

Structure control of Nd-Fe-B casting strip for high performance sintered magnets

Wenli Pei^{1,2)}, Fazeng Lian¹, Meng Fu¹, Guiqin Zhou¹

¹School of Materials and Metallurgy, Northeastern University, Shenyang, 110004, China

²Dept. of Electronic Engineering, graduate School of Engineering, Tohoku University
Aoba-yama 05, Sendai, 980-8579, Japan

Corresponding author: Wenli Pei; e-mail: Wenlipei@ecei.tohoku.ac.jp; wenlipei@sina.com
Tel:81-22-217-7134; Fax:81-22-263-9402

The structure of cast alloy has been found to be critical to the performance of Nd-Fe-B sintered magnets. The quickly cooling rate during strip casting (SC) suppresses the formation of Fe dendrites and of large Nd-rich pockets, and directional solidification causes a formation of columnar grains containing a typical arrangement hard magnetic Nd₂Fe₁₄B regions and Nd-rich regions, hence improving the magnetic properties of the magnets. In this work, microstructures of cast strip produced by different cooling roller speed were studied. The structure of strip prepared by rational cooling roller speed was ideal microstructure (Fig.1) with small and even grain size, columnar grains penetrated through the whole strips and evenly distributed rich-Nd phase. By using the cast strips, the final fine powders for sintering with a good particle size distribution and less than 3 μ m in mean size were easy to be obtained. After sequently sintering process, the magnets with homogeneous and fine microstructures could be attained. Using controlled SC alloy as master materials for sintered magnet results in an improvement of magnetic properties.

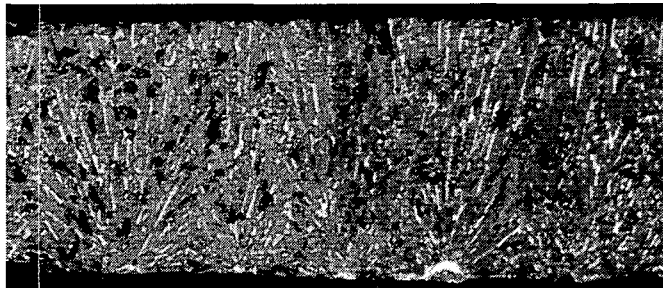


Fig.1 The SEM images of the ideal cast strip

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