Effects of Thermo-magnetic Heat Treatment on Microstructure and Magnetic Properties of Alnico 5DG Alloy

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(received: 24/8/2003, received in revised form: 14/3/2004)

Abstract: In this research, Alnico 5DG alloy was melt and cast in the optimum conditions and its samples were homogenised and heat treated in a magnetic field in order to obtain the required magnetic properties. Microstructure, phase composition and magnetic properties of samples were examined in every processing step. The results indicated that the properties of samples were highly influenced by processing parameters. A proper microstructure composed of $\alpha_1$ magnetic phase in a texture of $\alpha_2$ with acceptable magnetic properties was obtained by meticulous control of the processing conditions. The results also revealed that the magnetic coercivity (and remanence) of the cast samples should be increased by an appropriate heat treatment from 12 kA/m (and 0.55 T) to 41.6 kA/m (and 1.3 T), respectively.

Keywords: Magnetic materials, Directional solidification, Alnico 5DG, Phase composition.