

$\text{La}_{0.7}\text{Ca}_{0.3}\text{MnO}_3$ 의 자기저항에 미치는 비등방 스트레인의 효과

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ANISOTROPIC STRAINS AND MAGNETORESISTANCE OF $\text{La}_{0.7}\text{Ca}_{0.3}\text{MnO}_3$

In order to study the effect of anisotropic strains on the magnetoresistance (MR) of perovskite manganite $\text{La}_{0.7}\text{Ca}_{0.3}\text{MnO}_3$ (LCMO), thin films were grown epitaxially on SrTiO_3 (STO), MgO, and LaAlO_3 (LAO) substrates by the pulsed laser deposition method under the same growth conditions [1]. The unit cells of the three films, as determined by x-ray diffraction measurements, have different symmetries, i.e., contracted tetragonal, cubic, and elongated tetragonal for STO, MgO, and LAO cases, respectively, while the unit cell of the bulk is cubic. It is found that the samples with cubic unit cell show smaller peak MR than the noncubic ones do. We have also applied uniaxial strains to the films on MgO with cubic symmetry by bending the substrate crystal, and measured the MR properties [2]. The present results demonstrate that (1) the lattice symmetry is an important factor determining the MR of LCMO and (2) the MR can be controlled with externally imposed strains. We discuss the physical implication of our results on the basic mechanism, in particular the Jahn-Teller effect, of MR in LCMO.

references

- [1] T. Y. Koo, S. H. Park, K.-B. Lee, Y. H. Jeong, Appl. Phys. Lett. 71, 977 (1997).
- [2] T. Y. Koo, K. B. Lee, Y. H. Jeong, preprint.