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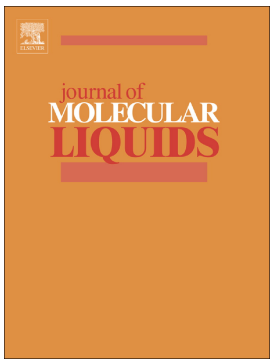

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Dynamic Viscosity of a Liquid Sn-3.0Ag-0.5Cu Alloy with Ni Nanoparticles

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Abstract

The impact of minor additions of Ni nanoparticles on the dynamic viscosity of the liquid Sn-3.0Ag-0.5Cu alloy (SAC305; in wt.%) is examined. The nanocomposite samples were prepared from commercial SAC305 powder and Ni nanopowder by cold pressing. The dynamic viscosity of the $(Sn_{96.5}Ag_{3.0}Cu_{0.5})_{100-x}Ni_x$ alloys measured during heating and cooling exhibited a hysteresis in a temperature range up to 100 K above the melting temperature. This is supposed to be related to the structural transformations caused by dissolution of Ni nanoparticles in the liquid Sn-based matrix upon heating. The experimental values of the viscosity of the $(Sn_{96.5}Ag_{3.0}Cu_{0.5})_{100-x}Ni_x$ alloys are in a good agreement with calculated data using thermodynamic approaches.

KEYWORDS: DYNAMIC VISCOSITY; NANOCOMPOSITE; METAL ALLOYS; MICROSTRUCTURE

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