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Structure/property relationship for ultrathin films of $La_{2/3}Sr_{1/3}MnO_3$ on $SrTiO_3$ (001)[1] ZHAOLIANG LIAO, Louisiana State University, DIOGO DUARTE DOS REIS, Louisiana State University & Universidade Federal de Minas Gerais, PENG GAO, XIAOQING PAN, University of Michigan, RONGYING JIN, E. WARD PLUMMER, JIANDI ZHANG, Louisiana State University — Dead layer, the insulating behavior in ultrathin films of metallic oxides, is an intriguing property of TMO films. Is this intrinsic effect caused by dimensionality effect, or by interface, segregation, or stoichiometry? We have studied thickness-dependence of structure/property relationship for thin films of $La_{2/3}Sr_{1/3}MnO_3$ (LSMO) grown with PLD on $SrTiO_3$ (001) (STO) by using in-situ characterization such as LEED and STM, and ex-situ transport measurements. By minimizing oxygen deficiency, the thickness of dead layer is found to be as small as 6 u.c., which can be characterized as the intrinsic critical thickness. Our LEED-I(V) structural refinement shows non-monotonic lattice relaxation with thickness. The distortion of the *c*-axis bond length at surface reaches its maximum value for 6 u.c. film being 19% smaller than the bulk value. Mn is no longer at oxygen octahedron center with Mn-O-Mn bond angles between 167° and 176° varying with film thickness. Regardless of the thickness, the surface La/Sr-O layer is almost all Sr due to surface segregation. Capping with STO overlayer reduces the critical thickness of dead layer, thus suggesting that LSMO/STO interface enhances the conductivity of LSMO.

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