

THERMODYNAMIC MODELLING OF THE Ag-Cu-In SYSTEM

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As part of the European COST531 action on lead-free solder materials, a complete self-consistent thermodynamic model of the Ag-Cu-In system has been derived. Using DTA measurements and experimental calorimetric and activity data for the liquid phase, supplemented by phase equilibrium data taken from the literature, the model parameters for all phases in the ternary system were optimized. Thermodynamic descriptions for the binary systems were taken from the COST531 thermodynamic database. However, owing to mixing in the ternary system between the Ag₂In and Cu₂In phases, it was necessary to change the model of the Ag₂In phase used at present in the database in order to make it compatible with that of the Cu₂In phase. It can be shown that this \square -brass type phase can exist at all compositions between Ag₂In and Cu₂In, but not at a single temperature; as the former is a low-temperature phase and the latter a high-temperature phase. Phase boundaries and thermodynamic properties calculated using the current set of parameters are in reasonable agreement with the experimental data.