

Properties of perovskites $\text{La}_{1-x}\text{Cd}_x\text{MnO}_3$

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Abstract: The $\text{La}_{1-x}\text{Cd}_x\text{MnO}_3$ ($x=0.1, 0.2, 0.3$) perovskites have been prepared by solid reaction technology with sintering temperature of 1050 °C. The samples are of single phase with rhombohedral structure of R-3c symmetry. The field-cooled (FC) and zero-field-cooled (ZFC) thermomagnetic measurements at low field indicate the spin glass-like state (or cluster glass) at low temperatures and a sharp change of magnetization around the phase-transition point of composition $\text{La}_{0.7}\text{Cd}_{0.3}\text{MnO}_3$. This sample exhibits large value for maximum magnetic-entropy change $|\Delta S_m|_{\text{max}}$ of 2.88 J/kg K in the field of 13.5 kOe and reveals giant magnetocaloric effect. This value for $|\Delta S_m|_{\text{max}}$ is larger than that of $\text{La}_{0.7}\text{Sr}_{0.3}\text{MnO}_3$ and $\text{La}_{0.7}\text{Pb}_{0.3}\text{MnO}_3$ perovskites. The resistance measurements show that the conductivity of $\text{La}_{1-x}\text{Cd}_x\text{MnO}_3$ perovskites is metallic at low temperatures and semiconducting at high temperatures but the metal-semiconductor transition temperatures are not coinciding with paramagnetic-ferromagnetic transition ones. The results can not be explained by using double-exchange (DE) model only. In addition to the DE Jahn-Teller lattice distortion plays an important role. © 2004 Elsevier B.V. All rights reserved.

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