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# Producing of the metallic compositions from the mixes of copper-containing powders and gallium melts: determination of optimum vibration treatment parameters

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**Abstract**

Metallic composites based on the fusible alloys (e.g. gallium and its eutectics with In and Sn) can be produced by the mechanical mixing of the liquid alloys mentioned and powder fillers at room temperature. The paste-like composition made by this method (diffusive-hardening alloy, DHA) undergoes a sequence of chemical transformations and forms hard metallic composite with high compression strength. The most typical powder-fillers are copper, nickel and their alloys with tin, aluminum, bismuth etc. Vibrational treatment onto the mix (like gallium melt-copper powder) in the sealed capsule provides the fulfilling of two main conditions: flooding of the powder into the liquid gallium and the achieving of full wetting between the mix components. Here, the peculiarities of metallic pastes producing were investigated for the pair (copper powder-liquid gallium) before the interaction reaction occurring. In particular we found minimum vibro-treatment time for given mixes. Also we determined amplitude and frequency parameters of the vibration impact which provides the producing of pastes with optimal rheological properties. The experimental results obtained confirm our theoretical approach.

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