

The influence of unipolar nanosecond electropulse effects on the properties of the alloy Cu-1%Cr. The connection properties of the alloy with the duration of melt processing.

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Abstract

The experimentally determined hardness, electrical resistivity, deformation resistance of the alloy Cu-1% Cr produced using irradiation it melts at a temperature of 1300-1350 °C unipolar nanosecond electric pulse effects a frequency of 1000 Hz, a duration of a single signal with 10^{-9} and a power of 10 kW. The dependences of the determined properties of the metal on the duration of electropulse irradiation have been established. A comparison of irradiated and non-irradiated but received in the same thermoremanent conditions, the alloy samples. Seen significant improvement due to electropulse influence as mechanical (hardness increase up to 40%) and electrical (resistivity decrease up to 10%). The deformation resistance of irradiated samples is higher than that of non-irradiated, all the way deformation on a tensile testing machine, and without loss of plasticity. Found that the best time of the electric pulse treatment is 8-10 mins. It is shown that the influence of the melt irradiation on the electrical resistance of the resulting alloy is more significant than its hardness, despite the achieved changes in the values of these characteristics, expressed as a percentage. The method of melt processing are presented in the form of schematic drawings, results of processing in tables, graphs, and mathematical formulas. On the basis of obtained results the conclusion about expediency of application of electric pulse treatment of melts with the aim of improving the properties of the respective alloys.

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