

Comparison of experimental and thermodynamic approaches in the study of Ga-enriched SAC305 lead-free solders

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The aim of the work was the study of lead-free solders SAC305 alloyed with gallium and comparison of experimental and thermodynamic approaches. In the experimental investigation, scanning electron microscopy, energy-dispersive X-ray spectroscopy, X-ray diffraction and differential scanning calorimetry were used. It has been observed that with the addition of gallium in the solders, the thermal properties of the solders are improved. Also at low gallium content, a refinement of the microstructure was observed. However, at high gallium content, the exclusion of the inappropriate gallium-rich phase was found. The experimental results are compared to thermodynamic calculations of the Sn-Ag-Cu-Ga system obtained using the Thermo-Calc software.

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