

Magneto-resistance and surface properties with deposition condition for La–Sr–Mn–O thin films

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Polycrystalline La–Sr–Mn–O thin films were grown through RF magnetron sputtering on Si(100) substrates. The conditions for the deposition of the La–Sr–Mn–O thin films were 0, 20, 40, 60 and 80% partial oxygen pressures of the buffer gas, an RF magnetron sputtering power of 2.46 W/cm² and a substrate temperature of room temperature. After the deposition, all the films were annealed in the air for 3 hours at 800 °C. The crystal structure, the chemical composition, the microstructure, the magnetic properties and the low-field magneto-resistance of the La–Sr–Mn–O films were studied using X-ray diffraction, Rutherford back-scattering spectroscopy, atomic force microscopy, and a vibrating sample magnetometer. The crystal structure of the LSMO thin films was found to be a pseudo-cubic perovskite. As the partial oxygen pressure increased, particle size and root mean square roughness decreased while saturation magnetization and the low-field magneto-resistance increased.