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Paste-Injection Molding of Low-Density Barium Hexaferrite Magnets

Facile paste-injection molding is an alternative to produce barium hexaferrite magnets with comparable magnetic properties of higher-density compact magnets. Aqueous-based pastes were prepared by mixing barium carbonate and iron oxide powders, with poly(vinyl alcohol) as the binder, poly(ethylene glycol) as the plasticizer, and EFKA® FA4620 as the dispersing agent. The homogeneous ceramic-polymer paste was injected into the mold using syringes and allowed to dry for 3 h at room temperature. Dried magnets were sintered at 1150 ℃ for 5 h and subsequently polished to obtain approximate sizes of 0.4x0.5x1.8 cm3. The amount of polymer additives was varied, yielding the density of magnets from 1.95–2.30 g/cm3. The external magnetic field can also be applied during the obtained this paste-injection molding process.

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