Domain structures and magnetization process in thin Co films with in-plane anisotropy

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In this work we report on magnetization reversal, anisotropy and domain structures in thin Co films for the thickness range where in-plane anisotropy is present [1]. Molecular beam epitaxy technique was used to grow the following samples: (i) sapphire (11-20) substrate; (ii) Mo (20 nm)/Au (20 nm) buffer layer annealed in 200°C; (iii) flat or wedge type Co layers with selected thickness (d) from the range between 2 nm and 100 nm; (iv) 8 nm thick Au cap layer. Both magneto-optical mili-magnetometer and micro-magnetometer techniques were used. In the mili-magnetometer Kerr rotation and ellipticity angles were measured for different configurations of in sample in-plane applied magnetic field. Magnetization vector orientations were deduced from magneto-optic vector magnetometry considering symmetry of polar and longitudinal Kerr effects. Changes of in-plane magnetic anisotropy symmetry were deduced from magnetization curves analysis. Two-fold and six-fold symmetry were observed for different thicknesses. Observation of domain structures (DS) were performed in the micro-magnetometer using the longitudinal Kerr effect in the polarizing optical microscope built in our laboratory. Both high sensitivity and high resolution micro-magnetometer configurations [2] were applied. The evolution of the domain structure during the magnetization reversal processes was studied for different orientation of magnetic field.

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