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Electrical transport and magnetic properties of epitaxial LSMO films grown on STO substrates¹ WEI YUAN, YUELEI ZHAO, TANG SU, QI SONG, WEI HAN, Peking Univ, JING SHI, University of California, Riverside — La_{0.7}Sr_{0.3}MnO₃ (LSMO) is a very attractive material for spintronics due to its half-metallic ferromagnetic properties. The LSMO films are epitaxially grown on STO (100) substrates using pulsed laser deposition. The effects of substrate temperature, laser power, oxygen pressure, and annealing on the LSMO growth are systematically investigated by the reflection high energy electron diffraction and atomic force microscopy. Under the optimized growth condition, we have achieved atomically flat LSMO thin films with a wide terrace width of more than 5 micrometers. The electrical transport properties of LSMO thin films of various thicknesses ranging from 8 to 20 monolayers are studied by measuring the resistivity as a function of temperature. We find that the growth condition plays an important role in the critical film thickness for the metal-insulator transition and the Curie temperature.

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