

Nanocomposites and Nanomaterials

Nanocomposite SAC solders: structure and electrical conductivity of the liquid Sn-3.0Ag-0.5Cu solder with Ni nanoadditions

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Nanocomposite Sn-Ag-Cu (SAC) solders reinforced with different metal nanoparticles, such as Co, Ni, etc., have become particularly attractive nowadays both in advanced materials science and in industry due to the significant impact of the minor metal nanoinclusions on the microstructure and various properties of the SAC solders [1,2].

The present study reports the structure and the electrical conductivity behaviour of the Sn_{3.0}Ag_{0.5}Cu (SAC305) alloys with minor additions of Ni nanoparticles (NPs) up to 2 wt.%. For this purpose, commercial Ni nanoparticles were used. The nanocomposite samples were prepared by manual mixing of the lead-free SAC305 solder powder with different amounts of Ni NPs followed by cold pressing.

The structure analysis in the melting-solidification temperature range showed transformations in the investigated alloys, caused by dissolution of the Ni nanoadditions in the liquid Sn-based matrix. Furthermore, the electrical conductivity measurements indicated also a hysteresis between the heating and cooling curves.

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1. *Yakymovych A., Plevachuk Yu., Svec P.Sr., et al.* Nanocomposite SAC solders: morphology, electrical and mechanical properties of Sn-3.8Ag-0.7Cu solders by adding Co nanoparticles // *J Mat Sci: Mat Electron.*-2017.-10.1007/s10854-017-6877-7.
2. *Noor E.E.M., Singh A., Chuan Y.T.* A review: influence of nano particles reinforced on solder alloy // *Sol Surf Mon Techn.*-2013.-**25**.-P. 229-241.