Thermo-Calc Software

TCS Mg-alloys Mobility Database (MOBMG2)

Technical Information

Available Starting with Thermo-Calc Version 2021a

Document created 11/13/2020

Contents

MOBMG2: TCS Mg-alloys Mobility Database

The TCS Mg-alloys Mobility Database MOBMG2 is a kinetic database containing atomic mobility data for Mg-based alloys. It provides kinetic data for those working with the add-on kinetic modules – the Diffusion Module (DICTRA) and the Precipitation Module (TC-PRISMA)– as well as a few specific calculation types, such as Scheil with back diffusion.

The MOBMG2 database is compatible and recommended for use in combination with TCMG6, the TCS thermodynamic Mg-based alloys database.

When used with the Add-on Modules and the thermodynamic TCMG6 database, it can help calculate various diffusivities in both solid and liquid solution phases. In Mg-based alloys it can also simulate diffusion-controlled phenomena, such as solidification, nucleation, growth / dissolution and coarsening of precipitates.

Included Elements (33)

Ag	Al	Bi	Ca	Ce	Cu	Dy	Er	Fe	Ga
Gd	H	Ho	In	K	La	Li	Mg	Mn	Na
Nd	Ni	Pr	Sb	Sc	Si	Sm	Sn	Sr	Th
Y	Zn	Zr							

Included Phases

HCP_A3 and LIQUID

The above phases have diffusion data included in the database. You can include other phases in a diffusion simulation. However, these other phases are treated as so-called diffusion *NONE*, i.e. there is no diffusion considered in these other phases. Any phase not listed above is automatically entered as diffusion *NONE* (in Console Mode in the DICTRA module or in Graphical Mode with the Diffusion Module (DICTRA) and/or Precipitation Module (TC-PRISMA)), as long as a thermodynamic description for the phases is retrieved prior to reading data from the mobility database.

Assessed Systems

All data sets are critically assessed against experimental information whenever available. The fact that the amount of experimental diffusion data is limited for Mg-based alloys has made it necessary to use ab-initio calculations and sound empirical rules extensively in the development of this kinetic database.

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 to know about any significant deviations in order to improve any future release.

Additional Resources

This document is available on our website on the Magnesium-based Alloys Databases page, where you can also learn more about the compatible thermodynamic database. Alternatively, when in Thermo-Calc, press F1 to search the online help for more information.

Also see our website for further applications of Thermo-Calc to magnesium including links to other resources such as publications, examples, background information about the CALPHAD methodology used for database development, plus much more.

MOBMG: TCS Mg-alloys Mobility Database Revision History

Current Database Version

Database name (acronym):	**TCS Mg-alloys Mobility Database (MOBMG)**
Database owner:	**Thermo-Calc Software AB**
Database version:	**2.0**
First release:	**MOBMG1 was released in 2015**

Changes in the Most Recent Database Release

MOBMG1.1 to MOBMG2.0

Software release 2021a (December 2020/January 2021).

- Nine elements added to the database: Bi, Dy, Er, Ga, H, Ho, In, Sb, and Sm.
- Existing descriptions of the HCP_A3 are improved taking into account the new available experimental data and CALPHAD assessments.

Previous Releases

MOBMG1.0 to MOBMG1.1

Released with the 2015b update in March 2016.

- The mobility data for the liquid phase is re-evaluated.