CALCULATION OF AG-SN PHASE DIAGRAM INCLUDING THE SIZE EFFECT

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Abstract

CALPHAD approach is a very useful technique for calculation of phase diagrams of bulk materials based on thermodynamic database containing data such as chemical potentials of pure substances and excess Gibbs energy of mixtures as a function of composition, temperature and pressure. In order to extend the use of CALPHAD approach to small metallic particles on sub-micron and nano scale, due to the surface effect, the chemical potentials and the excess Gibbs energy should be expressed with an additional parameter: the particle size.

In this study, the nanoalloy Ag-Sn binary phase diagram was calculated by using the CALPHAD method. Silver-tin alloy is one of the promising alternatives for Sn/Pb solders. The calculated nanoalloy phase diagram was verified using experimental data from the literature and also the data from own experimental work.

Keywords: Nanoalloys, phase diagram, CALPHAD method

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