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A study of the magnetic interlayer coupling between CoO(NiO) and Fe films across MgO spacer layer in CoO(NiO)/MgO/Fe/Ag(001) using MOKE and XMLD ALI TAN, JIA LI, YANG MENG, University of California Berkeley, ELKE ARENHOLZ, Advanced Light Source, Lawrence Berkeley National Laboratory, CHANYONG HWANG, Advanced Industrial Technology Group, Korea Research Institute of Standards and Sciences, ZI QIANG QIU, University of California Berkeley — CoO(NiO)/MgO/Fe/Ag(001) films were grown epitaxially and studied by Magneto Optical Kerr Effect (MOKE) and X-ray Magnetic Linear Dichroism (XMLD). The enhancement of the Fe layer coercivity due to its coupling to the AFM (NiO) overlayer was studied as a function of the MgO spacer layer thickness using MOKE. We found that the Fe coercivity enhancement persists to $\sim$2 ML MgO thickness, after which the AFM-FM interlayer coupling becomes too weak to affect the Fe ceorcivity. Below 2ML MgO thickness, the Fe coercivity enhancement depends both on the MgO and NiO thicknesses. To further understand the effect of interlayer coupling, the rotatable CoO spins in CoO/MgO/Fe/Ag(001) after field cooling along the Fe(100) axis were determined using the XMLD measurement as a function of the MgO thickness. We found that 2 ML MgO thickness sets a critical value beyond which the CoO/MgO/Fe interlayer coupling no longer rotates the CoO spins.

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