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Magnetic and transport properties of $La_{0.7}Ca_{0.3}MnO_3/BaTiO_3$ and $La_{0.7}Sr_{0.3}MnO_3/BaTiO_3$ bilayered films V.G. PROKHOROV, Institute of Metal Physics, Academy of Science of Ukraine, Kiev, 03142 Ukraine, Y.P. LEE, K.K. YU, S.Y. PARK, q-Psi and Department of Physics, Hanyang University, Seoul, 133-791, V.L. SVETCHNIKOV, National Center for HREM, TU Delft, 2628AL, The Netherlands — The magnetic and the transport properties of $La_{0.7}Ca_{0.3}MnO_3/BaTiO_3$ (LCMO/BTO) and $La_{0.7}Sr_{0.3}MnO_3/BaTiO_3$ (LSMO/BTO) bilayered films, prepared by the rf-magnetron sputtering, have been investigated. For comparison, the same data for the LCMO and the LSMO films, deposited on the bare $LaAlO_3$ (LAO) substrates, are obtained as well. The microstructural analysis reveals that LCMO/BTO and LSMO/BTO have the biaxial tensile in-plane and compressive out-of-plane strains, while LCMO/LAO and LSMO/LAO are reversely in the compressive in-plane and tensile out-of-plane strains. The films with biaxial tensile in-plane lattice strains undergo the magnetic transition at a higher temperature than those with biaxial compressive ones. This suggests that the Mn-O-Mn bond angle, controlled by the lattice strain, plays more important role in the formation of spin ordering in the manganite film than the modification of Mn-O bond length. The observed enhancement of magnetoresistance at room temperature in LSMO/BTO provides an advance for the development of new hybrid ferromagnetic/ferroelectric devices.

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