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Enhancement of magnetoresistance in $\text{La}_{0.75}\text{Ca}_{0.25}\text{MnO}_3$ thin films grown on Si (1 0 0) substrates

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Abstract

The enhancement of magnetoresistance (MR) in $\text{La}_{0.75}\text{Ca}_{0.25}\text{MnO}_3$ thin films, grown on Si (1 0 0) substrates by RF magnetron sputtering, is studied. The films have single phase and show characteristics of a cubic perovskite structure. The out-of-plane lattice parameters of films are reduced as much as 0.9 % compared with the one of the bulk sample. It is found that the maximum MR ($\Delta\rho/\rho_0$) of films are 0.34, 0.29 and 0.27 under the magnetic field of 1.5 T for each film with deposition temperatures of 700°C, 750°C and 800°C, respectively. The correlation between the magnetotransport property and lattice parameters of films is discussed. It seems that the enhancement of maximum MR can be attributed to the reduction of out-of-plane lattice parameters. © 2001 Elsevier Science B.V. All rights reserved.

Keywords: Magnetoresistance; Sputtering—magnetron; Films; Substrate—silicon; Lattice parameters
