[SP-16]

Effect of lattice strain on the magnetic and the transport properties of $La_{0.8}Sr_{0.2}MnO_3/La_{0.8}Ca_{0.2}MnO_3$ bilayer

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The influence of the kind of single-crystalline substrates on the magnetic and the electronic properties of manganite films has been quite investigated [1-2]. On the other hand, the development of hybrid devices based on multilayered colossal-magnetoresistive (CMR) films needs detailed information on the mutual influence between constituent layers. It is expected that the magnetic and the transport properties of the multilayered structure can substantially differ from those for the individual films of the constituent layers. The $La_{0.8}Sr_{0.2}MnO_3$ films were prepared by rf-magnetron sputtering grown on a $LaAlO_3$ (001) substrate and on a $La_{0.8}Ca_{0.2}MnO_3$ layer. The magnetic and the transport properties of the $La_{0.8}Sr_{0.2}MnO_3$ films were investigated in order to study the effects of lattice strain. It was found that the metal-insulator and the ferromagnetic transitions occur at higher temperatures for the film deposited on the $La_{0.8}Ca_{0.2}MnO_3$ layer than that on $LaAlO_3$. The role of a symmetry-braking Jahn-Teller distortion in the formation of ferromagnetic ordering turns out to be distinctly decreased with a growth of the biaxial compressive strain. We showed that a strong correlation between the crystal-lattice distortion, and the electronic and the magnetic states is realized in the CMR materials.

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