Diffusion in system with B2 ordering

Diffusion in including effects from chemical ordering. In this example folder, there is also a datafile `AlFeNi-data.TDB`, which contains both a thermodynamic and kinetic description for the ordered and disordered bcc.



exi1-setup

```
SYS:About

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 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exi1\setup.DCM.test"
SYS: @@
SYS: @@ Diffusion in complex phases.
SYS: @@ Diffusion in a system with B2 ordering
SYS: @@ This example shows diffusion in a system with B2 ordering.
SYS: @@ The datafile AlFeNi-data.TDB contains both a thermodynamic
SYS: @@ and kinetic description for the ordered and disordered BCC.
SYS: @@----------------------------------------------------------------------
SYS:
SYS: @@ exi1_setup.DCM
SYS:
SYS:
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                      /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12: sw user AlFeNi-data.TDB
 Current database: User defined Database
This database does not support the DATABASE_INFORMATION command

 VA  DEFINED
12:13:00,632 [Thread-0] INFO  TDBFileParser: USER_1695849785_22, number of lines read: 609
12:13:01,043 [Thread-0] INFO  DatabaseUtils: Parsing of USER_1695849785_22 completed in 486 ms
TDB_USER: def-sys fe al ni
 FE                      AL                      NI
   DEFINED
TDB_USER: rej ph *
 B2_BCC                  BCC_DIS                 B2_ORD
   REJECTED
TDB_USER: res ph bcc_dis b2_ord
 BCC_DIS                 B2_ORD  RESTORED
TDB_USER: get
12:13:01,235 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....
 INFO: Forcing option USE_POLY3 for complex phase B2_ORD
 -OK-
TDB_USER: go -m
 NO TIME STEP DEFINED
DIC> set-cond glob T 0 1277; * N
DIC>
DIC> enter-region beta
DIC>
DIC> enter-grid beta
WIDTH OF REGION /1/: 2e-3
TYPE /AUTO/: double
NUMBER OF POINTS /50/: 50
VALUE OF R IN THE GEOMETRICAL SERIE FOR LOWER PART OF REGION: 0.85
VALUE OF R IN THE GEOMETRICAL SERIE FOR UPPER PART OF REGION: 1.1765
DIC>
DIC> enter-phase
ACTIVE OR INACTIVE PHASE /ACTIVE/: act
REGION NAME : /BETA/: beta
PHASE TYPE /MATRIX/: matrix
PHASE NAME: /NONE/: b2_ord
DIC>
DIC> enter-composition
REGION NAME : /BETA/: beta
PHASE NAME: /B2_ORD/: b2_ord
DEPENDENT COMPONENT ? /NI/: fe
COMPOSITION TYPE /MOLE_FRACTION/: mole-fraction
PROFILE FOR /AL/: ni
TYPE /LINEAR/: function
Function F(X)= 0.28-0.277*erf((x-1e-3)/3e-6);
PROFILE FOR /NI/: al
TYPE /FUNCTION/: function
Function F(X)= 0.4295-0.0105*erf((x-1e-3)/3e-6);
12:13:02,359 [Thread-0] INFO  Database: Preparing system for use: USER_1695849785_22
12:13:02,996 [Thread-0] INFO  Phase: Preparing phase for use: B2_ORD
12:13:03,194 [Thread-0] INFO  Phase: Preparing phase for use: BCC_DIS
DIC>
DIC> set-simulation-time
END TIME FOR INTEGRATION /.1/: 345600
AUTOMATIC TIMESTEP CONTROL /YES/:
MAX TIMESTEP DURING INTEGRATION /34560/:
INITIAL TIMESTEP : /1E-07/:
SMALLEST ACCEPTABLE TIMESTEP : /1E-07/:
DIC> s-a-s-v
AUTOMATIC STARTING VALUES FOR PHASE COMPOSITIONS /YES/: no
START VALUES FOR PHASES IN REGION BETA
PHASE: B2_ORD
MAJOR CONSTITUENTS IN PHASE B2_ORD: NI;AL
DIC>
DIC>
DIC>
DIC>
DIC>
```

```
DIC> save exi1 yes
DIC>
DIC> set-inter
 --OK---
DIC>
```

exi1-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exi1\run.DCM.test"
DIC>
DIC>
DIC> @@ exi1_run.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR RUNNING EXAMPLE i1
DIC> @@
DIC>
DIC> @@
DIC> @@ ENTER THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  0.00000E+00
DIC> read exi1
 OK
DIC>
DIC> @@
DIC> @@ START THE SIMULATION
DIC> @@
DIC> sim
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 DEGREE OF IMPLICITY SET TO TRAPEZOIDAL RULE
 INFO: FORCED STARTING VALUES TURNED ON
 U-FRACTION IN SYSTEM:  AL = .429499345639258  FE = .290517917020317
                        NI = .279982737340425
 TOTAL SIZE OF SYSTEM:  .002 [m]
 U-FRACTION IN SYSTEM:  AL = .429499345639258  FE = .290517917020317
                        NI = .279982737340425
 TOTAL SIZE OF SYSTEM:  .002 [m]
  6  GRIDPOINT(S) ADDED   TO   CELL #1   REGION: BETA
 TIME =  0.10000000E-06 DT =  0.10000000E-06 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  AL = .429499345639258  FE = .290517917020317
                        NI = .279982737340425
 TOTAL SIZE OF SYSTEM:  .002 [m]
  CPU time used in timestep                    5  seconds
 TIME =  0.10010000E-03 DT =  0.10000000E-03 SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  AL = .429499345639258  FE = .290517917020317
                        NI = .279982737340425
 TOTAL SIZE OF SYSTEM:  .002 [m]
  CPU time used in timestep                    1  seconds
 TIME =  0.40010010     DT =  0.40000000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  AL = .429499345639258  FE = .290517917020317
                        NI = .279982737340425
 TOTAL SIZE OF SYSTEM:  .002 [m]
  CPU time used in timestep                    1  seconds
 TIME =   513.08856     DT =   512.68846     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  AL = .429499345639247  FE = .290517917020327
                        NI = .279982737340426
 TOTAL SIZE OF SYSTEM:  .002 [m]
  CPU time used in timestep                    1  seconds
 TIME =   1538.4655     DT =   1025.3769     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  AL = .429499345639233  FE = .290517917020342
                        NI = .279982737340425
 TOTAL SIZE OF SYSTEM:  .002 [m]
  CPU time used in timestep                    1  seconds
 TIME =   3589.2193     DT =   2050.7538     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  AL = .429499345639231  FE = .290517917020345
                        NI = .279982737340424
 TOTAL SIZE OF SYSTEM:  .002 [m]
  CPU time used in timestep                    2  seconds
 TIME =   7690.7270     DT =   4101.5077     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  AL = .429499345639227  FE = .290517917020346
                        NI = .279982737340428
 TOTAL SIZE OF SYSTEM:  .002 [m]
  CPU time used in timestep                    1  seconds
 TIME =   15893.742     DT =   8203.0154     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  AL = .429499345639233  FE = .290517917020342
                        NI = .279982737340426
 TOTAL SIZE OF SYSTEM:  .002 [m]
  CPU time used in timestep                    2  seconds
 TIME =   32299.773     DT =   16406.031     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  AL = .42949934563921  FE = .290517917020363
                        NI = .279982737340427
 TOTAL SIZE OF SYSTEM:  .002 [m]
  CPU time used in timestep                    1  seconds
 TIME =   65111.835     DT =   32812.062     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  AL = .429499345639174  FE = .290517917020383
                        NI = .279982737340444
 TOTAL SIZE OF SYSTEM:  .002 [m]
  CPU time used in timestep                    2  seconds
 TIME =   99671.835     DT =   34560.000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  AL = .429499345639088  FE = .290517917020497
                        NI = .279982737340415
 TOTAL SIZE OF SYSTEM:  .002 [m]
  CPU time used in timestep                    2  seconds
 TIME =   134231.83     DT =   34560.000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  AL = .429499345639131  FE = .290517917020483
                        NI = .279982737340386
 TOTAL SIZE OF SYSTEM:  .002 [m]
  CPU time used in timestep                    1  seconds
 TIME =   168791.83     DT =   34560.000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  AL = .429499345639167  FE = .290517917020446
                        NI = .279982737340387
 TOTAL SIZE OF SYSTEM:  .002 [m]
  CPU time used in timestep                    2  seconds
 TIME =   203351.83     DT =   34560.000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  AL = .429499345639157  FE = .290517917020456
                        NI = .279982737340388
 TOTAL SIZE OF SYSTEM:  .002 [m]
  CPU time used in timestep                    1  seconds
 TIME =   237911.83     DT =   34560.000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  AL = .429499345639151  FE = .290517917020441
                        NI = .279982737340408
 TOTAL SIZE OF SYSTEM:  .002 [m]
  CPU time used in timestep                    1  seconds
 TIME =   272471.83     DT =   34560.000     SUM OF SQUARES =   0.0000000
 U-FRACTION IN SYSTEM:  AL = .429499345639151  FE = .290517917020425
                        NI = .279982737340423
 TOTAL SIZE OF SYSTEM:  .002 [m]
```

```
 CPU time used in timestep                    2  seconds
TIME =   307031.83     DT =   34560.000     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  AL = .429499345639159  FE = .290517917020413
                       NI = .279982737340428
TOTAL SIZE OF SYSTEM:  .002 [m]
 CPU time used in timestep                    1  seconds
TIME =   341591.83     DT =   34560.000     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  AL = .429499345639172  FE = .290517917020402
                       NI = .279982737340426
TOTAL SIZE OF SYSTEM:  .002 [m]
 CPU time used in timestep                    1  seconds
TIME =   345600.00     DT =   4008.1652     SUM OF SQUARES =   0.0000000
U-FRACTION IN SYSTEM:  AL = .429499345639172  FE = .290517917020402
                       NI = .279982737340426
TOTAL SIZE OF SYSTEM:  .002 [m]
MUST SAVE WORKSPACE ON FILE
WORKSPACE SAVED ON FILE
RECLAIMING WORKSPACE
DELETING TIME-RECORD FOR TIME    0.0000000
DELETING TIME-RECORD FOR TIME   0.10000000E-06
DELETING TIME-RECORD FOR TIME   0.10010000E-03
DELETING TIME-RECORD FOR TIME   0.40010010
DELETING TIME-RECORD FOR TIME    513.08856
DELETING TIME-RECORD FOR TIME    1538.4655
DELETING TIME-RECORD FOR TIME    3589.2193
DELETING TIME-RECORD FOR TIME    7690.7270
DELETING TIME-RECORD FOR TIME    15893.742
DELETING TIME-RECORD FOR TIME    32299.773
DELETING TIME-RECORD FOR TIME    65111.835
DELETING TIME-RECORD FOR TIME    99671.835
DELETING TIME-RECORD FOR TIME    134231.83
DELETING TIME-RECORD FOR TIME    168791.83
DELETING TIME-RECORD FOR TIME    203351.83
DELETING TIME-RECORD FOR TIME    237911.83
DELETING TIME-RECORD FOR TIME    272471.83
DELETING TIME-RECORD FOR TIME    307031.83

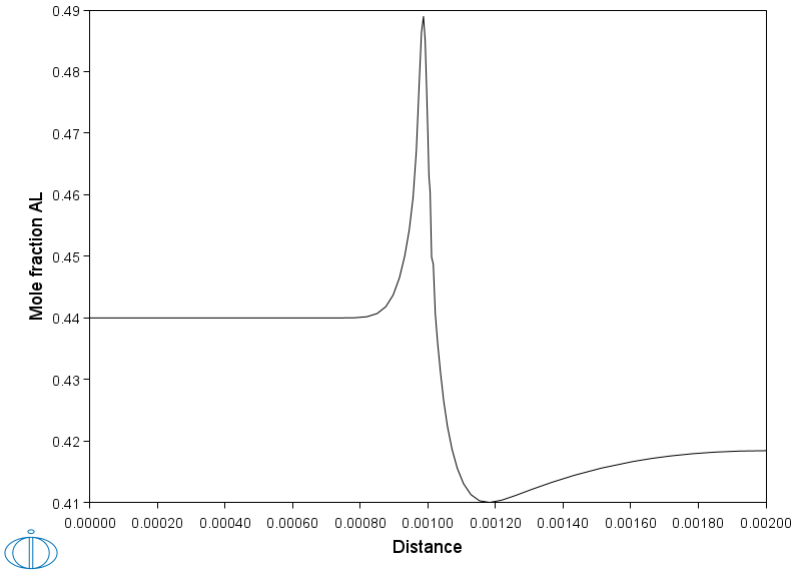
KEEPING TIME-RECORD FOR TIME    341591.83
AND FOR TIME                    345600.00
WORKSPACE RECLAIMED

TIMESTEP AT     345600.000     SELECTED

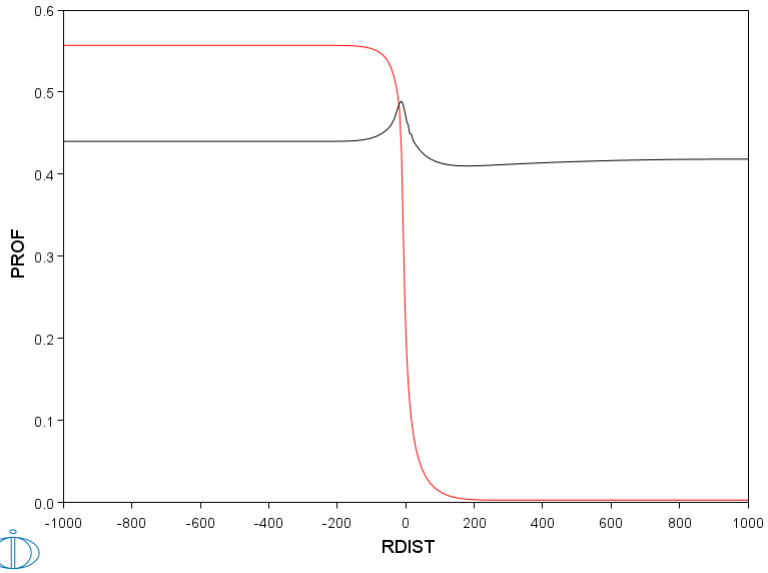
DIC>
DIC> set-inter
 --OK---
DIC>
```

exi1-plot

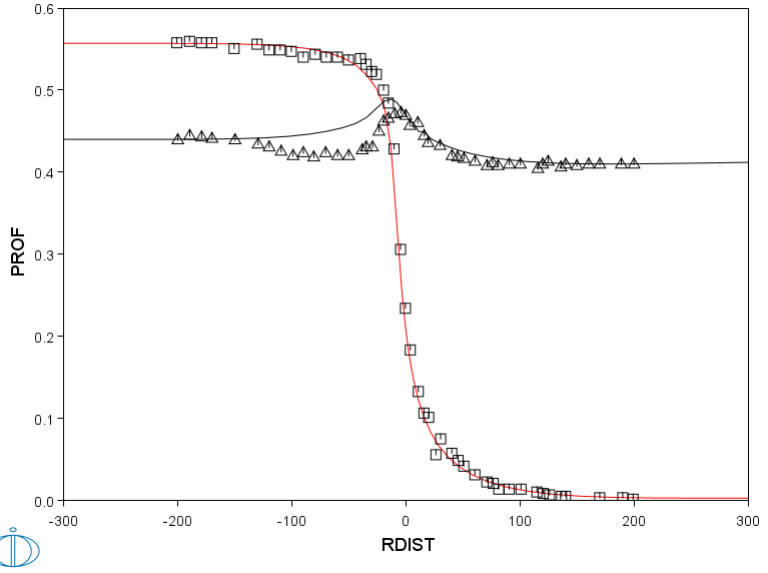
```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exi1\plot.DCM.test"
DIC>
DIC> @@ exi1_plot.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR GENERATING GRAPHICAL OUTPUT FOR EXAMPLE i1
DIC> @@
DIC>
DIC> @@
DIC> @@ GO TO THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  3.45600E+05
DIC> read exi1
 OK
DIC>
DIC> @@
DIC> @@ ENTER THE POST PROCESSOR
DIC> @@
DIC> post
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1: s-d-a x dist glob
  INFO: Distance is set as independent variable
POST-1:
POST-1: s-d-a y m-f al
POST-1:
POST-1: s-p-c time last
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```




```
POST-1:
POST-1:@?<Hit_return_to_continue>
POST-1:
POST-1: ent tab prof
Variable(s) x(al) x(ni)
POST-1:
POST-1: ent fun rdist
FUNCTION: 1e6*(gd-10e-4)
&
POST-1: s-d-a y prof
COLUMN NUMBER /*/: 1 2
POST-1:
POST-1: s-d-a x rdist
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```




```
POST-1:
POST-1:
POST-1:@?<Hit_return_to_continue>
POST-1:
POST-1: app y exi1.exp
PROLOGUE NUMBER: /0/: 1
DATASET NUMBER(s): /-1/: 1
POST-1:
POST-1: s-s-s x n -300 300
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```




```
POST-1:
POST-1:
POST-1: set-inter
 --OK---
POST-1:
```

Example exi2

Diffusion of carbon in cementite

This example demonstrates the use of the model for calculation of diffusion through a stoichiometric phase. The flux of a component in the stoichiometric phase is assumed to be proportional to the difference in chemical potential at each side of the stoichiometric phase multiplied with the mobility for the component in the phase. The mobility is assessed from experimental information and is basically the tracer diffusivity for the component. This calculation is compared with experimental data where a sample of pure iron has been exposed to a gas atmosphere with a certain carbon activity. The weight gain is then measured as a function of time. The experimental data is obtained from Ozturk B., Fearing V. L., Ruth A. Jr. and Simkovich G., Met. Trans A, vol 13A (1982), pp. 1871-1873.

$$J \sim \Delta\mu$$

exi2-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exi2\setup.DCM.test"
SYS: @@
SYS: @@ Diffusion in complex phases.
SYS: @@ Diffusion of carbon in cementite
SYS: @@ This example demonstrates the use of the model for calculation of
SYS: @@ diffusion through a stoichiometric phase. The flux of a component in
SYS: @@ the stoichiometric phase is assumed to be proportional to the
SYS: @@ difference in chemical potential at each side of the stoichiometric
SYS: @@ phase multiplied with the mobility for the component in the phase. The
SYS: @@ mobility is assessed from experimental information and is basically
SYS: @@ the tracer diffusivity for the component.
SYS: @@
SYS: @@ This calculation is compared with experimental data where a sample of
SYS: @@ pure iron has been exposed to a gas atmosphere with a certain carbon
SYS: @@ activity. The weight gain is then measured as a function of time.
SYS: @@ The experimental data is obtained from Ozturk B., Fearing V. L.,
SYS: @@ Ruth A. Jr. and Simkovich G., Met. Trans A, vol 13A (1982), pp. 1871-1873.
SYS: @@--------------------------------------------------------------------
SYS:
SYS: @@
SYS: @@ RETRIEVE DATA FROM THE DATABASES
SYS: @@
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                     /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12:
TDB_TCFE12: @@
TDB_TCFE12: @@ USE A THERMODYNAMIC DATABASE TO RETRIEVE DATA
TDB_TCFE12: @@
TDB_TCFE12: switch FEDEMO
 Current database: Iron Demo Database v6.0

 VA                     /-  DEFINED
TDB_FEDEMO: def-sys fe c
 FE                     C  DEFINED
TDB_FEDEMO: rej ph * all
 GAS:G                  LIQUID:L               BCC_A2
 C14_LAVES              CBCC_A12               CEMENTITE_D011
 CUB_A13                DIAMOND_A4             FCC_A1
 GRAPHITE_A9            HCP_A3                 KSI_CARBIDE
 M23C6_D84              M5C2                   M7C3_D101
   REJECTED
TDB_FEDEMO: res ph bcc fcc cementite grap
 BCC_A2                 FCC_A1                 CEMENTITE_D011
 GRAPHITE_A9  RESTORED
TDB_FEDEMO: get
12:16:24,231 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 REINITIATING GES .....
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
TDB_FEDEMO:
TDB_FEDEMO: @@
TDB_FEDEMO: @@ SWITCH TO A MOBILITY DATABASE TO RETRIEVE MOBILITY DATA
TDB_FEDEMO: @@
TDB_FEDEMO: app MFEDEMO
 Current database: Fe-Alloys Mobility demo database v5.0

 VA  DEFINED
APP: def-sys fe c
 FE                     C  DEFINED
APP: rej ph * all
 BCC_A2                 FCC_A1                 CEMENTITE_D011
 LIQUID:L  REJECTED
APP: res ph fcc bcc cementite
 FCC_A1                 BCC_A2                 CEMENTITE_D011
   RESTORED
APP: get
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-
APP:
APP: @@
APP: @@ ENTER THE DICTRA MONITOR
APP: @@
APP: go d-m
 NO TIME STEP DEFINED
 *** ENTERING GRAPHITE_A9 AS A DIFFUSION NONE PHASE
```

```
DIC>
DIC> set-ref c grap,,,,,,,,,,
DIC>
DIC> @@
DIC> @@  ENTER THE GLOBAL CONDITION T
DIC> @@
DIC> set-cond glob t 0 723; * n
DIC>
DIC> @@
DIC> @@ ENTER THE REGIONS carb AND fer
DIC> @@
DIC> enter-region
REGION NAME : fer
DIC>
DIC> enter-region
REGION NAME : carb
ATTACH TO REGION NAMED /FER/:
ATTACHED TO THE RIGHT OF FER /YES/:
DIC> @@
DIC> @@ ENTER LINEAR GRIDS INTO THE REGIONS
DIC> @@
DIC>
DIC> @@
DIC> @@ ENTER A SIZE FOR THE FERRITE
DIC> @@
DIC> enter-grid
REGION NAME : /FER/: fer
WIDTH OF REGION /1/: 3.3E-6
TYPE /AUTO/: AUTO
DIC>
DIC> @@
DIC> @@ ENTER A SIZE (VERY SMALL) FOR THE CEMENTITE LAYER
DIC> @@
DIC> @@
DIC> enter-grid
REGION NAME : /CARB/: carb
WIDTH OF REGION /1/: 1E-12
TYPE /AUTO/: AUTO
DIC>
DIC>
DIC> @@
DIC> @@ ENTER PHASES INTO THE REGIONS
DIC> @@
DIC> enter-phase act carb  matrix   cementite
  COMPOSITION RECORD FOR STOICHIOMETRIC PHASE CEMENTITE_D011 IN REGION CARB CREATED
DIC> enter-phase act fer   matrix   bcc#1
DIC>
DIC> @@
DIC> @@ ENTER THE INITIAL COMPOSITIONS IN THE PHASES
DIC> @@
DIC> enter-composition
REGION NAME : /FER/: carb
PHASE NAME: /CEMENTITE_D011/: cementite
DIC>
DIC> enter-composition
REGION NAME : /FER/: fer
PHASE NAME: /BCC_A2/: bcc#1
COMPOSITION TYPE /MOLE_FRACTION/: weig-fraction
PROFILE FOR /C/: C  lin 1E-5 1E-5
DIC>
DIC> set-cond bound upp
CONDITION TYPE /CLOSED_SYSTEM/: mix
Dependent substitutional element:FE
Dependent interstitial element:VA
LOW TIME LIMIT /0/: 0
ACR(C)(TIME)= 9;
HIGH TIME LIMIT /*/: *
ANY MORE RANGES /N/: N
DIC>
DIC>
DIC>
DIC> @@
DIC> @@ SIMULATE FOR 150 MINUTES
DIC> @@
DIC> set-simulation-time
END TIME FOR INTEGRATION /.1/: 9000
AUTOMATIC TIMESTEP CONTROL /YES/:
MAX TIMESTEP DURING INTEGRATION /900/:
INITIAL TIMESTEP : /1E-07/:
SMALLEST ACCEPTABLE TIMESTEP : /1E-07/:
DIC> @@
DIC> @@ SAVE THE SET UP TO A NEW STORE FILE AND EXIT
DIC> @@
DIC> save exi2 Y
DIC>
DIC> set-inter
 --OK---
DIC>
```

exi2-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exi2\run.DCM.test"
DIC>
DIC>
DIC> @@ exi2_run.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR RUNNING EXAMPLE i2
DIC> @@
DIC>
DIC> @@
DIC> @@ ENTER THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  0.00000E+00
 *** ENTERING GRAPHITE_A9 AS A DIFFUSION NONE PHASE
DIC> read exi2
 OK
DIC>
DIC> @@
DIC> @@ START THE SIMULATION
DIC> @@
DIC> sim
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 Region: FER
 geometric   0.833333     dense at   0.330000E-05   58 points
 Region: CARB
 geometric    1.03732     dense at    0.00000       27 points
 geometric   0.964027     dense at   0.100000E-11   28 points
 DEGREE OF IMPLICITY SET TO TRAPEZOIDAL RULE
  Trying old scheme                     3
 U-FRACTION IN SYSTEM:  C = 4.6598005784384E-05  FE = 1
 TOTAL SIZE OF SYSTEM:  3.300001E-06 [m]
 U-FRACTION IN SYSTEM:  C = 4.6598005784384E-05  FE = 1
 TOTAL SIZE OF SYSTEM:  3.300001E-06 [m]
 0.111094398574294        0.111116618523482        1.492608521054145E-021       TIME =  0.10000000E-06 DT =  0.10000000E-
06 SUM OF SQUARES =  0.14926085E-20
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.18662795E-05 AND  -0.18662795E-05
 POSITION OF INTERFACE FER / CARB IS   0.32999998E-05
 U-FRACTION IN SYSTEM:  C = 4.65902910647489E-05  FE = 1
 TOTAL SIZE OF SYSTEM:  3.300001E-06 [m]
  CPU time used in timestep                    0  seconds
 3.323893769823795E-005        3.324596706135781E-005        7.233236589042160E-019       TIME =  0.42041248E-04 DT =  0.41941248E-
04 SUM OF SQUARES =  0.72332366E-18
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.99189833E-07 AND  -0.99189833E-07
 POSITION OF INTERFACE FER / CARB IS   0.32999957E-05
 U-FRACTION IN SYSTEM:  C = 4.69866088811509E-05  FE = 1
 TOTAL SIZE OF SYSTEM:  3.300001E-06 [m]
  43  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: CARB

  CPU time used in timestep                    0  seconds
 5.940110999669561E-006        5.941690376777649E-006        2.104117988379031E-021       TIME =  0.12592374E-03 DT =  0.83882496E-
04 SUM OF SQUARES =  0.21041180E-20
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.24081889E-07 AND  -0.24081889E-07
 POSITION OF INTERFACE FER / CARB IS   0.32999936E-05
 U-FRACTION IN SYSTEM:  C = 4.71625228459343E-05  FE = 1
 TOTAL SIZE OF SYSTEM:  3.300001E-06 [m]
  CPU time used in timestep                    1  seconds
 4.461608160703778E-006        4.464931782486729E-006        1.636372192861907E-024       TIME =  0.29368874E-03 DT =  0.16776499E-
03 SUM OF SQUARES =  0.16363722E-23
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.17262907E-07 AND  -0.17262907E-07
 POSITION OF INTERFACE FER / CARB IS   0.32999907E-05
 U-FRACTION IN SYSTEM:  C = 4.74178764530576E-05  FE = 1
 TOTAL SIZE OF SYSTEM:  3.300001E-06 [m]
  2  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: CARB

  CPU time used in timestep                    0  seconds
 2.345403980549840E-006        2.347131404695197E-006        9.284327548873648E-025       TIME =  0.62921872E-03 DT =  0.33552998E-
03 SUM OF SQUARES =  0.92843275E-24
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.12322827E-07 AND  -0.12322827E-07
 POSITION OF INTERFACE FER / CARB IS   0.32999866E-05
 U-FRACTION IN SYSTEM:  C = 4.77844661736849E-05  FE = 1
 TOTAL SIZE OF SYSTEM:  3.300001E-06 [m]
  46  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: CARB

  CPU time used in timestep                    0  seconds
 1.221304081916776E-006        1.222193895137852E-006        3.101453521948746E-025       TIME =  0.13002787E-02 DT =  0.67105997E-
03 SUM OF SQUARES =  0.31014535E-24
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.87607071E-08 AND  -0.87607071E-08
 POSITION OF INTERFACE FER / CARB IS   0.32999807E-05
 U-FRACTION IN SYSTEM:  C = 4.83070921370174E-05  FE = 1
 TOTAL SIZE OF SYSTEM:  3.300001E-06 [m]
  17  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: CARB

  CPU time used in timestep                    0  seconds
 6.255421686500668E-007        6.259949039541144E-007        1.800510303087057E-025       TIME =  0.26423986E-02 DT =  0.13421199E-
02 SUM OF SQUARES =  0.18005103E-24
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.62125570E-08 AND  -0.62125570E-08
 POSITION OF INTERFACE FER / CARB IS   0.32999724E-05
 U-FRACTION IN SYSTEM:  C = 4.90492847126159E-05  FE = 1
 TOTAL SIZE OF SYSTEM:  3.300001E-06 [m]
  41  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: CARB

  CPU time used in timestep                    0  seconds
 3.168643734259357E-007        3.170928724322179E-007

output ignored...



... output resumed

 1.301364867290735E-007        1.302712141808378E-007        1.843534117375387E-
028       TIME =   3207.3147     DT =   900.00000     SUM OF SQUARES =  0.18435341E-27
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.45187270E-11 AND  -0.45187270E-11
 POSITION OF INTERFACE FER / CARB IS   0.32713661E-05
 U-FRACTION IN SYSTEM:  C = .00291788309545735  FE = 1
 TOTAL SIZE OF SYSTEM:  3.300001E-06 [m]
  21  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: CARB

  CPU time used in timestep                    0  seconds
```

```
 3.377659190387827E-008        3.383086688779757E-008        1.961189739094106E-
029       TIME =   4107.3147     DT =   900.00000     SUM OF SQUARES =  0.19611897E-28
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.38769576E-11 AND  -0.38769576E-11
 POSITION OF INTERFACE FER / CARB IS   0.32678768E-05
 U-FRACTION IN SYSTEM:  C = .00327030650759308  FE = 1
 TOTAL SIZE OF SYSTEM:  3.300001E-06 [m]
  15  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: CARB

  CPU time used in timestep                    0  seconds
 1.311342784028283E-008        1.314244738346602E-008        3.302723518027951E-
030       TIME =   5007.3147     DT =   900.00000     SUM OF SQUARES =  0.33027235E-29
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.34558504E-11 AND  -0.34558504E-11
 POSITION OF INTERFACE FER / CARB IS   0.32647666E-05
 U-FRACTION IN SYSTEM:  C = .00358445040429918  FE = 1
 TOTAL SIZE OF SYSTEM:  3.300001E-06 [m]
  12  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: CARB

  CPU time used in timestep                    0  seconds
 6.184494689289238E-009        6.202261928651467E-009        2.840823780400587E-
031       TIME =   5907.3147     DT =   900.00000     SUM OF SQUARES =  0.28408238E-30
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.31507905E-11 AND  -0.31507905E-11
 POSITION OF INTERFACE FER / CARB IS   0.32619309E-05
 U-FRACTION IN SYSTEM:  C = .00387086373221729  FE = 1
 TOTAL SIZE OF SYSTEM:  3.300001E-06 [m]
  24  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: CARB

  CPU time used in timestep                    0  seconds
 3.274215435456154E-009        3.286004107096795E-009        4.286971591269478E-
031       TIME =   6807.3147     DT =   900.00000     SUM OF SQUARES =  0.42869716E-30
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.29160992E-11 AND  -0.29160992E-11
 POSITION OF INTERFACE FER / CARB IS   0.32593064E-05
 U-FRACTION IN SYSTEM:  C = .00413594313662343  FE = 1
 TOTAL SIZE OF SYSTEM:  3.300001E-06 [m]
  10  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: CARB

  CPU time used in timestep                    0  seconds
 1.870097337252293E-007        1.878344674571135E-007        1.264643842388650E-
029       TIME =   7707.3147     DT =   900.00000     SUM OF SQUARES =  0.12646438E-28
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.27280333E-11 AND  -0.27280333E-11
 POSITION OF INTERFACE FER / CARB IS   0.32568511E-05
 U-FRACTION IN SYSTEM:  C = .00438392696890556  FE = 1
 TOTAL SIZE OF SYSTEM:  3.300001E-06 [m]
  9  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: CARB

  CPU time used in timestep                    0  seconds
 1.125755556993257E-007        1.131743110018835E-007        3.856145082900733E-
030       TIME =   8607.3147     DT =   900.00000     SUM OF SQUARES =  0.38561451E-29
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.25728080E-11 AND  -0.25728080E-11
 POSITION OF INTERFACE FER / CARB IS   0.32545356E-05
 U-FRACTION IN SYSTEM:  C = .00461780050542361  FE = 1
 TOTAL SIZE OF SYSTEM:  3.300001E-06 [m]
  7  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: CARB

  CPU time used in timestep                    0  seconds
 7.034765029309732E-008        7.079414981850979E-008        2.601088760516486E-
031       TIME =   9000.0000     DT =   392.68528     SUM OF SQUARES =  0.26010888E-30
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.24417764E-11 AND  -0.24417764E-11
 POSITION OF INTERFACE FER / CARB IS   0.32535768E-05
 U-FRACTION IN SYSTEM:  C = .00471464650795351  FE = 1
 TOTAL SIZE OF SYSTEM:  3.300001E-06 [m]
 MUST SAVE WORKSPACE ON FILE
 WORKSPACE SAVED ON FILE
 RECLAIMING WORKSPACE
 DELETING TIME-RECORD FOR TIME    0.0000000
 DELETING TIME-RECORD FOR TIME   0.10000000E-06
 DELETING TIME-RECORD FOR TIME   0.42041248E-04
 DELETING TIME-RECORD FOR TIME   0.12592374E-03
 DELETING TIME-RECORD FOR TIME   0.29368874E-03
 DELETING TIME-RECORD FOR TIME   0.62921872E-03
 DELETING TIME-RECORD FOR TIME   0.13002787E-02
 DELETING TIME-RECORD FOR TIME   0.26423986E-02
 DELETING TIME-RECORD FOR TIME   0.53266385E-02
 DELETING TIME-RECORD FOR TIME   0.10695118E-01
 DELETING TIME-RECORD FOR TIME   0.21432078E-01
 DELETING TIME-RECORD FOR TIME   0.42905997E-01
 DELETING TIME-RECORD FOR TIME   0.85853835E-01
 DELETING TIME-RECORD FOR TIME   0.17174951
 DELETING TIME-RECORD FOR TIME   0.34354086
 DELETING TIME-RECORD FOR TIME   0.68712357
 DELETING TIME-RECORD FOR TIME    1.3742890
 DELETING TIME-RECORD FOR TIME    2.7486198
 DELETING TIME-RECORD FOR TIME    5.4972814
 DELETING TIME-RECORD FOR TIME    10.994605
 DELETING TIME-RECORD FOR TIME    21.989251
 DELETING TIME-RECORD FOR TIME    43.978544
 DELETING TIME-RECORD FOR TIME    87.957130
 DELETING TIME-RECORD FOR TIME    175.91430
 DELETING TIME-RECORD FOR TIME    351.82865
 DELETING TIME-RECORD FOR TIME    703.65734
 DELETING TIME-RECORD FOR TIME    1407.3147
 DELETING TIME-RECORD FOR TIME    2307.3147
 DELETING TIME-RECORD FOR TIME    3207.3147
 DELETING TIME-RECORD FOR TIME    4107.3147
 DELETING TIME-RECORD FOR TIME    5007.3147
 DELETING TIME-RECORD FOR TIME    5907.3147
 DELETING TIME-RECORD FOR TIME    6807.3147
 DELETING TIME-RECORD FOR TIME    7707.3147

 KEEPING TIME-RECORD FOR TIME    8607.3147
 AND FOR TIME                    9000.0000
 WORKSPACE RECLAIMED

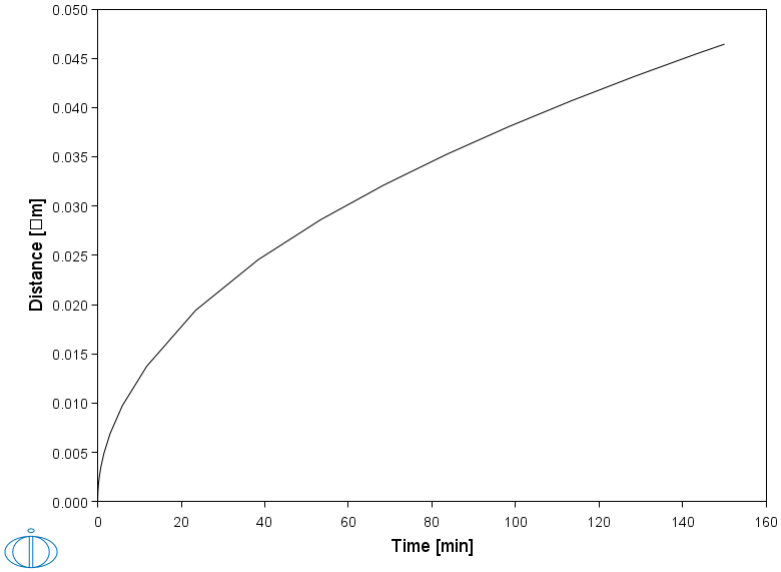
 TIMESTEP AT     9000.00000     SELECTED

DIC>
DIC> set-inter
 --OK---
DIC>
```

exi2-plot

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exi2\plot.DCM.test"
DIC>
DIC> @@ exi2_plot.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR GENERATING GRAPHICAL OUTPUT FOR EXAMPLE i2
DIC> @@
DIC>
DIC> @@
DIC> @@ GO TO THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  9.00000E+03
 *** ENTERING GRAPHITE_A9 AS A DIFFUSION NONE PHASE
DIC>
DIC>
DIC> read exi2 Y
 OK
DIC>
DIC>
DIC> @@
DIC> @@ PLOT THE SIZE OF THE CEMENTITE LAYER AS A FUNCTION OF TIME
DIC> @@
DIC> post
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1: ent-symb func csize
FUNCTION: 1e6*(poi(car,u)-poi(car,l));
POST-1:
POST-1: ent-symb func minutes
FUNCTION: time/60;
POST-1:
POST-1: s-d-a x minutes
POST-1: s-d-a y csize
POST-1:
POST-1: s-p-c inter first
POST-1:
POST-1: s-a-t-s x n Time [min]
POST-1: s-a-t-s y n Distance [i¿½m]
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y

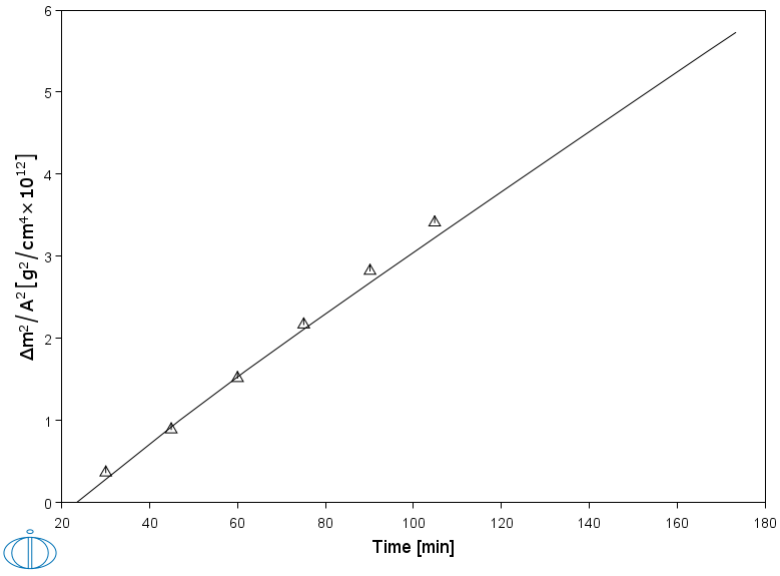
           OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```




```
POST-1:
POST-1:@?<_hit_return_to_continue_>
POST-1:
POST-1:
POST-1: @@
POST-1: @@ ASSUME A CERTAIN TIME FOR NUCLEATION OF THE CEMENTITE LAYER
POST-1: @@
POST-1: ent-symb func cortim
FUNCTION: (time+1400)/60;
POST-1:
POST-1: @@
POST-1: @@ PLOT THE WEIGHT GAIN AS A FUNCTION OF TIME
POST-1: @@
POST-1: ent-symb func cwei
FUNCTION: 1e12*((poi(car,u)-poi(car,l)-1E-12)*12.01/2.33E-5*1e-4)**2;
POST-1:
POST-1:
POST-1: s-d-a x cortim
POST-1: s-d-a y cwei
POST-1:
POST-1: @@
POST-1: @@ COMPARE WITH EXPERIMENTAL DATA
POST-1: @@
POST-1: app y exi2.exp 0; 1
POST-1:
POST-1:
```

```
POST-1: s-a-t-s x n Time [min]
POST-1: s-a-t-s y n \latex \Delta m^2/A^2\, [g^2/cm^4\times 10^{12}]
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y

          OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

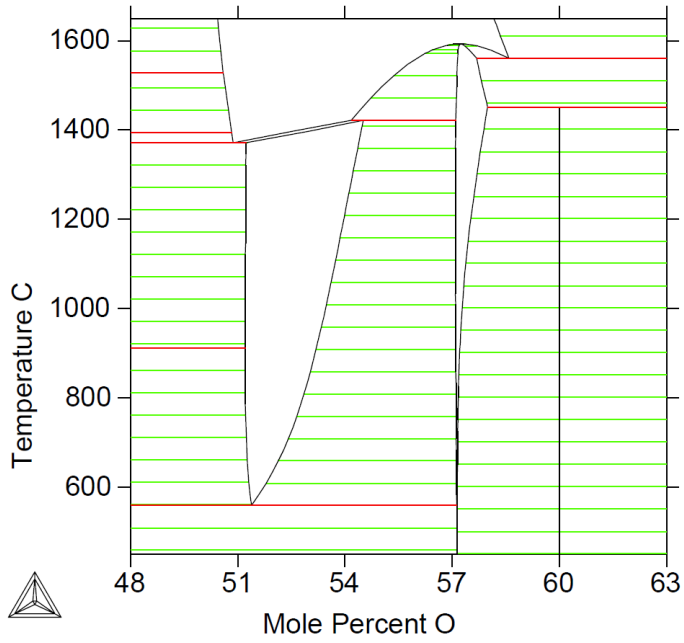



```
POST-1:
POST-1:
POST-1: set-inter
 --OK---
POST-1:
```

Example exi3a

Diffusion in iron oxide (FeO)

This example shows the oxidation of an iron sample and the consequent growth of an oxide layer using the grain boundary diffusion contribution model.



exi3a-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exi3a\setup.DCM.test"
SYS: @@
SYS: @@ Diffusion in complex phases.
SYS: @@ Diffusion in iron oxide (FeO)
SYS: @@ This example shows the oxidation of an iron sample and the
SYS: @@ consequent growth of an oxide layer.
SYS: @@----------------------------------------------------------------------
SYS:
SYS: @@ exi3_setup.DCM
SYS:
SYS: @@
SYS: @@ START BY GOING TO THE DATABASE MODULE
SYS: @@
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                        /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12:
TDB_TCFE12: @@
TDB_TCFE12: @@ SELECT A USER DATABASE FOR READING THE THERMODYNAMIC DATA
TDB_TCFE12: @@
TDB_TCFE12: sw user FeO.TDB
 Current database: User defined Database
This database does not support the DATABASE_INFORMATION command

 VA                        /-  DEFINED
12:19:22,508 [Thread-0] INFO  TDBFileParser: USER_190315336_22, number of lines read: 217
12:19:22,759 [Thread-0] INFO  DatabaseUtils: Parsing of USER_190315336_22 completed in 337 ms
TDB_USER: def-sys fe o
 FE                        O  DEFINED
TDB_USER: rej sp *
 /-                        VA                        FE
 O                         FE+2                      FE+3
 FE+4                      FE2O3                     FEO
 FEO3/2                    O-2                       O2
   REJECTED
TDB_USER: res sp fe fe+2 fe+3 o o2 o-2 va
 FE                        FE+2                      FE+3
 O                         O2                        O-2
 VA  RESTORED
TDB_USER: rej ph * all
 GAS:G                     BCC_A2                    SPINEL:I
   REJECTED
TDB_USER: res ph bcc spinel gas
 BCC_A2                    SPINEL:I                  GAS:G
   RESTORED
TDB_USER:
TDB_USER: get
12:19:22,900 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-

 *** WARNING: One or more elements have been rejected only as species but not as elements. This is not allowed with GES6, temporarily reverting

TDB_USER:
TDB_USER: @@
TDB_USER: @@ SWITCH TO A USER-DEFINED MOBILITY DATABASE TO RETRIEVE MOBILITY DATA
TDB_USER: @@
TDB_USER: app user FeOmob.TDB
 Current database: User defined Database
         test database

 VA                        /-                        O
   DEFINED
12:19:23,230 [Thread-0] INFO  TDBFileParser: USER_1269960560_22, number of lines read: 129
12:19:23,267 [Thread-0] INFO  DatabaseUtils: Parsing of USER_1269960560_22 completed in 37 ms
TDB_APP: def-sys fe o
 FE  DEFINED
TDB_APP: rej sp *
 /-                        VA                        FE
 O                         FE+2                      FE+3
 FE2O3                     FEO                       FEO3/2
 O-2                       O2  REJECTED
TDB_APP: res sp fe fe+2 fe+3 o o2 o-2 va
 FE                        FE+2                      FE+3
 O                         O2                        O-2
 VA  RESTORED
TDB_APP: rej ph * all
 SPINEL:I                  GAS:G                     BCC_A2
   REJECTED
TDB_APP: res ph bcc spinel gas
 BCC_A2                    SPINEL:I                  GAS:G
   RESTORED
TDB_APP:
TDB_APP: get
```

```
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 *** ERROR  2018 IN DESHPH: DIFFUSION DATA NOT POSSIBLE FOR GAS PHASE
 *** ERROR  2018 IN DESHPH: DIFFUSION DATA NOT POSSIBLE FOR GAS PHASE
 FUNCTIONS ....
 -OK-
TDB_APP:
TDB_APP:
TDB_APP: @@
TDB_APP: @@ ENTER THE DICTRA MONITOR
TDB_APP: @@
TDB_APP: go d-m
 NO TIME STEP DEFINED
DIC>
DIC>
DIC> @@
DIC> @@  ENTER THE GLOBAL CONDITION T
DIC> @@
DIC> set-cond glob T 0 823; * N
DIC>
DIC>
DIC> @@
DIC> @@  SET THE REFERENCE STATE FOR O TO O2 (GAS)
DIC> @@
DIC> set-ref o gas,,,,,,,
DIC>
DIC>
DIC> @@
DIC> @@ ENTER THE REGIONS fer AND sp
DIC> @@
DIC> ent-reg fer
DIC> ent-reg sp,,,,,,,,
DIC>
DIC>
DIC> @@
DIC> @@ ENTER PHASES INTO THE REGIONS
DIC> @@
DIC> ent-phase act fer matrix bcc#1
DIC> ent-phase act sp matrix spinel
DIC>
DIC>
DIC> @@
DIC> @@ ENTER GRIDS INTO THE REGIONS
DIC> @@
DIC>
DIC> @@
DIC> @@ ENTER A SIZE FOR THE FERRITE
DIC> @@
DIC> @@
DIC> ent-grid fer 4.99999e-3 AUTO
DIC>
DIC> @@
DIC> @@ ENTER A THIN INITIAL SIZE FOR THE OXIDE
DIC> @@
DIC> @@
DIC> ent-grid sp  1.00e-10 AUTO
DIC>
DIC>
DIC> @@
DIC> @@ ENTER THE INITIAL COMPOSITIONS IN BCC
DIC> @@
DIC> ent-comp fer bcc#1 m-f
PROFILE FOR /O/: o lin 1e-9 1e-9
DIC>
DIC>
DIC> @@
DIC> @@ ENTER THE INITIAL COMPOSITIONS IN THE OXIDE
DIC> @@
DIC> ent-comp sp spinel m-f
  this is a phase with charged species
  with more than 2 sublattices
PROFILE FOR /FE/: FE lin 4.28771E-01 4.28549E-01
DIC>
DIC>
DIC> @@
DIC> @@ ENTER A BOUNDARY CONDITION "GAS" ON THE UPPER (RIGHT-MOST) INTERFACE
DIC> @@ OF THE OXIDE. THIS ALLOWS THE SYSTEM TO EXPAND AND THE OXIDE LAYER
DIC> @@ TO GROW EXTERNALY. FOR THIS EXAMPLE AN OXYGEN ACTIVITY IS SPECIFIED
DIC> @@ THAT IS LOW ENOUGH NOT TO FORM CORUNDUM (FE2O3). WE ALSO SPECIFY
DIC> @@ THAT THERE IS NO FLUX OF Fe ACROSS THIS INTERFACE, I.E. NO Fe
DIC> @@ IS ALLOWED TO ENTER OR LEAVE THE SYSTEM.
DIC> @@
DIC> set-cond boundary upper gas
TYPE OF CONDITION FOR COMPONENT FE /ZERO_FLUX/: zero-flux
TYPE OF CONDITION FOR COMPONENT O /ZERO_FLUX/: act
LOW TIME LIMIT /0/: 0 4.5e-4; * N
DIC>
DIC>
DIC> @@
DIC> @@ ENTER START VALUES FOR THE INITIAL INTERFACE VELOCITIES
DIC> @@
DIC> s-a-s-v -1e-5 1e-5 yes
 STARTING VALUES WILL BE TAKEN FROM PROFILES
DIC>
DIC>
DIC> @@
DIC> @@ SIMULATE FOR 24 HOURS
DIC> @@
DIC> s-s-time 86400,,,,
SMALLEST ACCEPTABLE TIMESTEP : /1E-07/:
DIC>
DIC> @@
DIC> @@ SPECIFY THAT POTENTIALS AND NOT ACTIVITIES ARE VARIED AT THE PHASE
DIC> @@ INTERFACE. ALSO USE A FULLY IMPLICIT SCHEME FOR TIME INTEGRATION.
DIC> @@
DIC> set-option DEGREE_OF_IMPLICITY 1.0
DIC> set-option VARY_POTENTIALS_OR_ACTIVITIES POT
 RELEASING OLD STARTING VALUES
```

```
DIC>
DIC> @@
DIC> @@ SAVE THE SET UP TO A NEW STORE FILE AND EXIT
DIC> @@
DIC> save exi3.DIC Y
DIC>
DIC> set-inter
 --OK---
DIC>
```

exi3a-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exi3a\run.DCM.test"
DIC>
DIC>
DIC> @@ exi3_run.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR RUNNING EXAMPLE i3
DIC> @@
DIC>
DIC> @@
DIC> @@ ENTER THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  0.00000E+00
DIC> read exi3
 OK
DIC>
DIC> @@
DIC> @@ START THE SIMULATION
DIC> @@
DIC> sim y
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 Region: FER
 geometric   0.833333     dense at   0.499999E-02   58 points
 Region: SP
 geometric    1.03726     dense at    0.00000       27 points
 geometric   0.964075     dense at   0.100000E-09   28 points
  Trying old scheme                      3
 U-FRACTION IN SYSTEM:  FE = 0.99999999500542  O = 2.10000395011622E-08
 TOTAL SIZE OF SYSTEM:  .0049999901 [m]
 U-FRACTION IN SYSTEM:  FE = 0.99999999500542  O = 2.10000395011622E-08
 TOTAL SIZE OF SYSTEM:  .0049999901 [m]
 0.349081609858999        0.349080835531550        0.349081007853904        4.642752747505995E-002        1.120690054913772E-
022       TIME =  0.10000000E-06 DT =  0.10000000E-06 SUM OF SQUARES =  0.90194335E-22
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.39716422E-03 AND    0.0000000
 POSITION OF INTERFACE FER / SP IS   0.49999900E-02
 CELL # 1 VELOCITY AT INTERFACE # 3 IS   0.67173966E-03 AND    0.0000000
 POSITION OF INTERFACE SP / gas interface IS   0.49999901E-02
 U-FRACTION IN SYSTEM:  FE = 0.99999998952496  O = 3.46904751690148E-08
 TOTAL SIZE OF SYSTEM:  .00499999012746 [m]
  2  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: SP

  CPU time used in timestep                    4  seconds
 1.517028292176161E-005        1.517215069608089E-005        1.517300764370686E-005        2.265990420845123E-007        5.697661555441296E-
031       TIME =  0.30000000E-06 DT =  0.20000000E-06 SUM OF SQUARES =  0.56975558E-30
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.14930286E-03 AND    0.0000000
 POSITION OF INTERFACE FER / SP IS   0.49999899E-02
 CELL # 1 VELOCITY AT INTERFACE # 3 IS   0.20336879E-03 AND    0.0000000
 POSITION OF INTERFACE SP / gas interface IS   0.49999901E-02
 U-FRACTION IN SYSTEM:  FE = 0.99999998714832  O = 4.28252475791112E-08
 TOTAL SIZE OF SYSTEM:  .00499999013827 [m]
  7  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: SP

  CPU time used in timestep                    1  seconds
 1.514037495171659E-008        1.513166981068657E-008        1.510830032176752E-008        2.795568792863825E-011        9.864748592100637E-
033       TIME =  0.70000000E-06 DT =  0.40000000E-06 SUM OF SQUARES =  0.98630559E-32
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.14929887E-03 AND    0.0000000
 POSITION OF INTERFACE FER / SP IS   0.49999899E-02
 CELL # 1 VELOCITY AT INTERFACE # 3 IS   0.21700179E-03 AND    0.0000000
 POSITION OF INTERFACE SP / gas interface IS   0.49999902E-02
 U-FRACTION IN SYSTEM:  FE = 0.99999998166679  O = 6.01854379777001E-08
 TOTAL SIZE OF SYSTEM:  .00499999016535 [m]
  44  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: SP

  CPU time used in timestep                    0  seconds
 5.663774818837994E-007        5.665323146073978E-007        5.665310409931821E-007        2.246879451473522E-010        1.332775494962310E-
034       TIME =  0.15000000E-05 DT =  0.80000000E-06 SUM OF SQUARES =  0.85693538E-35
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.93408704E-04 AND    0.0000000
 POSITION OF INTERFACE FER / SP IS   0.49999898E-02
 CELL # 1 VELOCITY AT INTERFACE # 3 IS   0.13329938E-03 AND    0.0000000
 POSITION OF INTERFACE SP / gas interface IS   0.49999902E-02
 U-FRACTION IN SYSTEM:  FE = 0.99999997507896  O = 8.15134066057134E-08
 TOTAL SIZE OF SYSTEM:  .00499999019726 [m]
  19  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: SP

  CPU time used in timestep                    1  seconds
 8.058821561752016E-006        8.062619089474481E-006        8.062238357193631E-006        1.165684182191291E-008        2.052996181733722E-
032       TIME =  0.31000000E-05 DT =  0.16000000E-05 SUM OF SQUARES =  0.87750183E-32
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.70802777E-04 AND    0.0000000
 POSITION OF INTERFACE FER / SP IS   0.49999897E-02
 CELL # 1 VELOCITY AT INTERFACE # 3 IS   0.10188903E-03 AND    0.0000000
 POSITION OF INTERFACE SP / gas interface IS   0.49999902E-02
 U-FRACTION IN SYSTEM:  FE = 0.99999996490286  O = 1.14118010001096E-07
 TOTAL SIZE OF SYSTEM:  .004999990247 [m]
  32  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: SP

  CPU time used in timestep                    0  seconds
 8.132098852618615E-006        8.134925573841666E-006        8.134787791164075E-006        7.243073328920213E-009        2.777807879241706E-
031       TIME =  0.63000000E-05 DT =  0.32000000E-05 SUM OF SQUARES =  0.27354901E-30

output ignored...



... output resumed

 POSITION OF INTERFACE FER / SP IS   0.49497155E-02
 CELL # 1 VELOCITY AT INTERFACE # 3 IS   0.85407152E-09 AND    0.0000000
 POSITION OF INTERFACE SP / gas interface IS   0.50215844E-02
 U-FRACTION IN SYSTEM:  FE = .995603829359565  O = .0143121645761789
 TOTAL SIZE OF SYSTEM:  .00502158440342 [m]
  27  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: SP

  CPU time used in timestep                    0  seconds
 2.790409294570028E-007        2.794910911415554E-007        2.794508894727145E-007        3.803336758548622E-010        1.691959548799568E-
033       TIME =   56943.895     DT =   8640.0000     SUM OF SQUARES =  0.13910330E-32
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.54744068E-09 AND    0.0000000
 POSITION OF INTERFACE FER / SP IS   0.49449857E-02
 CELL # 1 VELOCITY AT INTERFACE # 3 IS   0.78319159E-09 AND    0.0000000
 POSITION OF INTERFACE SP / gas interface IS   0.50236213E-02
```

```
 U-FRACTION IN SYSTEM:  FE = .995197138119411  O = .0156533528957594
 TOTAL SIZE OF SYSTEM:  .00502362129123 [m]
  14  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: SP

  CPU time used in timestep                    1  seconds
 1.594434870751020E-007        1.597546086899677E-007        1.597282693767137E-007        2.020570951031568E-010        8.380804523622581E-
034       TIME =   65583.895     DT =   8640.0000     SUM OF SQUARES =  0.81927254E-33
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.50752276E-09 AND    0.0000000
 POSITION OF INTERFACE FER / SP IS   0.49406007E-02
 CELL # 1 VELOCITY AT INTERFACE # 3 IS   0.72678065E-09 AND    0.0000000
 POSITION OF INTERFACE SP / gas interface IS   0.50255157E-02
 U-FRACTION IN SYSTEM:  FE = .994819677334695  O = .0168969527422597
 TOTAL SIZE OF SYSTEM:  .00502551567938 [m]
  14  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: SP

  CPU time used in timestep                    0  seconds
 9.565003039175641E-008        9.587316942933162E-008        9.585506335686136E-008        1.148735197124206E-010        4.521421471002847E-
034       TIME =   74223.895     DT =   8640.0000     SUM OF SQUARES =  0.43333424E-33
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.47496539E-09 AND    0.0000000
 POSITION OF INTERFACE FER / SP IS   0.49364970E-02
 CELL # 1 VELOCITY AT INTERFACE # 3 IS   0.68063741E-09 AND    0.0000000
 POSITION OF INTERFACE SP / gas interface IS   0.50272927E-02
 U-FRACTION IN SYSTEM:  FE = .994466192093075  O = .0180607362911242
 TOTAL SIZE OF SYSTEM:  .00502729268569 [m]
  13  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: SP

  CPU time used in timestep                    1  seconds
 5.956737357418226E-008        5.973203651930760E-008        5.971910347031317E-008        6.870509385067094E-011        1.113428249098871E-
034       TIME =   82863.895     DT =   8640.0000     SUM OF SQUARES =  0.10833356E-33
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.44780139E-09 AND    0.0000000
 POSITION OF INTERFACE FER / SP IS   0.49326280E-02
 CELL # 1 VELOCITY AT INTERFACE # 3 IS   0.64205364E-09 AND    0.0000000
 POSITION OF INTERFACE SP / gas interface IS   0.50289710E-02
 U-FRACTION IN SYSTEM:  FE = .994132791227442  O = .0191577859112694
 TOTAL SIZE OF SYSTEM:  .00502897102519 [m]
  10  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: SP

  CPU time used in timestep                    0  seconds
 1.009711694759717E-008        1.004042487447079E-008        1.016247011600812E-008        1.115235233007664E-011        5.115751414778595E-
034       TIME =   86400.000     DT =   3536.1047     SUM OF SQUARES =  0.50856588E-33
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.44532653E-09 AND    0.0000000
 POSITION OF INTERFACE FER / SP IS   0.49310532E-02
 CELL # 1 VELOCITY AT INTERFACE # 3 IS   0.61782693E-09 AND    0.0000000
 POSITION OF INTERFACE SP / gas interface IS   0.50295810E-02
 U-FRACTION IN SYSTEM:  FE = .994011770932698  O = .0195898327439478
 TOTAL SIZE OF SYSTEM:  .00502958100464 [m]
 MUST SAVE WORKSPACE ON FILE
 WORKSPACE SAVED ON FILE
 RECLAIMING WORKSPACE
 DELETING TIME-RECORD FOR TIME    0.0000000
 DELETING TIME-RECORD FOR TIME   0.10000000E-06
 DELETING TIME-RECORD FOR TIME   0.30000000E-06
 DELETING TIME-RECORD FOR TIME   0.70000000E-06
 DELETING TIME-RECORD FOR TIME   0.15000000E-05
 DELETING TIME-RECORD FOR TIME   0.31000000E-05
 DELETING TIME-RECORD FOR TIME   0.63000000E-05
 DELETING TIME-RECORD FOR TIME   0.12700000E-04
 DELETING TIME-RECORD FOR TIME   0.25500000E-04
 DELETING TIME-RECORD FOR TIME   0.51100000E-04
 DELETING TIME-RECORD FOR TIME   0.10230000E-03
 DELETING TIME-RECORD FOR TIME   0.20470000E-03
 DELETING TIME-RECORD FOR TIME   0.40950000E-03
 DELETING TIME-RECORD FOR TIME   0.81910000E-03
 DELETING TIME-RECORD FOR TIME   0.16383000E-02
 DELETING TIME-RECORD FOR TIME   0.32767000E-02
 DELETING TIME-RECORD FOR TIME   0.65535000E-02
 DELETING TIME-RECORD FOR TIME   0.13107100E-01
 DELETING TIME-RECORD FOR TIME   0.26214300E-01
 DELETING TIME-RECORD FOR TIME   0.52428700E-01
 DELETING TIME-RECORD FOR TIME   0.10485750
 DELETING TIME-RECORD FOR TIME   0.20971510
 DELETING TIME-RECORD FOR TIME   0.41943030
 DELETING TIME-RECORD FOR TIME   0.83886070
 DELETING TIME-RECORD FOR TIME    1.6777215
 DELETING TIME-RECORD FOR TIME    3.3554431
 DELETING TIME-RECORD FOR TIME    6.7108863
 DELETING TIME-RECORD FOR TIME    13.421773
 DELETING TIME-RECORD FOR TIME    26.843545
 DELETING TIME-RECORD FOR TIME    53.687091
 DELETING TIME-RECORD FOR TIME    107.37418
 DELETING TIME-RECORD FOR TIME    214.74836
 DELETING TIME-RECORD FOR TIME    429.49673
 DELETING TIME-RECORD FOR TIME    858.99346
 DELETING TIME-RECORD FOR TIME    1717.9869
 DELETING TIME-RECORD FOR TIME    3435.9738
 DELETING TIME-RECORD FOR TIME    6871.9477
 DELETING TIME-RECORD FOR TIME    13743.895
 DELETING TIME-RECORD FOR TIME    22383.895
 DELETING TIME-RECORD FOR TIME    31023.895
 DELETING TIME-RECORD FOR TIME    39663.895
 DELETING TIME-RECORD FOR TIME    48303.895
 DELETING TIME-RECORD FOR TIME    56943.895
 DELETING TIME-RECORD FOR TIME    65583.895
 DELETING TIME-RECORD FOR TIME    74223.895

 KEEPING TIME-RECORD FOR TIME    82863.895
 AND FOR TIME                    86400.000
 WORKSPACE RECLAIMED

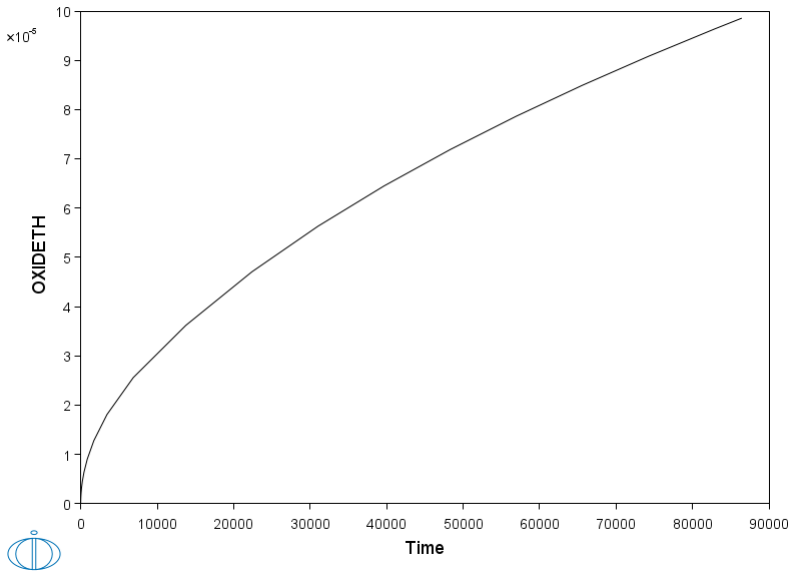
 TIMESTEP AT     86400.0000     SELECTED

DIC>
DIC> set-inter
 --OK---
DIC>
```

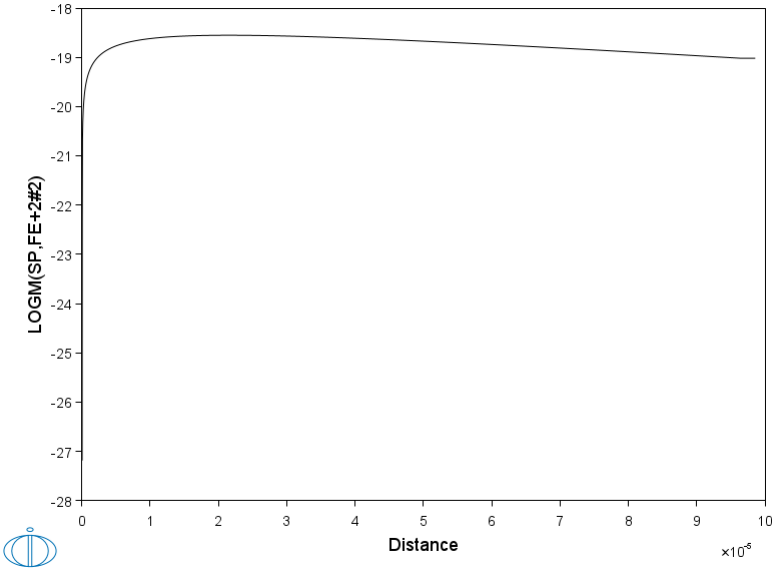
exi3a-plot

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exi3a\plot.DCM.test"
DIC>
DIC> @@ exi3_plot.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR GENERATING GRAPHICAL OUTPUT FOR EXAMPLE i3
DIC> @@
DIC>
DIC> @@
DIC> @@ GO TO THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  8.64000E+04
DIC> read exi3
 OK
DIC>
DIC> @@
DIC> @@ ENTER THE POST PROCESSOR
DIC> @@
DIC> post
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1: @@
POST-1: @@ PLOT THE THICKNESS OF THE OXIDE LAYER GROWING AT THE SURFACE.
POST-1: @@ FOR THIS WE NEED TO ENTER A FUNCTION ACCORDING TO THE FOLLOWING.
POST-1: ent func oxideth
FUNCTION: poi(sp,upper)-poi(sp,lower)
&
POST-1: @@
POST-1: @@ PUT THIS FUNCTION ON THE Y-AXIS
POST-1: @@
POST-1: s-d-a y oxideth
POST-1:
POST-1: @@
POST-1: @@ AND PLOT THE OXIDE THICKNESS VERSUS TIME
POST-1: @@
POST-1: s-d-a x time
  INFO: Time is set as independent variable
POST-1:
POST-1: @@
POST-1: @@ SINCE WE ARE PLOTTING A FUNCTION, SPECIFY A PLOT CONDITION
POST-1: @@
POST-1: s-p-c interface sp upper
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y

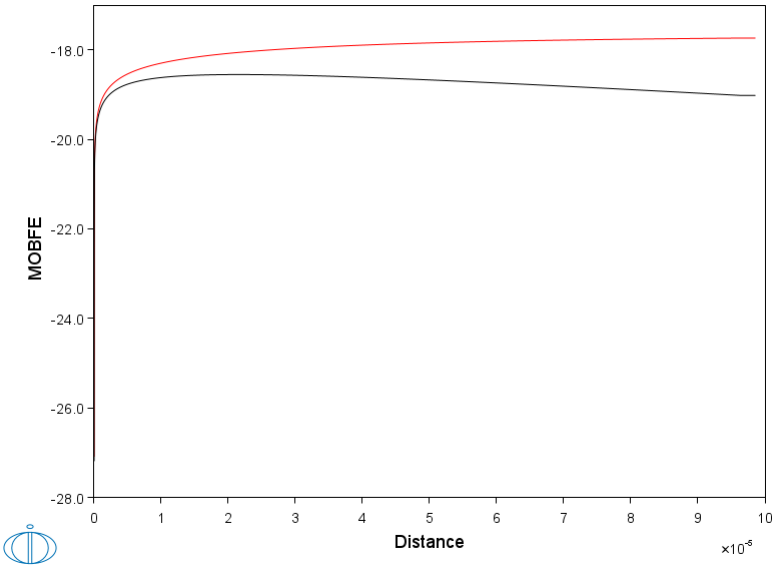
          OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```



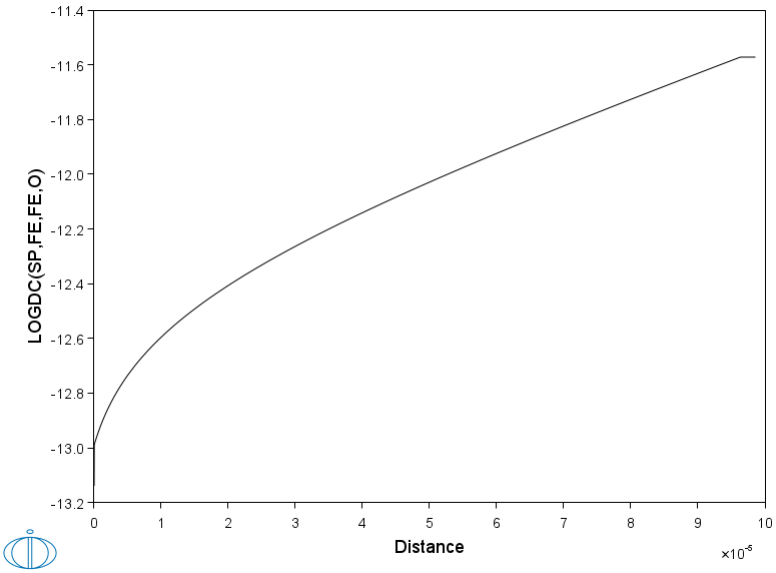

```
POST-1:
POST-1:@?<Hit_return_to_continue>
POST-1:
POST-1: @@
POST-1: @@ NOW PLOT THE MOBILITY IN A SPINEL FOR Fe+2 ON THE SECOND SUBLATTICE
POST-1: @@
POST-1: s-d-a y logm(sp,fe+2#2)
POST-1:
POST-1: @@
POST-1: @@ LIMIT THE PLOT TO THE SPINEL PHASE
POST-1: @@
POST-1: s-d-a x dis local sp
  INFO: Distance is set as independent variable
POST-1:
POST-1: s-p-c time 86400
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```




```
POST-1:
POST-1:
POST-1:@?<Hit_return_to_continue>
POST-1:
POST-1: @@
POST-1: @@ COMPARE MOBILITIES IN A SPINEL FOR Fe+2 AND Fe+3 SPECIES PRESENT ON THE
POST-1: @@ SECOND SUBLATTICE. FOR THIS WE NEED TO ENTER A TABLE.
POST-1: @@
POST-1: ent table mobfe
Variable(s) logm(sp,fe+2#2) logm(sp,fe+3#2)
POST-1:
POST-1: s-d-a y mobfe
COLUMN NUMBER /*/:
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```




```
POST-1:
POST-1:
POST-1:@?<Hit_return_to_continue>
POST-1: @@
POST-1: @@ NOW PLOT THE INTERDIFFUSION COEFFICIENT OF Fe IN A SPINEL
POST-1: @@
POST-1: s-d-a y logdc(sp,fe,fe,o)
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 5
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y
POST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```

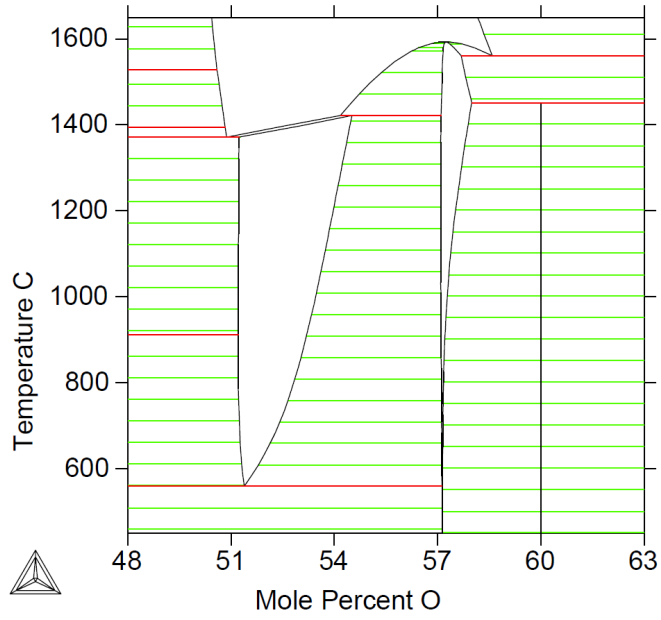



```
POST-1:
POST-1:
POST-1: set-inter
 --OK---
POST-1:
```

Example i3b

Diffusion in iron oxide (FeO) with grain boundary contribution

Oxidation of iron sample and consequent growth of an oxide layer using the grain boundary diffusion contribution model.



exi3b-setup

```
SYS:About

 Thermo-Calc / DICTRA is software package for calculation of phase diagrams,
 simulation of phase transformation kinetics and much more.

 Copyright Foundation for Computational Thermodynamics,
 Stockholm, Sweden

 Software running on Windows 64-bit wordlength
 Compiler: Intel Fortran Compiler 2025.0.0
 License library version: 9.7.0.0036
 Linked: Nov 19 2025 at 14:44:36


SYS:SYS:MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exi3b\setup.DCM.test"
SYS: @@
SYS: @@ Diffusion in complex phases.
SYS: @@ Diffusion in iron oxide (FeO) with a grain boundary contribution
SYS: @@ This example shows the oxidation of an iron sample and consequent
SYS: @@ growth of an oxide layer using the grain boundary diffusion
SYS: @@ contribution model.
SYS: @@------------------------------------------------------------------
SYS:
SYS: @@ exi3_setup.DCM
SYS:
SYS: @@
SYS: @@ START BY GOING TO THE DATABASE MODULE
SYS: @@
SYS: go da
 THERMODYNAMIC DATABASE module
 Database folder:
 C:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\databases\da
 ta
 Current database: Steels/Fe-Alloys  v12.0

 VA                       /-  DEFINED
 DICTRA_FCC_A1  REJECTED
TDB_TCFE12:
TDB_TCFE12: @@
TDB_TCFE12: @@ SELECT A USER DATABASE TO READ THE THERMODYNAMIC DATA
TDB_TCFE12: @@
TDB_TCFE12: sw user FeO.TDB
 Current database: User defined Database
This database does not support the DATABASE_INFORMATION command

 VA                       /-  DEFINED
12:22:49,105 [Thread-0] INFO  TDBFileParser: USER_1997769799_22, number of lines read: 217
12:22:49,361 [Thread-0] INFO  DatabaseUtils: Parsing of USER_1997769799_22 completed in 346 ms
TDB_USER: def-sys fe o
 FE                       O  DEFINED
TDB_USER: rej sp *
 /-                       VA                       FE
 O                        FE+2                     FE+3
 FE+4                     FE2O3                    FEO
 FEO3/2                   O-2                      O2
   REJECTED
TDB_USER: res sp fe fe+2 fe+3 o o2 o-2 va
 FE                       FE+2                     FE+3
 O                        O2                       O-2
 VA  RESTORED
TDB_USER: rej ph * all
 GAS:G                    BCC_A2                   SPINEL:I
   REJECTED
TDB_USER: res ph bcc spinel gas
 BCC_A2                   SPINEL:I                 GAS:G
   RESTORED
TDB_USER:
TDB_USER: get
12:22:49,475 [Thread-0] INFO  JavaWrapper: *** Invoking Gibbs Energy System v6 ***
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 FUNCTIONS ....

 Use the command LIST_REFERENCES to see the list of references for assessed data

 -OK-

 *** WARNING: One or more elements have been rejected only as species but not as elements. This is not allowed with GES6, temporarily reverting

TDB_USER:
TDB_USER: @@
TDB_USER: @@ SWITCH TO A USER-DEFINED MOBILITY DATABASE TO RETRIEVE MOBILITY DATA
TDB_USER: @@
TDB_USER: app user FeOmob.TDB
 Current database: User defined Database
         test database

 VA                       /-                       O
   DEFINED
12:22:49,859 [Thread-0] INFO  TDBFileParser: USER_1399043279_22, number of lines read: 128
12:22:49,900 [Thread-0] INFO  DatabaseUtils: Parsing of USER_1399043279_22 completed in 42 ms
TDB_APP: def-sys fe o
 FE  DEFINED
TDB_APP: rej sp *
 /-                       VA                       FE
 O                        FE+2                     FE+3
 FE2O3                    FEO                      FEO3/2
 O-2                      O2  REJECTED
TDB_APP: res sp fe fe+2 fe+3 o o2 o-2 va
 FE                       FE+2                     FE+3
 O                        O2                       O-2
 VA  RESTORED
TDB_APP: rej ph * all
 SPINEL:I                 GAS:G                    BCC_A2
   REJECTED
TDB_APP: res ph bcc spinel gas
 BCC_A2                   SPINEL:I                 GAS:G
   RESTORED
TDB_APP:
```

```
TDB_APP: get
 ELEMENTS .....
 SPECIES ......
 PHASES .......
 PARAMETERS ...
 *** ERROR  2018 IN DESHPH: DIFFUSION DATA NOT POSSIBLE FOR GAS PHASE
 *** ERROR  2018 IN DESHPH: DIFFUSION DATA NOT POSSIBLE FOR GAS PHASE
 FUNCTIONS ....
 -OK-
TDB_APP:
TDB_APP:
TDB_APP: @@
TDB_APP: @@ ENTER THE DICTRA MONITOR
TDB_APP: @@
TDB_APP: go d-m
 NO TIME STEP DEFINED
DIC>
DIC>
DIC> @@
DIC> @@  ENTER THE GLOBAL CONDITION T
DIC> @@
DIC> set-cond glob T 0 823; * N
DIC>
DIC>
DIC> @@
DIC> @@  SET THE REFERENCE STATE FOR O TO O2 (GAS)
DIC> @@
DIC> set-ref o gas,,,,,,,
DIC>
DIC>
DIC> @@
DIC> @@ ENTER THE REGIONS fer AND sp
DIC> @@
DIC> ent-reg fer
DIC> ent-reg sp,,,,,,,,
DIC>
DIC>
DIC> @@
DIC> @@ ENTER PHASES INTO THE REGIONS
DIC> @@
DIC> ent-phase act fer matrix bcc#1
DIC> ent-phase act sp matrix spinel
DIC>
DIC>
DIC> @@
DIC> @@ ENTER GRIDS INTO THE REGIONS
DIC> @@
DIC>
DIC> @@
DIC> @@ ENTER A SIZE FOR THE FERRITE
DIC> @@
DIC> @@
DIC> ent-grid fer 4.99999e-3 AUTO
DIC>
DIC> @@
DIC> @@ ENTER A THIN INITIAL SIZE FOR THE OXIDE
DIC> @@
DIC> @@
DIC> ent-grid sp  1.00e-10 AUTO
DIC>
DIC>
DIC> @@
DIC> @@ ENTER THE INITIAL COMPOSITIONS IN BCC
DIC> @@
DIC> ent-comp fer bcc#1 m-f
PROFILE FOR /O/: o lin 1e-9 1e-9
DIC>
DIC>
DIC> @@
DIC> @@ ENTER THE INITIAL COMPOSITIONS IN THE OXIDE
DIC> @@
DIC> ent-comp sp spinel m-f
  this is a phase with charged species
  with more than 2 sublattices
PROFILE FOR /FE/: FE lin 4.28771E-01 4.28549E-01
DIC>
DIC>
DIC> @@
DIC> @@ ENTER A BOUNDARY CONDITION "GAS" ON THE UPPER (RIGHT-MOST) INTERFACE
DIC> @@ OF THE OXIDE. THIS ALLOWS THE SYSTEM TO EXPAND AND THE OXIDE LAYER
DIC> @@ TO GROW EXTERNALY. FOR THIS EXAMPLE AN OXYGEN ACTIVITY IS SPECIFIED
DIC> @@ THAT IS LOW ENOUGH NOT TO FORM CORUNDUM (FE2O3). ALSO SPECIFY THAT
DIC> @@ THERE IS NO FLUX OF Fe ACROSS THIS INTERFACE, I.E. NO Fe IS
DIC> @@ ALLOWED TO ENTER OR LEAVE THE SYSTEM.
DIC> @@
DIC> set-cond boundary upper gas
TYPE OF CONDITION FOR COMPONENT FE /ZERO_FLUX/: zero-flux
TYPE OF CONDITION FOR COMPONENT O /ZERO_FLUX/: act
LOW TIME LIMIT /0/: 0 4.5e-4; * N
DIC>
DIC>
DIC> @@
DIC> @@ ENTER START VALUES FOR THE INITIAL INTERFACE VELOCITIES
DIC> @@
DIC> s-a-s-v -1e-5 1e-5 yes
 STARTING VALUES WILL BE TAKEN FROM PROFILES
DIC>
DIC>
DIC> @@
DIC> @@ SIMULATE FOR 24 HOURS
DIC> @@
DIC> s-s-time 86400,,,,
SMALLEST ACCEPTABLE TIMESTEP : /1E-07/:
DIC>
DIC> @@
DIC> @@ SPECIFY THAT POTENTIALS AND NOT ACTIVITIES ARE VARIED AT THE PHASE
DIC> @@ INTERFACE. ALSO USE A FULLY IMPLICIT SCHEME FOR TIME INTEGRATION.
DIC> @@
DIC> set-option DEGREE_OF_IMPLICITY 1.0
DIC> set-option VARY_POTENTIALS_OR_ACTIVITIES POT
```

```
 RELEASING OLD STARTING VALUES
DIC>
DIC> @@ ENABLE THE GRAIN BOUNDARY DIFFUSION CONTRIBUTION MODEL
DIC> GB
REGION NAME : /SP/: SP
PHASE NAME: /SPINEL/: SPINEL
Enable model for grainboundary contribution to diffusion /YES/: YES
Grainboundary thickness /5E-10/: 5e-10
Grainsize(T,P,TIME)= 10.0e-6;
Bulkdiffusion activation energy multiplier /.5/: 0.333333
Enable model for dislocation contribution to diffusion /YES/: NO
DIC>
DIC>
DIC>
DIC> @@
DIC> @@ SAVE THE SET UP TO A NEW STORE FILE AND EXIT
DIC> @@
DIC> save exi3b.DIC Y
DIC>
DIC>
DIC>
DIC> set-inter
 --OK---
DIC>
```

exi3b-run

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exi3b\run.DCM.test"
DIC>
DIC>
DIC> @@ exi3_run.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR RUNNING EXAMPLE i3
DIC> @@
DIC>
DIC> @@
DIC> @@ ENTER THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  0.00000E+00
DIC> read exi3b
 OK
DIC>
DIC> @@
DIC> @@ START THE SIMULATION
DIC> @@
DIC> sim y
 INFO: Default responses (if any) will be applied during the simulation. Use "SIMULATE_REACTION NO" instead for manual input.
 Region: FER
 geometric   0.833333     dense at   0.499999E-02   58 points
 Region: SP
 geometric    1.03726     dense at    0.00000       27 points
 geometric   0.964075     dense at   0.100000E-09   28 points
  Trying old scheme                        3
 U-FRACTION IN SYSTEM:  FE = 0.99999999500542  O = 2.10000395011622E-08
 TOTAL SIZE OF SYSTEM:  .0049999901 [m]
 U-FRACTION IN SYSTEM:  FE = 0.99999999500542  O = 2.10000395011622E-08
 TOTAL SIZE OF SYSTEM:  .0049999901 [m]
 0.292908950472656        0.292908246928952        0.292908395685021        3.918702200652587E-002        9.367735717507752E-
023       TIME =  0.10000000E-06 DT =  0.10000000E-06 SUM OF SQUARES =  0.74972824E-22
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.36177235E-03 AND    0.0000000
 POSITION OF INTERFACE FER / SP IS   0.49999900E-02
 CELL # 1 VELOCITY AT INTERFACE # 3 IS   0.61983704E-03 AND    0.0000000
 POSITION OF INTERFACE SP / gas interface IS   0.49999901E-02
 U-FRACTION IN SYSTEM:  FE = 0.99999998985525  O = 3.36524206707485E-08
 TOTAL SIZE OF SYSTEM:  .00499999012581 [m]
  3  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: SP

  CPU time used in timestep                   1  seconds
 3.143617040855247E-006        3.144236471659743E-006        3.144881466811322E-006        4.076561546982120E-008        7.212645257549425E-
032       TIME =  0.30000000E-06 DT =  0.20000000E-06 SUM OF SQUARES =  0.60465361E-31
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.26719690E-03 AND    0.0000000
 POSITION OF INTERFACE FER / SP IS   0.49999899E-02
 CELL # 1 VELOCITY AT INTERFACE # 3 IS   0.37865989E-03 AND    0.0000000
 POSITION OF INTERFACE SP / gas interface IS   0.49999901E-02
 U-FRACTION IN SYSTEM:  FE = 0.99999998519419  O = 4.87988508687407E-08
 TOTAL SIZE OF SYSTEM:  .0049999901481 [m]
  33  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: SP

  CPU time used in timestep                   2  seconds
 8.582625080322057E-007        8.586191088743216E-007        8.585770780586650E-007        1.725688368190803E-009        1.121891808424791E-
034       TIME =  0.70000000E-06 DT =  0.40000000E-06 SUM OF SQUARES =  0.16974138E-34
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.19377424E-03 AND    0.0000000
 POSITION OF INTERFACE FER / SP IS   0.49999898E-02
 CELL # 1 VELOCITY AT INTERFACE # 3 IS   0.27792398E-03 AND    0.0000000
 POSITION OF INTERFACE SP / gas interface IS   0.49999902E-02
 U-FRACTION IN SYSTEM:  FE = 0.99999997826752  O = 7.10328257106202E-08
 TOTAL SIZE OF SYSTEM:  .00499999018176 [m]
  25  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: SP

  CPU time used in timestep                   1  seconds
 6.515892209006579E-007        6.518089521559404E-007        6.517960973641674E-007        7.160515018440124E-010        1.726801201357940E-
033       TIME =  0.15000000E-05 DT =  0.80000000E-06 SUM OF SQUARES =  0.16974138E-32
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.13205341E-03 AND    0.0000000
 POSITION OF INTERFACE FER / SP IS   0.49999897E-02
 CELL # 1 VELOCITY AT INTERFACE # 3 IS   0.18888697E-03 AND    0.0000000
 POSITION OF INTERFACE SP / gas interface IS   0.49999902E-02
 U-FRACTION IN SYSTEM:  FE = 0.99999996888748  O = 1.01254825184996E-07
 TOTAL SIZE OF SYSTEM:  .00499999022723 [m]
  25  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: SP

  CPU time used in timestep                   2  seconds
 2.443476937795328E-007        2.444400502254134E-007        2.444331403409376E-007        3.133477941735192E-010        6.757329275701920E-
034       TIME =  0.31000000E-05 DT =  0.16000000E-05 SUM OF SQUARES =  0.35181370E-33
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.93735802E-04 AND    0.0000000
 POSITION OF INTERFACE FER / SP IS   0.49999896E-02
 CELL # 1 VELOCITY AT INTERFACE # 3 IS   0.13437817E-03 AND    0.0000000
 POSITION OF INTERFACE SP / gas interface IS   0.49999903E-02
 U-FRACTION IN SYSTEM:  FE = 0.99999995551222  O = 1.44255972784647E-07
 TOTAL SIZE OF SYSTEM:  .00499999029225 [m]
  29  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: SP

  CPU time used in timestep                   3  seconds
 1.350156100676961E-005        1.350641195995434E-005        1.350610187182701E-005        1.525413798364827E-008        2.200149266547059E-
032       TIME =  0.63000000E-05 DT =  0.32000000E-05 SUM OF SQUARES =  0.21998483E-31

output ignored...



... output resumed

 POSITION OF INTERFACE FER / SP IS   0.49344229E-02
 CELL # 1 VELOCITY AT INTERFACE # 3 IS   0.10984395E-08 AND    0.0000000
 POSITION OF INTERFACE SP / gas interface IS   0.50281239E-02
 U-FRACTION IN SYSTEM:  FE = .994278667446015  O = .0186355570646506
 TOTAL SIZE OF SYSTEM:  .00502812390109 [m]
  28  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: SP

  CPU time used in timestep                   3  seconds
 4.810881384903808E-007        4.818502687534282E-007        4.817787239929768E-007        6.672711984601621E-010        2.745954803520864E-
033       TIME =   56943.895     DT =   8640.0000     SUM OF SQUARES =  0.26188133E-32
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.70318910E-09 AND    0.0000000
 POSITION OF INTERFACE FER / SP IS   0.49283473E-02
 CELL # 1 VELOCITY AT INTERFACE # 3 IS   0.10060063E-08 AND    0.0000000
 POSITION OF INTERFACE SP / gas interface IS   0.50307402E-02
```

```
 U-FRACTION IN SYSTEM:  FE = .993757761568711  O = .0203536215381767
 TOTAL SIZE OF SYSTEM:  .00503074024138 [m]
  16  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: SP

  CPU time used in timestep                    2  seconds
 2.759410377008257E-007        2.764666912549018E-007        2.764223294828198E-007        3.498157980721660E-010        4.393527685633382E-
034       TIME =   65583.895     DT =   8640.0000     SUM OF SQUARES =  0.36412113E-33
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.65102059E-09 AND    0.0000000
 POSITION OF INTERFACE FER / SP IS   0.49227225E-02
 CELL # 1 VELOCITY AT INTERFACE # 3 IS   0.93227325E-09 AND    0.0000000
 POSITION OF INTERFACE SP / gas interface IS   0.50331703E-02
 U-FRACTION IN SYSTEM:  FE = .993275042334175  O = .0219441459344009
 TOTAL SIZE OF SYSTEM:  .00503317026435 [m]
  11  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: SP

  CPU time used in timestep                    3  seconds
 1.589276677386145E-007        1.592978117430478E-007        1.592654678748259E-007        1.906234424384614E-010        1.195581198289139E-
032       TIME =   74223.895     DT =   8640.0000     SUM OF SQUARES =  0.11943775E-31
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.60902394E-09 AND    0.0000000
 POSITION OF INTERFACE FER / SP IS   0.49174605E-02
 CELL # 1 VELOCITY AT INTERFACE # 3 IS   0.87303127E-09 AND    0.0000000
 POSITION OF INTERFACE SP / gas interface IS   0.50354513E-02
 U-FRACTION IN SYSTEM:  FE = .992822785564275  O = .0234321821932705
 TOTAL SIZE OF SYSTEM:  .00503545128769 [m]
  14  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: SP

  CPU time used in timestep                    2  seconds
 9.861076236609520E-008        9.888140217383175E-008        9.886219594631730E-008        1.117162369142064E-010        2.204287006661954E-
034       TIME =   82863.895     DT =   8640.0000     SUM OF SQUARES =  0.21741944E-33
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.57420070E-09 AND    0.0000000
 POSITION OF INTERFACE FER / SP IS   0.49124995E-02
 CELL # 1 VELOCITY AT INTERFACE # 3 IS   0.82330959E-09 AND    0.0000000
 POSITION OF INTERFACE SP / gas interface IS   0.50376036E-02
 U-FRACTION IN SYSTEM:  FE = .992396693735749  O = .0248342299540171
 TOTAL SIZE OF SYSTEM:  .00503760358843 [m]
  10  GRIDPOINT(S) REMOVED FROM CELL #1   REGION: SP

  CPU time used in timestep                    2  seconds
 1.759128687822074E-008        1.751684888645274E-008        1.771652447788329E-008        1.534273091642826E-011        1.339123164456750E-
033       TIME =   86400.000     DT =   3536.1047     SUM OF SQUARES =  0.13270861E-32
 CELL # 1 VELOCITY AT INTERFACE # 2 IS  -0.56935899E-09 AND    0.0000000
 POSITION OF INTERFACE FER / SP IS   0.49104861E-02
 CELL # 1 VELOCITY AT INTERFACE # 3 IS   0.78982165E-09 AND    0.0000000
 POSITION OF INTERFACE SP / gas interface IS   0.50383832E-02
 U-FRACTION IN SYSTEM:  FE = .992242570130794  O = .0253847103980189
 TOTAL SIZE OF SYSTEM:  .00503838316747 [m]
 MUST SAVE WORKSPACE ON FILE
 WORKSPACE SAVED ON FILE
 RECLAIMING WORKSPACE
 DELETING TIME-RECORD FOR TIME    0.0000000
 DELETING TIME-RECORD FOR TIME   0.10000000E-06
 DELETING TIME-RECORD FOR TIME   0.30000000E-06
 DELETING TIME-RECORD FOR TIME   0.70000000E-06
 DELETING TIME-RECORD FOR TIME   0.15000000E-05
 DELETING TIME-RECORD FOR TIME   0.31000000E-05
 DELETING TIME-RECORD FOR TIME   0.63000000E-05
 DELETING TIME-RECORD FOR TIME   0.12700000E-04
 DELETING TIME-RECORD FOR TIME   0.25500000E-04
 DELETING TIME-RECORD FOR TIME   0.51100000E-04
 DELETING TIME-RECORD FOR TIME   0.10230000E-03
 DELETING TIME-RECORD FOR TIME   0.20470000E-03
 DELETING TIME-RECORD FOR TIME   0.40950000E-03
 DELETING TIME-RECORD FOR TIME   0.81910000E-03
 DELETING TIME-RECORD FOR TIME   0.16383000E-02
 DELETING TIME-RECORD FOR TIME   0.32767000E-02
 DELETING TIME-RECORD FOR TIME   0.65535000E-02
 DELETING TIME-RECORD FOR TIME   0.13107100E-01
 DELETING TIME-RECORD FOR TIME   0.26214300E-01
 DELETING TIME-RECORD FOR TIME   0.52428700E-01
 DELETING TIME-RECORD FOR TIME   0.10485750
 DELETING TIME-RECORD FOR TIME   0.20971510
 DELETING TIME-RECORD FOR TIME   0.41943030
 DELETING TIME-RECORD FOR TIME   0.83886070
 DELETING TIME-RECORD FOR TIME    1.6777215
 DELETING TIME-RECORD FOR TIME    3.3554431
 DELETING TIME-RECORD FOR TIME    6.7108863
 DELETING TIME-RECORD FOR TIME    13.421773
 DELETING TIME-RECORD FOR TIME    26.843545
 DELETING TIME-RECORD FOR TIME    53.687091
 DELETING TIME-RECORD FOR TIME    107.37418
 DELETING TIME-RECORD FOR TIME    214.74836
 DELETING TIME-RECORD FOR TIME    429.49673
 DELETING TIME-RECORD FOR TIME    858.99346
 DELETING TIME-RECORD FOR TIME    1717.9869
 DELETING TIME-RECORD FOR TIME    3435.9738
 DELETING TIME-RECORD FOR TIME    6871.9477
 DELETING TIME-RECORD FOR TIME    13743.895
 DELETING TIME-RECORD FOR TIME    22383.895
 DELETING TIME-RECORD FOR TIME    31023.895
 DELETING TIME-RECORD FOR TIME    39663.895
 DELETING TIME-RECORD FOR TIME    48303.895
 DELETING TIME-RECORD FOR TIME    56943.895
 DELETING TIME-RECORD FOR TIME    65583.895
 DELETING TIME-RECORD FOR TIME    74223.895

 KEEPING TIME-RECORD FOR TIME    82863.895
 AND FOR TIME                    86400.000
 WORKSPACE RECLAIMED

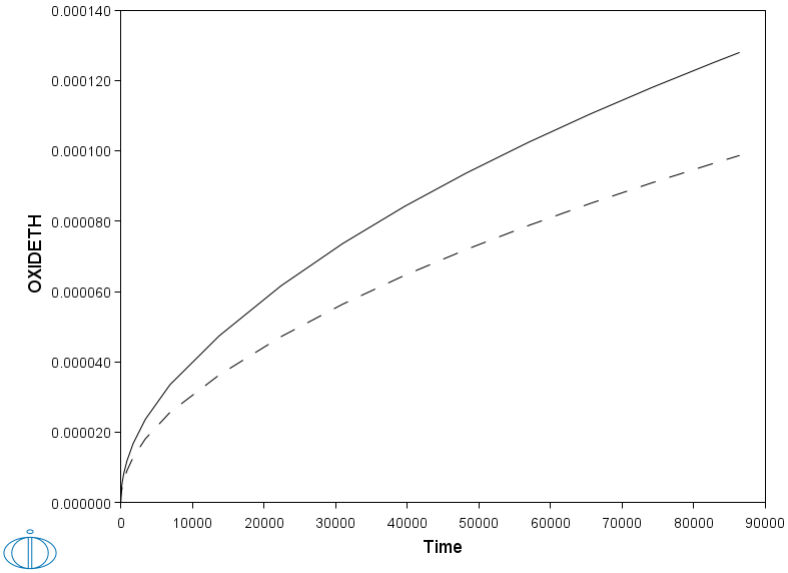
 TIMESTEP AT     86400.0000     SELECTED

DIC>
DIC> set-inter
 --OK---
DIC>
```

exi3b-plot

```
DIC>About
 NO SUCH COMMAND, USE HELP
DIC>DIC>MACRO "c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples\examples\exi3b\plot.DCM.test"
DIC>
DIC> @@ exi3_plot.DCM
DIC>
DIC> @@
DIC> @@ FILE FOR GENERATING GRAPHICAL OUTPUT FOR EXAMPLE i3
DIC> @@
DIC>
DIC> @@
DIC> @@ GO TO THE DICTRA MONITOR AND READ THE STORE RESULT FILE
DIC> @@
DIC> go d-m
 TIME STEP AT TIME  8.64000E+04
DIC> read exi3b
 OK
DIC>
DIC> @@
DIC> @@ ENTER THE POST PROCESSOR
DIC> @@
DIC> post
  POST PROCESSOR VERSION   1.7
  Implemented by Bjorn Jonsson
POST-1:
POST-1: @@
POST-1: @@ PLOT THE THICKNESS OF THE OXIDE LAYER GROWING AT THE SURFACE.
POST-1: @@ FOR THIS WE NEED TO ENTER A FUNCTION ACCORDING TO THE FOLLOWING.
POST-1: ent func oxideth
FUNCTION: poi(sp,upper)-poi(sp,lower)
&
POST-1: @@
POST-1: @@ PUT THIS FUNCTION ON THE Y-AXIS
POST-1: @@
POST-1: s-d-a y oxideth
POST-1:
POST-1: @@
POST-1: @@ AND PLOT THE OXIDE THICKNESS VERSUS TIME
POST-1: @@
POST-1: s-d-a x time
  INFO: Time is set as independent variable
POST-1:
POST-1: @@
POST-1: @@ SINCE WE ARE PLOTTING A FUNCTION, SPECIFY A PLOT CONDITION
POST-1: @@
POST-1: s-p-c interface sp upper
POST-1:
POST-1: app y exi3a.exp 0; 1;
POST-1:
POST-1:
POST-1: SET_EXP_FILE_FORMAT 4
POST-1: MAKE c:\jenkins\workspace\dev_pipeline\generate_dictra_console_examples/unite/distribution\macroResult.exp Y

          OST-1: SET_EXP_FILE_FORMAT 10
POST-1:
POST-1: plot
```




```
POST-1:
POST-1:
POST-1: set-inter
 --OK---
POST-1:
```