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Giant magnetic entropy change in colossal magnetoresistance in $La_{0.7}Ca_{0.3}MnO_3$ material in low field

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The structural, magnetic, and magnetocaloric properties of the manganite $La_{0.7}Ca_{0.3}MnO_3$ have been studied. Change in the giant magnetic entropy was observed without any noticeable magnetic hysteresis but with small thermal hysteresis losses. We observed a first order magnetic phase transition around 251 K. The magnetic entropy change observed in this work is estimated to be 5.27 J/kg K for field changes from 0 to 1.5 T based on magnetization measurements. This value is about twice as large as those for other perovskite manganites and is even larger than for Gd-based magnetic materials at low fields. In addition, the entropy change was estimated by using the heat capacity method, which can be well explained by the Maxwell relation. [doi:10.1063/1.3359808]