

## **Powder Soft Magnetic Layered-gradient Materials with a Controlled Anisotropy of Properties**

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In the proposed work, results of experimental investigations of manufacturing processes of composite materials with a layered-gradient structure on the base of iron powders are presented. The microlayer structure of materials was obtained by cladding of iron powder particles with nickel, tin, phosphorous, and nonmetallic interlayers such as organic resins.

The influences of the thickness, the chemical composition of a nonmagnetic interlayer on the magnetic properties in alternating fields were investigated, which made it possible to choose an optimal compaction method of the powder layered materials with controlled properties (magnetic induction, eddy-current losses, the anisotropy of the magnetic resistance).

The influences of the conditions of compaction, sintering, and thermal treatment in a protective atmosphere on the structure and magnetic properties of the materials was studied. It was shown that the multilayer structures of magnetic cores allow to obtain a saturation magnetic induction within 1.2-1.4 T, magnetic losses of 3.0-5.0 W/kg at an induction of 1 T and a frequency of 50 H. For the anisotropic layered materials, the ratio of magnetic resistance in different directions can be controlled within 1:10. Such materials are recommended for operation as multipurpose adapters of surface-grinding machines, retrieving magnets, and arresting arrangements.