HIGH COERCIVITY OF Nd-Fe-B THIN FILMS PREPARED BY RF-SPUTTERING WITH SUBSEQUENT HEAT-TREATMENT

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9.7 cm

We prepared $Nd-Fe-B$ thin films by RF-sputtering with subsequent heat-treatment. The films possess perpendicular magnetic anisotropy, $H_c \geq 15kOe$, $(BH)_{max} \geq 20MGOe$, $M_r/M_s \neq 1$. The initial magnetization curve suggests that the coercivity mechnism in these films is nucleation type. The as-deposited films are in amorphous state and show soft magnetic properties with strong in-plane and weak out-of-plane anisotropy. In these films heat-treated at $650°C$ for 30min, $Nd_2Fe_{14}B$ phase crystallizes with c-axis orientation along the film normal. SEM observation revealed that the as-deosited films have dense, continous structure, on the other hand, the heat-treated films have the columnar-like texture consisting of many fine crystallites. The fine structure that originates weak out-of-plane anisotropy in as-deosited film may concern with the fine structure which that results in excellent, hard, magnetic characteristics in the heat-treated films.

13.4 cm

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