

Effects of water quenching before hydrogenation, disproportionation, desorption, and recombination process on the magnetic properties of nd-fe-b powder

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Abstrak

In general, the Nd-Fe-B as-cast ingot is homogenized for a long time before the hydrogenation, disproportionation, desorption and recombination (HDDR) process, to produce good magnetic properties. Since the homogenizing process is expensive, this work examined the possibility of replacing it with a water quenching process for Nd-Fe-B magnetic powder. The magnetic powders were soaked at 1100oC for 4 hours, followed by water quenching prior to HDDR. The resulting powder had magnetic properties that were almost similar to magnetic powder that was homogenized prior to HDDR. The remanence values of the water-quenched alloy and the homogenized alloy were 7.8 KG and 8.9 KG, respectively, while the coercivity values were 12.6 KOe and 10.3 KOe, respectively. In general, the magnetic properties of both samples were not much different. The microstructure of Nd₂Fe₁₄B phase combined with a very slight Nd rich phase in micro grain boundary likely caused the coercivity enhancement.