Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Electronic and Magnetic Properties of $\mathbf{Co_{1-x}Fe_{2+x}O_4}$[1] JARRETT A. MOYER, Department of Applied Physics and Center for Research on Interface Structures and Phenomena (CRISP), Yale University, DARIO A. ARENA, National Synchotron Light Source, Brookhaven National Laboratory, VICTOR E. HENRICH, Department of Applied Physics and CRISP, Yale University — New materials having both resistivities similar to those of semiconductors and high room temperature spin polarizations would greatly benefit spintronic devices. Cobalt ferrite ($CoFe_2O_4$) is predicted to have a high spin polarization, but is an insulator; however, it begins to conduct when doped with iron. In this work, epitaxial $Co_{1-x}Fe_{2+x}O_4$ thin films ($0 \leq x \leq 0.5$) are grown by MBE on MgO (001). XPS and XMCD are used to determine the stoichiometry and cation valence states, and UPS measures the density-of-states near the Fermi energy. Transport measurements demonstrate the ability to tailor the conductivity by varying the value of x. Bulk magnetic moments are obtained with MOKE and SQUID magnetometry, while site specific magnetic moments are obtained with XMCD. These measurements enable us to determine which stoichiometry gives a material that is best suited for use as a spin-polarized source or detector in spintronic devices.

[1]This research is primarily supported by NSF Grant MRSEC DMR-0520495.

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Date submitted: 01 Dec 2009 Electronic form version 1.4