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Structural, AFM, MFM and magnetic studies of $LaMnO_3$ thin films prepared by atomic layer deposition method MUKESH CHANDRA, HIMANI KHANDURI, National Institute of Chemical Physics and Biophysics, Tallinn-12618, Estonia, S. VASALA, Department of Chemistry, Aalto University School of Chemical Technology, Finland, S. LEINBERG, R. LOHMUS, Institute of Physics, Faculty of Science and Technology, University of Tartu - 51014, Tartu, Esonia, J. KRUSTOK, Tallinn University of Technology, Tallinn- 19086, Estonia, MAARIT KARPPINEN, Department of Chemistry, Aalto University School of Chemical Technology, Finland, RAIVO STERN, National Institute of Chemical Physics and Biophysics, Tallinn-12618, Estonia — Structural, microstructural and magnetic properties of the thin films of $LaMnO_3$ have been investigated and will be presented in this paper. Thin films were deposited by atomic layer deposition method on silicon (100) substrates. Effect of varying thickness, annealing atmosphere and temperature has been studied on $LaMnO_3$ thin film. Films annealed in a temperature range 700-800 °C show single phase perovskite crystal structure, which was confirmed from the X-ray diffraction and Raman spectra. SEM/AFM studies show uniform and high quality films with grains mostly in 20-100 nm depending on preparation conditions. MFM images measured at 65K, show different magnetic domains in films annealed in N_2 and O_2 environments. Stoichiometry, microstructure and magnetic properties are strongly dependent on films annealed in N_2 and O_2 environments; however there was no change in crystal structure. Curie transition temperature in these LMO thin films annealed in N_2 were found to be around 200K, while for the films annealed in O_2 atmosphere was around 250K. Enhanced Curie temperatures from ideal value ($\sim$140 K) can be related to non-stoichiometry in our LMO films.

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