World PM2016 – MIM Materials for Special Applications

Manuscript refereed by Dr Peter Vervoort (Eisenmann Thermal Solutions GmbH, Germany)

Metal Injection Moulding of NdFeB Based on Recycled Powders

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ABSTRACT

Over the last ten years several groups have been carrying out research into metal injection moulding (MIM) of neodymium-iron-boron (NdFeB) powders to produce isotropic or anisotropic rare earth magnets with higher complexity than in the conventional press and sintering approaches. However, difficult processability due to the high affinity of the powder to oxygen and carbon pickup remains problematic in terms of obtaining sufficient remanence and coercivity. In this paper, a new approach to MIM of NdFeB magnets is presented. It is based on the use of powder obtained from recycling of used rare earth magnets by the hydrogen decrepitation (HD) process. Different types of binder systems have been used for producing mouldable MIM feedstock. Influence of debinding and sintering conditions on interstitial contents and magnetic properties of sintered MIM parts are presented and discussed. Magnets with a remanence of 570 mT, a coercivity of 970 kA/m and an energy product of 57 kJ/m³ could be produced without additional heat treatment.