Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Magnetic Element Doped Transparent Conducting In_2O_3Thin Films for Spintronic Applications[1] E. NAHLIK, A. LAUDARI, M. LANGHOFF, K. GHOSH, Department of Physics, Astronomy and Materials Science, Missouri State University, Springfield, MO 65897 — Tremendous research efforts are underway to exploit the property of electron spin in spintronics. Spintronic devices critically depend on the availability of a specific materials system for spin injection, manipulation and detection. Transition metal (Cr, Fe, or Co) doped wide band gap oxide semiconductors possess these properties. Indium oxide (In_2O_3) is a wide band gap semiconductor with unique optical and electrical properties. Here, we investigate the effect of Cr, Fe, or Co doping on electrical and optical properties of In_2O_3 thin films. Thin films have been grown on sapphire and quartz substrates using pulse laser deposition method. Electrical and optical characteristics have been measured using UV-VIS spectroscopy and magneto-transport techniques. Optical transmittance and electrical parameters such as carrier concentration and carrier mobility vary with growth parameters such as growth temperature of the substrate and oxygen pressure of the chamber. These details will be discussed during this presentation.

[1]This work is supported by National Science Foundation (Award Number DMR-0907037)

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Date submitted: 27 Nov 2011 Electronic form version 1.4