Influence of local structure on magnetic anisotropy in Co/Pd thin film

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We present the magnetic and structure properties of Co/Pd thin films where the influence of intermixing at the interfaces is addressed. The series of $Si/[Co_{0.3}/Pd_t]_{10}$ multilayers were prepared with Pd layer thickness $t = 0.6$ and 1.0 *nm*. Next the samples were annealed in vacuum at 300^0C for 15 min to enhance the mixing. The structure was studied with XRD measurements and with EXAFS spectroscopy measured at Pd and Co K-edge. For annealed alloys with different amount of Pd XRD showed a small differences of lattice constants for both systems while the Pd layer thickness has almost no influence on the Co and Pd interatomic distances obtained from EXAFS measurements. The interatomic distances of Co-Co and Pd-Pd atoms for the as-prepared Co/Pd multilayers were close to the bulk values suggesting a small intermixing at the interfaces and partial preservation of multilayered structure. A presence of PMA in both as-prepared and annealed samples indicates strong influence of magnetocrystalline anisotropy.

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