Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Thickness dependent multiferroicity in relaxor $Pb(Fe_{2/3}W_{1/3})O_3$ thin films ASHOK KUMAR, RAM S. KATIYAR, University of Puerto Rico — Epitaxial multiferroic $Pb(Fe_{2/3}W_{1/3})O_3$ thin films were fabricated on MgO substrates by pulse laser deposition. The surface morphology indicates homogeneous distribution of grain with an average surface roughness $\sim$ 2-5 nm. Highly frequency dispersive spectra were observed between 120 K to 220 K suggests relaxor-like nature of epitaxial PFW thin films. Relaxor behavior was suppressed and dielectric dispersion increased with decrease in thickness from 300 nm to 50 nm. Modified Curie-Weiss law was used to analyze the relaxor character of films. Dielectric characteristic were further studied using different DC bias field $\sim$ 5 kV/cm over wide range of temperature to investigate the polarization properties below freezing temperature. The impedance spectroscopy was carried out to check the grain and grain boundary effects near the dielectric dispersion regions. Magnetization vs. applied magnetic field displayed weak ferromagnetic properties. Temperature dependent polarized Raman spectroscopy were carried out to investigate the change in crystal structure, lower frequency F_{2g} phonon mode, A_{1g} phonon mode near the dielectric dispersion region. In plane compressive strain plays vital role to suppress relaxor behavior in thin films compare to single crystal/bulk counter part.

Ashok Kumar
University of Puerto Rico

Date submitted: 15 Dec 2008 Electronic form version 1.4