

High curie temperature for La₅/8Sr₃/8MnO₃ thin films prepared by pulsed laser deposition on glass substrates

ABSTRACT

The manganite LSMO films were successfully grown on glass substrates without any additional buffer layer by pulsed laser deposition. The films have been investigated by X-ray diffraction (XRD), field emission-scanning electron microscope (FE-SEM), electrical and magnetic measurements. From the XRD pattern the film is found to be polycrystalline single-phase's character. The LSMO thin films growth on glass substrate, follows the island growth model with average grain size of 44.46nm. The metal-insulator transition (TMI) temperature was above room temperature and electrical conduction mechanism of LSMO films below phase transition temperature (TP) is due to the electron-electron (major) and electron-magnon scattering processes. The Curie temperature of LSMO films is around 352 K, which is one of the high TC in all LSMO films and as our knowledge, is the highest value that is reported in literature for low cost amorphous substrates such as glass. The low resistivity, high TMI and high TC makes these LSMO films very useful for room temperature magnetic devices.

Keyword: Curie temperature; Manganite; Polycrystalline; Pulse laser deposition.