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Anomalous Magneto Transport in amorphous TbFeCo thin films¹

NATTAWUT ANUNIWAT, Physics Department, University of Virginia, MARC COSTANTINE, JIWEI LU, Materials Science Department, University of Virginia, MANLI DING, JOSEPH POON, Physics Department, University of Virginia — TbFeCo has attracted some interests because of its high perpendicular anisotropy and tunable magnetic properties for nanomagnetic and spintronics application. In this study, we report a strong size dependence of the coercive field in 30 nm-thick Tb₃₀Fe_{63.5}Co_{6.5} films with MgO capping. Magneto Optical Kerr effect (MOKE) and Vibrating Sample Magnetometer are performed on unpatterned films. The films exhibited strong PMA characteristics with $M_S \sim 200$ emu/cc, $H_C \sim 6000$ Oe, and $K_U \sim 5 \times 10^6$ erg/cc. The films were then fabricated into Hall bars with 500 nm, 50 μ m and 500 μ m in width. From anomalous Hall effect (AHE), H_C was determined for these patterned films. For Hall bars with the width less than 50 μ m, an increase in the coercivity field (~ 1.4 Tesla) was observed at room temperature. The temperature dependent of AHE was characterized from 50K to 300K. The thickness and composition dependent will also be studied and discussed.

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