

Structure and Properties of Polymer Matrix Hard Magnetic Composite Materials Nd-Fe-B

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Abstract

Investigation results of the polymer matrix hard magnetic composite materials with particles of the powdered rapid quenched Nd-Fe-B strip are presented at this paper. The Nd-Fe-B powder was mixed with powders of iron, aluminum, CuSn10 casting copper alloy with tin and high alloy steel X2CrNiMo17-12-2. Epoxy resin has been used as a matrix (2,5% wt.). The composites were unilaterally and uniaxially pressed at room temperature under the pressure of 800 – 900 MPa and cured afterwards for 2 hours at 180°C. It was estimated that coercive force H_{cB} decreases with the addition of soft magnetic material while remanence B_r of composite is not influenced. The addition of non-magnetic material reduces coercive force H_{cB} and remanence B_r . Metallographic examination of the structure shows uniform distribution of powders: Nd-Fe-B, copper casting alloy with tin CuSn10 and high alloy steel X2CrNiMo17-12-2 in the polymer matrix. Some agglomerations of powders of aluminum and iron have been observed. Addition of metallic powders improve mechanical properties of magnets. Powder of high alloy steel X2CrNiMo17-12-2 has the biggest influence on hardness, powder of iron – on ultimate compressive strength.