

Large magnetic entropy change above 300 K in a colossal magnetoresistive material $\text{La}_{0.7}\text{Sr}_{0.3}\text{Mn}_{0.98}\text{Ni}_{0.02}\text{O}_3$

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Abstract: A thorough study of the magnetocaloric effect (MCE) in a colossal magnetoresistive compound of $\text{La}_{0.7}\text{Sr}_{0.3}\text{Mn}_{0.98}\text{Ni}_{0.02}\text{O}_3$ has been made. The large magnetic entropy change of 7.65 J/kg K upon an applied field of 70 kOe has been found to occur at 350 K, which allows magnetic refrigeration at room temperature. It is interesting to note that, even in high magnetic fields, the magnetic entropy change versus temperature distribution is much more uniform than that of gadolinium and several polycrystalline perovskite manganites, which is desirable for an Ericson-cycle magnetic refrigerator. It is found that such a small amount (~2%) of substitution of Mn^{3+} by a magnetic ion (Ni^{3+} or Co^{3+}) in the perovskite manganite can favor the spin order and hence the MCE. Undoubtedly, this observation opens a window to explore the active magnetic refrigeration at high temperatures. © 2005 American Institute of Physics.

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