MOBTI2: TCS Ti-alloys Mobility Database

Database name:	TCS Ti-alloys Mobility Database	*Database acronym:*	MOBTI
Database owner:	Thermo-Calc Software AB	*Database version:*	2.0
Database segment:	Ti/TiAl based alloys		

MOBTI2 is a kinetic database containing mobility data limited to Ti/TiAl-based alloys. Data is present in a format suitable for simulation of diffusion controlled phenomena using the add-on Diffusion Module (DICTRA) and/or Precipitation Module (TC-PRISMA), and/or for use together with any Thermo-Calc programming interface.

MOBTI2 is compatible and recommended for use in combination with the TCTI1 (TCS Ti/TiAl-based Alloys Thermodynamic Database).

Applications

Together with the thermodynamic database for Ti/TiAl-alloys (e.g. TCTI1), the MOBTI2 can be used to study several different diffusion-controlled phenomena in Ti/TiAl based alloys, such as e.g. microsegregation during solidification, homogenisation kinetics, growth/dissolution kinetics of precipitates, and much more by using the add-on Diffusion Module (DICTRA). In a similar way, MOBTI2 is suitable for simulating concurrent nucleation, growth, and coarsening of precipitates in Ti/TiAl-alloys by using the Precipitation Module (TC-PRISMA).

Included Elements (23)

Al	B	C	Co	Cr	Fe	Hf	Mn	Mo	N	Nb	Ni	O	Re	Ru
Si	Sn	Ta	Ti	V	W	Y	Zr							

Included Phases (4)

BCC_A2	HCP_A3	ALTI_L10	LIQUID

Please note that apart from the above phases for which diffusion data is indeed included in the database, other phases may be included in a diffusion simulation. However, these other phases will be treated as so-called diffusion “NONE”, i.e. there will be no diffusion considered in such phases. Phases which are not listed above will automatically be entered as diffusion “NONE” in the DICTRA module in Thermo-Calc, provided a thermodynamic description for such phases has been retrieved prior to reading data from the mobility database.

Assessed Systems

MOBTI2 contains critically assessed self- and impurity diffusion data for the elements in the LIQUID, BCC_A2, HCP_A3 and ALTi_L10 phases when experimental information is available. Otherwise, some estimates based on empirical rules have been made. This database also includes complete and critical assessments of the binary and ternary systems (listed below) for the LIQUID, BCC_A2 and ALTI_L10 phases. For the HCP_A3 phase, which has a very small solubility range and completely no reported experimental diffusivities in binary and ternary Ti-based alloys, only the self- and impurity diffusivities are included. Diffusion data for the LIQUID phase has also been assessed for systems where experimental data is available; otherwise the modified Sutherland equation was used for estimation.

Binary systems (20)

BCC_A2

Al-Fe	Al-Ti	Al-V	Cr-Ti	Fe-Ti	Hf-Ti	Mo-Ti	Nb-Ti	Ni-Ti
Si-Ti	Sn-Ti	Ta-Ti	Ti-V	Ti-Zr				

ALTI_L10

Al-Ti

LIQUID

Al-Ni	Al-Si	Fe-Mn	Fe-Si	Ni-Si

Ternary systems (7)

BCC_A2

Al-Fe-Ti	Al-Ti-V	Al-Cr-Ti

ALTI_L10

Al-Cr-Ti	Al-Mn-Ti	Al-Nb-Ti	Al-Ti-Zr

Limits

As in the spirit of the CALPHAD method, predictions can be made for multicomponent systems by extrapolation into multicomponent space of data critically evaluated and assessed based on binary, ternary and in some cases higher order systems.

However, critical calculations must always be verified by equilibrium experimental data; it is the user's responsibility to verify the calculations but Thermo-Calc Software AB is interested in knowing about any significant deviations in order to improve any future release.

Scientific Models and References

See the Thermo-Calc Software reference list and reference library at: https://www.thermocalc.com/support/resources/