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Magnetoresistance of $\text{La}_{1-x}\text{Sr}_x\text{MnO}_3$ films deposited by RF magnetron co-sputtering

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Abstract

La–Sr–Mn–O thin films have been grown on $\text{SiO}_2/\text{Si}(100)$ and $\text{MgO}(100)$ substrate by co-sputtering LSMO compound target and pure Sr target. The La–Sr–Mn–O films deposited on MgO were grown to single phase, while the films grown on SiO_2/Si showed polycrystalline structure. The Sr ratio x of the deposited $\text{La}_{1-x}\text{Sr}_x\text{MnO}_3$ films could be controlled in the range of 0.15 and 0.23 by varying the RF power to the Sr target. For the films on $\text{MgO}(100)$, metal–insulator transition occurred at 270 K for $x = 0.15$ and transition temperature increased as the Sr ratio increased. The MR curves showed sharp peaks at a temperature slightly lower than T_{M-1} . The maximum MR reached about 46.4% at 250 K for 1.5 T. For the films on SiO_2 , the MR decreased monotonically, and films did not show any Sr ratio dependent electrical property differences. © 2001 Published by Elsevier Science B.V.

Keywords: CMR; LSMO; RF magnetron sputtering
