

Ti-doped A-site deficient lanthanum manganites: Local structure and properties

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Abstract: A study of $\text{La}_{0.6}\text{Sr}_{0.4-x}\text{MnTi}_x\text{O}_3$ ($x=0.0, 0.05, 0.1, 0.15$, and 0.2) manganites with the Ti in B(=Mn)-position and vacancies in A(=La, Sr)-site is presented. The manganites belonged to the rhombohedral phase and small amount of Mn_3O_4 oxide was observed with increase of Ti content. X-ray adsorption fine structure (XAFS) analysis showed an appearance of Mn^{2+} ions in perovskite cell and tremendous change of local structure. We suppose that the change of local structure was mainly caused by the appearance of Mn ions in the A-positions and partially by the formation of vacancies in the above position with the increase of x-value. Curie temperature, TC, decreased drastically with x: $\text{TC}(x=0)=355\text{K}$ and, $\text{TC}(x=0.05)=185\text{K}$. Further increase of Ti content changed the low-temperature magnetic state from the ferromagnetic to spin/cluster glass state. Effects of destruction of the eg electron pathway and change of local structure on Curie temperature, caused by the Ti doping, is discussed. © 2005 Elsevier B.V. All rights reserved.

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