

Manganese perovskites for room temperature magnetic refrigeration applications

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Abstract: We found the large magnetocaloric effect (MCE) in $\text{La}_{0.6}\text{Ca}_{0.3}\text{Pb}_{0.1}\text{MnO}_3$ (sample No. 1), $\text{La}_{0.7}\text{Ca}_{0.2}\text{Pb}_{0.1}\text{MnO}_3$ (sample No. 2), and $\text{La}_{0.7}\text{Ca}_{0.1}\text{Pb}_{0.2}\text{MnO}_3$ (sample No. 3) perovskites, which were prepared by a conventional ceramic method. For a magnetic field change of 13.5 kOe, the magnetic entropy change (ΔS_M) reached values of 2.55, 2.53 and 3.72 J/kg K for samples Nos. 1, 2 and 3, respectively. Interestingly, the large ΔS_M was found to occur around 300 K for all samples investigated, which allows magnetic refrigeration at room temperature. These perovskites have the large magnetic entropy changes induced by low magnetic field change, which is beneficial for the household application of active magnetic refrigerant (AMR) materials. © 2007 Elsevier B.V. All rights reserved.

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