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Surface anisotropy enhancement of Co nanoparticles by capping with Ag. JUAN BARTOLOME, FERNANDO LUIS, CSIC, Spain, LUIS MIGUEL GARCíA VINUESA, FERNANDO BARTOLOME, CSIC, Spain, FREDERIC PETROFF, C. DERANLOT, CNRS/Thales, France, ANATOLY ROGALEV, P. BENCOK, F. WILHELM, NICK BROOKES, ESRF, France — The present work deals with the observed enhancement of the magnetic anisotropy of Co nanoparticles by capping with Ag, and its origin. The studied samples are granular multilayers prepared by sequential sputtering deposition of Co on amorphous Al_2O_3. For low Co deposition rates, fcc Co nanoparticles with average diameter $0.7 << 5$ nm are formed, and self-organized in a quasi-regular spatial order. We report on the enhancement of anisotropy induced by capping with Ag ($4d^{10}$), which represents an interesting case due to its intermediate spin orbit coupling and Co-interface metal binding energy, lying between those of Cu and Au [1]. We present magnetic measurements and X-ray Magnetic Circular Dichroism (XMCD) data on the $L_{2,3}$edges of Co, showing an increase in the mean orbital moments of Co, and a polarization of the 3d bands of Ag observed ayt the $L_{2,3}$ edges of Ag. From the XMCD K-edge spectra of Co we verify that the induced magnetic moments of the 3d and 4p bands of Co have opposite sign. We prove therefore that surface anisotropy enhancement is caused by the increase of surface Co orbital moments due to hybridization of the 3d Co and 4d Ag bands. [1] F. Luis et al., Europhys Lett. 76, 142 (2006).

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