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Crystal Structure and Physical Properties of Oxygen Composition Controlled $\text{La}_{1-x}\text{Sr}_x\text{MnO}_{3+\delta}$ Single Crystals. YUUI YOKOTA, JUN-ICHI SHIMOYAMA, TETSURO OGATA, ATSUSHI NAKAMURA, HIRAKU OGINO, SHIGERU HORII, KOHJI KISHIO, DEPARTMENT OF APPLIED CHEMISTRY, UNIVERSITY OF TOKYO TEAM — The $\text{La}_{1-x}\text{Sr}_x\text{MnO}_{3+\delta}$ is known to have various magnetic and crystal structures as functions of x . Although this system has relatively large oxygen nonstoichiometry, the effects of excess oxygen on the crystal structure and physical properties have not been well understood. In the present study, the crystal structure and physical properties of excess oxygen controlled $\text{La}_{1-x}\text{Sr}_x\text{MnO}_{3+\delta}$ single crystals were systematically studied. Single crystals with nominal compositions of $\text{La}_{1-x}\text{Sr}_x\text{MnO}_{3+\delta}$ ($0.05 \leq x \leq 0.2$) were grown by the floating zone method. Thin plate-like crystals were obtained from the grown boules and controlled the oxygen content by post-annealing in various atmospheres. With increasing δ , the orthorhombic of the as-grown $\text{La}_{0.95}\text{Sr}_{0.05}\text{MnO}_{3+\delta}$ crystal changed to the rhombohedral through pseudo-cubic orthorhombic. In addition, ferromagnetic behaviors appeared accompanying the CMR effect and T_C increased as a function of δ . These are attributable to an increase of valence of Mn by excess oxygen. Relationships among the Sr substitution level, excess oxygen content, crystal structure and magnetic behaviors of $\text{La}_{1-x}\text{Sr}_x\text{MnO}_{3+\delta}$ will be discussed.

Yuui Yokota

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