Additive Manufacturing of Injection Mold for Fabricating NdFeB Magnets

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Abstract

This work presents the fabrication of NdFeB based magnets using a novel method which combines powder injection and 3D printing technique. Using customized 3D printed plastic molds, we demonstrate efficiently manufacturing of magnets with various shapes. The work provides a cost-effective means to fabricate complex shaped magnetic components.

1. Introduction

Neodymium Iron Boron magnets, generally referred to as neodymium magnets or NdFeB magnets were first developed by General Motors and Sumitomo Special Metals in 1984 [3]. Since then, they are the most widely used rare earth magnets. NdFeB magnets are a type of permanent magnet made from an alloy of neodymium, iron, and boron. They are also the strongest class of magnets which are available commercially [4]. Although neodymium is a rare earth metal, its presence is significant in the earth's crust. Neodymium shows paramagnetism at room temperature and when cooled below -253 °C displays antiferromagnetism [5]. Compounds of neodymium with transition