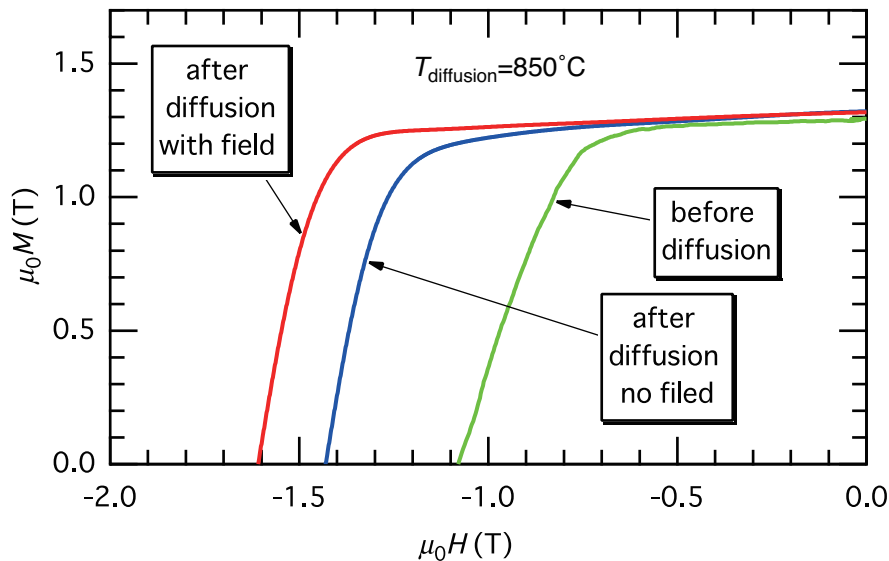


Magnetic Properties of Nd-Fe-B Sintered Magnets Annealed in Strong Gradient Magnetic Fields

ネオジウム系焼結磁石の強勾配磁場中熱処理と磁気特性



Grain-boundary diffusion processing (GBDP) of Dy source from the surface of sintered Nd-Fe-B magnets is paid much attention as a promising method to save the usage of an important rare metal, Dy. However, it is difficult to apply GBDP to large-sized bulk magnets since the diffusion depth is limited to as much as 5 mm. On the other hand, we noticed that the paramagnetic susceptibility of Dy^{3+} is about an order of magnitude larger than that of Nd^{3+} , located in the grain boundary "Nd-rich" phase. We therefore investigated the effect of strong gradient magnetic fields on the GBDP in sintered Nd-Fe-B magnets. Shown in the figure are the demagnetization curves of sintered Nd-Fe-B magnets for which sputter-deposited Dy was diffusion processed at $T_{\text{diffusion}}=850^\circ\text{C}$ under the strong gradient magnetic fields of 18T-CSM. Coercivity of the magnetic GBDP sample is apparently larger than that of the reference sample, suggesting that a magnetic-force-assisted diffusion of Dy is working.

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拡散深さの限界が課題となっているネオジウム焼結磁石のDy粒界拡散法を克服するため、強勾配磁場中でDyの粒界拡散を検討した。その結果、上図のように有意な保磁力向上効果を観測することができた。

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