

Abstract Submitted  
for the MAR05 Meeting of  
The American Physical Society

**Comparative Study of PMA of Fe/Tb and Fe/Gd Multilayers**

ATAUR CHOWDHURY, University of Alaska Fairbanks, ANDREA FREITAG, Brookhaven National Laboratories — To study the influence of uniaxial anisotropy of rare-earth metals on the perpendicular magnetic anisotropy (PMA) multilayers of Fe/Tb and Fe/Gd were fabricated with magnetron sputtering. Extreme care was taken to fabricate multilayers of Fe/Tb and Fe/Gd with approximately equal layer thicknesses. The samples were studied Mossbauer spectroscopy and torque magnetometer. For samples with very thin layers of Tb and Gd, Mossbauer study shows that the magnetic moments of iron are oriented normal to the surface of the samples. And with increasing layer thicknesses the moments become oriented parallel to the surface of the samples. Magnetic anisotropy constants, measured with torque magnetometer, reveal similar behavior for Fe/Tb and Fe/Gd samples with equal layer thicknesses. The combined results of Mossbauer and torque magnetometer suggests that the uniaxial anisotropy of the rare-earth metals, which is very large for Tb ions and quite insignificant for Gd ions, does not contribute to the perpendicular magnetic anisotropy of transition-metal/rare-earth multilayers.

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Date submitted: 02 Dec 2004

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