

Influence of additional cooling of casted strips on magnetic properties of Nd-Fe-B sintered magnets

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We investigated the additional (secondary) cooling effect of casted strips on magnetic properties of Nd-Fe-B sintered magnets. The Nd-Fe-B sintered magnets were fabricated with the casted strips prepared without and with additional cooling. The additional cooling was performed by blowing Ar gas with various pressures (0.1, 0.3, and 0.6 MPa) on the free-side surface of the strips during strip-casting process. The higher magnetic properties of H_c , B_r , and $(BH)_{\max}$ of the final Nd-Fe-B sintered magnets were obtained for 0.1 MPa rather than for 0.0 MPa. The best microstructure of columnar grains in the casted strips was produced with the aid of lower gas cooling at the free side. It was found that the microstructure of the strips affects the distribution of grains grown in the sintered magnets. This is the first report of demonstrating improved magnetic performance in Nd-Fe-B sintered magnets by additional gas cooling.

Keywords : permanent magnets, Nd-Fe-B sintered magnet, strip casting, additional cooling, magnetic properties