Growth and characterization of La0.7Na0.3MnO3 thin films prepared by pulsed laser deposition on different substrates

ABSTRACT

Perovskite manganite La0.7Na0.3MnO3 thin films were directly grown on MgO (1 0 0), Si (1 0 0) and glass substrates by pulsed laser deposition. From the XRD patterns, the films are found polycrystalline single-phases rhombohedral. The surface appears porous and cauliflower-like morphology for all LNMO films. LNMO films deposited on the glass substrate were presented smooth morphologies of the top surfaces as compared with other films. The highest magnetoresistance value obtained was −18.86% for LNMO/MgO films at 80 K in a 1 T magnetic field. Phase transition temperature is 221 K for LNMO/Cg, 214 K for LNMO/Si and 144 K for films deposited on MgO substrates. The films exhibit ferromagnetic transition at a temperature around 286 K for LNMO/MgO, 304 K for LNMO/Si and 292 K for LNMO/Cg thin film. The Curie temperature of LNMO films deposited on the glass substrate, 292 K is the highest value that is reported in literature for LNMO films deposited on low-cost amorphous substrates.

Keyword: Thin films; Vapor deposition; Crystal growth; X-ray diffraction