Fabrication and characterization of all-perovskite oxide pn junctions based on La1-xSrxMnO3 and Nb-1wt% doped SrTiO3

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Abstract

All-perovskite oxide pn junctions have been fabricated by pulsed laser deposition. Semiconducting p-type La1-xSrxMnO3 (LSMO) and n-type Nb-1wt% doped SrTiO3 (NSTO) were used. Thin films of LSMO were epitaxially grown on (100) NSTO single crystal substrate at 650oC and under an ambient oxygen pressure of 100mTorr. Heteroepitaxial relationship of (100)LSMO——(100)NSTO has been obtained. Good electrical rectifying characteristics have been observed at room temperature. LSMO is a well known colossal magnetoresistive material with a Curie temperature Tc at around room temperature. The I-V characteristics of the p-LSMO/n-NSTO junction were studied under the temperature range of 77K - 700K and an applied magnetic field of up to 1T.