Thermo-Calc Software

MOBAl1

Database name:	TCS Al-alloys Mobility Database	Database acronym:	MOBAl1
Database owner:	Thermo-Calc Software AB	Database version:	1.0
Database segment:	Aluminium alloys		

Brief Description

MOBAl1 is a kinetic database containing mobility data for Al-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.

MOBAL1 is primarily intended for use in combination with the TTAl thermodynamic database, but is also compatible for use in combination with the SSOL or COST thermodynamic databases.

Applications

Used together with the DICTRA software and a thermodynamic database for Al-alloys (e.g. TTAl) the MOBAl1 database can be used in order to study several different phenomena of interest to aluminium alloys, such as e.g. microsegregation during solidification, homogenisation kinetics, growth/dissolution kinetics of precipitates, interdiffusion in Al-compounds, and much more.

Included Elements

Ag	Al	Au	B	Be	C	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	Ge	H
In	La	Li	Mg	Mn	Mo	Na	Nb	Nd	Ni	Pb	Pd	Pr	Sb	Sc	Si	Sm
Sn	Sr	Ti	Tl	V	Zn	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

This database contains assessed impurity diffusion data in FCC_Al for all included elements. However, data for B, C, Ca, Sc, Sr and Zr have been estimated due to lack of reliable experimental information. In addition, a binary assessment for Al-Si (FCC) is included.

There is also assessed data for diffusion in liquid Al for Al, Co, Cr, Cu, Fe, Ga, Ge, Mg, Mn, Ni, Si, Ti, V, and Zn. For remaining elements we use a simple estimate, i.e. $D = 1E\text{-}7 \bullet \exp^{(-30000/RT)}$.

Limits

The database is applicable for most commercial Al-based alloys, care should be taken with alloys including high amounts of alloying elements. 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 experimental data; it is the user's responsibility to verify the calculations but Thermo-Calc Software AB is interested to know about any significant deviations in order to improve any future release.

Scientific Models & References

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

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