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Epitaxial-strain effect on charge- and orbital-ordered Pr0.5Ca0.5MnO3 films DAISUKE OKUYAMA, MASAO NAKAMURA, YASUJIRO TAGUCHI, CMRG-RIKEN, YUSUKE WAKABAYASHI, Osaka Univ., HIROTAKE ITOH, ERATO-JST, REIJI KUMAI, HIROYUKI YAMADA, AIST, TAKAHISA ARIMA, MASASHI KAWASAKI, Tohoku Univ., YOSHINORI TOKURA, Univ. of Tokyo — Transition from charge- and orbital-ordered (CO-OO) state to disordered state has been studied extensively in mixed valence manganites. An epitaxial strain effect from a substrate is one way to control the phases. To clarify the effect of epitaxial strain on CO-OO states, we have studied the growth-orientation dependence of epitaxial-strain effects by using thin films of CO-OO material, Pr0.5Ca0.5MnO3 (PCMO). We have fabricated PCMO thin films with two different growth orientations; one is made on a (011)-orientated substrate [(011)-film] and the other is deposited on a (001)-orientated substrate [(001)-film]. The resistivity of (011)-film shows a clear anomaly around 220 K, while that of (001)-film does not. We have performed synchrotron x-ray diffraction experiments on these films. In the (011)-film, the temperature dependence of the intensity of a superlattice reflection of (1/4 7/4 2) disappears at 220 K in accord with the anomaly in resistivity. By contrast, the reflection in the (001)-film subsists around 300 K. From these experimental results, we conclude that the transition temperature of CO-OO in PCMO film can be controlled by the growth orientation.

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