A Thermodynamic Database for Solder Systems

A. Dinsdale

NPL Materials Centre
National Physical Laboratory
Teddington, UK

Abstract

Owing to impending European legislation, lead will no longer be used in the fabrication of electrical and electronic materials within Europe. COST 531 was a European action on the study of new lead-free materials suitable for use in the electronics industry. One of the objectives of the action was the provision of a self-consistent thermodynamic database for lead-free solder materials and substrates. Assessed thermodynamic parameters for more than 50 binary systems were collected from the literature or have been provided directly by a programme of experimental and assessment work as part of the COST action. These data were supplemented by parameters for ternary systems to provide a self-consistent thermodynamic database. The database has been tested thoroughly using proprietary software to ensure its portability. The database is now described in great detail in a recent Atlas of Phase Diagrams for Lead Free Solders published as a final report from COST531.

This presentation will be concerned with a description of the scope and potential of the database, how the database has been developed as a result of collaboration between a large number of European partners within the COST framework and how it can be used with appropriate software such as MTDATA as an aid in the design and use of solders. The presentation will conclude with an introduction to a new COST project HISOLD concerned with the development of new High Temperature Lead Free Solders.