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FEATURES OF THE PROCESSES OF FORMING AND SINTERING OF POWDERED THERMOMAGNETIC MATERIALS ON THE IRON-NICKEL BASE WITH CHROMIUM ADDITIVES

SYTNYK Iaroslav & MASLYUK Vitalii
Frantsevich Institute for Problems of Materials Science, Ukraine

Purpose. Investigate the influence of chromium addition on the demagnetization temperature and Curie point of powder metallurgy thermomagnetic materials by determining the breakout force of its sample from a permanent magnet.

Methodology. The studies were carried out through the investigations of processes for the formation and sintering of powdered thermomagnetic materials on the iron-nickel base and the determination of the breakout force of its sample from a permanent magnet on a laboratory stand.

Findings. With an increase in the concentration of Cr, the difference in breakout force from a permanent magnet increases and at concentrations of Cr 6 - 8 wt. % reaches the maximum value. On this basis, the optimum content of Cr is in the range of 6 - 8 wt. %. The dependence of the density on the temperature of sintering shows that when the temperature rises from 1200 to 1350 ˚C, the density of the samples also increases, and the porosity decreases significantly. This indicates a greater completeness of the processes of alloying. The highest density of the alloy is 7.01 g/cm^3, at the temperature of 1350 ˚C. When the temperature of sintering increases, the amount of the new phase - a triple solid solution decreases. In the temperature range of 1200 - 1300 ˚C, this phase is distributed evenly throughout the sample volume, and in the temperature range 1300 - 1350 ˚C

combines into separate plots. The dependence of the breakout force on the sintering temperature and on the concentration of chromium showed that the resulting phase reduces the separation effort and the deviation of the curve on the graph from the linear dependence at a temperature of 1300 ˚C can be explained by the accumulation of this phase in the microobjective. The analysis of microstructures showed that the most satisfactory temperature of sintering is 1200 ˚C.

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Key words: thermomagnetic material, Curie point, relays, electromotor devices, iron-nickel alloy

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