Effect of Gd-substitution at Y-site on the Structural and dielectric properties of $Y_{1-x}Gd_xMnO_3$ (x=0, 0.05) thin film

Amit Singh Rajput[1,2], Samta Chauhan[1], Saurabh Kumar Srivastava[1], M. Sankar[3], Ramesh Chandra[1*]

[1]Nanoscience Laboratory, Institute Instrumentation Centre,
Indian Institute of Technology Roorkee, Roorkee-247667, India
[2]Centre of Nanotechnology, Indian Institute of Technology Roorkee, Roorkee-247667, India
[3]Department of Chemistry, Indian Institute of Technology Roorkee, Roorkee-247667, India
** Corresponding author*
ramesfic@iitr.ernet.in

ABSTRACT

Perovskite like RMnO3 (R: rare-earth) exhibits magneto electric effects because of the intimate Correlation between magnetic and ferroelectric orders. In this paper, the effect of doping Gd at Y site in hexagonal-$YMnO_3$ have been studied. We report the synthesis of hexagonal $Y_{1-x}Gd_xMnO_3$ (x=0, 0.05) thin film over Pt/Al_2O_3 via Pulsed Laser Deposition technique in a pure oxygen atmosphere. The effect of doping on crystalline structure, surface morphology and dielectric properties of $Y_{1-x}Gd_xMnO_3$ (x=0, 0.05) thin film have been investigated. The crystalline structure was studied by X-ray diffraction and topography of film surface was analyzed by atomic force microscopy. The thickness of the as-deposited thin films is measured by Surface Profilometer and found to be ~200 nm. Frequency dependent dielectric measurements reveal the improved dielectric properties of Gd-doped h-$YMnO_3$.