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XMCD studies of antiferromagnetically coupled Co/Pt Multilayers A. BARUTH, S. ADENWALLA, Department of Physics, University of Nebraska - Lincoln, D.J. KEAVNEY, Advanced Photon Source, Argonne National Laboratory — Previous results on multilayered structures of [Pt(5Å)/Co(4Å)]$_3$/NiO(t$_{NiO}$Å) /[Co(4Å)/Pt(5Å)]$_3$ show exchange coupling between the two Co/Pt layers as well as exchange bias between the Co and NiO below 200K [1]. The exchange coupling is explained through the canting of AFM NiO spins which were theoretically predicted [2] and seen using X-ray Magnetic Circular Dichroism [3]. Using XMCD we have studied the element specific magnetization of Co and NiO as functions of field and temperature (above and below the blocking temperature, 200K) in two samples with 11Å and 12Å NiO. At these thicknesses of NiO, both sets of Co/Pt multilayers couple antiferromagnetically, but the coupling strength for the 12Å NiO sample is approximately half that of the 11Å. Element specific hysteresis loops showed identical behavior for both Co and Ni implying that the AFM NiO spins at the interface cant in the direction of the Co magnetization. Photoemission electron microscope images on a virgin sample at room temperature revealed the exact correlation between FM domains in the Co and NiO layers in the strongest antiferromagnetically coupled sample. We plan to measure the AFM domain structure of NiO using Magnetic Linear Dichroism. [1] Phys. Rev. Lett. 91, 037207 (2003) [2] Phys. Rev. Lett. 92, 219703 (2004) [3] Z.Y. Liu et. al. Phys Rev B (accepted) Funded by NSF MRSEC

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