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Diffusive-hardening alloys based on copper and gallium: calorimetry and structure investigation

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Abstract

Diffusive-hardening alloys (DHA) based on copper and gallium and containing additional metallic components (like indium, bismuth etc.) are used as lead-free solders which can be easily prepared, are hardening at room temperature and demonstrate high strength after hardening. One of the important problems is the affording of high mechanical characteristics of DHA. At the same time the solders must show optimal structure and thermo-physical properties. Here, thermal properties have been studied by differential scanning calorimetry (DSC) and microstructure characteristics were investigated by scanning electron microscopy (SEM). These properties were considered for the DHA compositions which demonstrated high tensile strength. Phase composition of the solders determined by DSC is in good agreement with those found by SEM-EDX method.