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3D printing of barium hexaferrite magnets with complex shapes

Additive manufacturing can produce near-net-shape permanent magnets with varying geometries. Interestingly, the magnetic properties of 3D-printed alloys from selective laser melting were comparable to those of conventional sintered and bonded magnets with the same compositions. The fuse filament fabrication successfully printed strontium hexaferrite were with high magnetic loadings in thermoplastics. In this study, a commercial 3D printer was modified for extrusion free-forming of barium hexaferrites with complex shapes. Ceramic pastes were prepared by mixing BaCo_3 , Fe_2O_3 , PVA binder, EFKA®FA4620 dispersant, and PEG-400 plasticizer. The printability of ceramic pastes is dependent on the viscosity of the pastes. PEG-400 was adjusted to obtain printed structures with appropriate density after the heat treatment. Similar set-ups could produce other functional ceramics from appropriate paste formulation.

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