FORMATION OF THE PERPENDICULAR MAGNETIC ANISOTROPY IN RE -TM FILMS (RE = Gd, Tb; TM = Co, Fe)

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9.7 cm

Several models have been proposed to explain phenomena of perpendicular anisotropy in RE–TM films but there are few experimental data to prove some of these models. In this paper we report our results of investigation on amorphous RE-TM films and multilayers which include different type single ion anisotropy metals - Gd and Tb. We investigated amorphous RE_X-TM_{1-X} for x=0.15, 0.25, 0.35, 0.5, prepared by co–deposition of RE and TM in high vacuum and RE/TMe multilayers prepared by alternate deposition method. In–plane anisotropy was found in Gd-TM amorphous films and multilayers. But we observed strong perpendicular anisotropy for Tb-TM films. The strong perpendicular magnetic anisotropy in Tb containing films is caused by the interaction of Tb ions with nonspherical f- electron state and the neighbouring TM ions, but in the "spherical" Gd case the magnetic properties of the films depend on the shape anisotropy of thin films. The single ion anisotropy of Tb plays a significant role in the perpendicular magnetic anisotropy in RE–TM amorphous films and multilayers.

13.4 cm

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