

Structural and magnetic behavior of hard magnetic Sm-Co_x thin films

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Relatively thick Sm-Co films are attractive for permanent magnets as they exhibit high intrinsic coercive forces and large remanent moment values. Thin Sm-Co films, on the other side are attractive for ultrahigh density recording medium as they allow thermal stability even in nanometer ordered grains. Since room temperature deposited SmCo films are amorphous we present here a systematic investigation on the influence of thickness and annealing conditions on the magnetic properties and structural features. SmCo_x (x ≤ 5) films were deposited by magnetron sputtering on Cu and underlayers that were deposited on thermally oxidized Si wafers. We observed an increase of the coercivity with the ordering of the post-annealed film but also an increase of coercivity even when the recrystallization was not detected after annealing. The microstructural modifications of the thin films were investigated by X-ray diffraction and electron microscopy while the magnetic behavior was observed by VSM measurements. The remanent magnetization and the coercive field were deduced from hysteresis curves, performed in magnetic fields up to 10 T at room temperature.

9.7 cm

13.4 cm

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