Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Magnetism in Transition Element Doped In_2O_3 Dilute Magnetic Semiconductors[1] M. LANGHOFF, E. NAHLIK, Department of Physics, Astronomy, and Materials Science, Missouri State University, Springfield, MO 65897, Y. KOLEKAR, Department of Physics, University of Pune, Pune, India, P. KAHOL, K. GHOSH, Department of Physics, Astronomy, and Materials Science, Missouri State University, Springfield, MO 65897 — There is currently a tremendous research effort in the area of dilute magnetic semiconductors (DMS). It is proposed that a DMS exhibiting ferromagnetic properties at room temperature could be used in a new class of devices termed spintronics. Whereas standard electronics work on the principle of manipulation of charge properties of an electron, spintronics work on controlling electron spin. Indium oxide is a wide band gap semiconductor with unique optical and electrical properties. Defect concentrations such as transition metal doping and oxygen vacancies in In_2O_3 can tune the electrical/magnetic behavior from ferromagnetic metal-like to ferromagnetic semiconducting to paramagnetic insulating. Bulk materials of magnetic element (Fe, Co and Cr) doped In_2O_3have been made using a standard solid state reaction method. Structural and magnetic properties have been measured using standard techniques. XRD analysis confirmed single phase $In_2O_3$with no impurity phases due to addition of magnetic elements. Magnetization as a function of applied magnetic field and temperature were collected on all the samples using a SQUID magnetometer. Detailed structural and magnetic properties will be presented in this talk.

Kartik Ghosh
Dept. of Physics, Astronomy, and Materials Science,
Missouri State University, Springfield, MO 65897

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

Date submitted: 17 Nov 2011 Electronic form version 1.4