Studies on magneto-transport properties of dilute magnetic semiconductors

R. GUPTA, A. GHOSH, Missouri State University, Y. KOLEKAR, Pune University, K. GHOSH, P. KAHOL, Missouri State University — Diluted magnetic semiconductors (DMS) are rare group of promising semiconductors in which a fraction of the constituent ions is replaced by magnetic ions. This study is aimed to understand the magneto-transport properties of magnetic ion doped In2O3 thin films. The films were grown under different temperature and partial oxygen pressures by pulsed laser deposition. The films were characterized using various techniques such as X-ray diffraction, UV-VIS spectroscopy and magneto-transport. Anomalous magneto-resistive (MR) behavior has been observed for these films, which largely depends on growth conditions. For example, Co doped In2O3 films show presence of negative as well as positive MR at low temperatures. However, the film grown at 400 0C at a partial oxygen pressure of 1×10-4 mbar shows negative MR with a maximum value of around -0.3%. Films grown under higher partial oxygen pressures show large positive MR. Maximum positive MR of 8.9% is seen for the film grown at partial oxygen pressure of 4.3×10- 4 mbar at 400 0C. The effect of growth conditions on MR properties of these films will be presented in detailed. This work is supported by National Science Foundation (Award Number DMR-0907037).