



Database name:	TCS Ni-alloys Mobility Database	Database version:	1.0
Database acronym:	MOBNI1		
Database owner:	Thermo-Calc Software AB		
Database segment:	Nickel-based superalloys		

Brief description

MOBNI1 is a kinetic database containing mobility data for Ni-based alloys present in a format suitable for simulation of diffusion controlled phenomena using the DICTRA simulation software, and/or for use together with any Thermo-Calc programming interface.

MOBNI1 is compatible and primarily recommended for use in combination with the TTNi thermodynamic database.

Applications

Used together with the DICTRA software and a thermodynamic database for Ni-based alloys (e.g. TTNi), then the MOBNI1 database can be used in order to study several different phenomena of interest to Ni-based superalloys design and manufacturing, such as e.g. microsegregation during solidification, homogenisation kinetics, precipitate growth/dissolution kinetics, interdiffusion in Ni-base superalloy coating/substrate compounds, and much more.

Included Elements

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

Included Phases

FCC_A1 LIQUID

Please note that apart from above phases for which diffusion data is indeed included in the database, then also other phases may be included in a DICTRA 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 DICTRA, provided a thermodynamic description for such phases has been retrieved prior to reading data from the mobility database.

Assessed Systems

The MOBNI1 database contains assessed impurity diffusion data in FCC_A1 Ni for all included elements. It also includes complete and critical assessments of FCC_A1 for the following binary, ternary systems, and higher order systems:

Al-B Al-Cr Al-Fe Al-Ni B-Ni C-Cr C-Fe C-Ni Co-Fe Co-Ni Cr-Fe Cr-Ni
Fe-Mn Fe-Ni Hf-Ni Mn-Ni Mo-Ni Ni-Re Ni-Ta Ni-Ti Ni-W

Al-B-Ni Al-Cr-Ni C-Cr-Fe C-Cr-Ni C-Fe-Ni Cr-Fe-Ni

Fe-Cr-Ni-C

There are also parameters added for diffusion in the liquid following a simple estimate that all diffusion coefficients in the liquid are equal to $1 \cdot 10^{-9}$ [m²/s].

Limits

The database is applicable for commercial Ni-based superalloys, but care should always be taken, as these alloys are highly complex alloys that usually are including very high amounts of alloying elements.

Scientific Models & References

See the Thermo-Calc Software reference available at:

http://www.thermocalc.com/DOWNLOAD_AREA/References.html