

Large magnetocaloric effect in $\text{Pr}_{1-x}\text{Pb}_x\text{MnO}_3$ (0.1 $\leq x \leq$ 0.5) perovskites

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Abstract: This research reports the findings of large low-field magnetocaloric effect in polycrystalline $\text{Pr}_{1-x}\text{Pb}_x\text{MnO}_3$ (0.1 $\leq x \leq$ 0.5) perovskites. It is found that, upon an applied field of 13.5 kOe, the magnetic entropy change (ΔS_M) reached values of 3.91, 3.68, and 3.34 J/kg K for $x=0.1$, 0.4, and 0.5 compositions, respectively. These values are larger than that of Gd (3.32 J/kg K) and were attained by a low applied magnetic field that can be generated by permanent magnets. These superior magnetocaloric features together with a relatively low material cost make the $\text{Pr}_{1-x}\text{Pb}_x\text{MnO}_3$ perovskites attractive candidate materials for magnetic refrigerators in a temperature range of 150-270 K. © 2006 American Institute of Physics.

Index Keywords: Composition; Magnetic field effects; Permanent magnets; Polycrystalline materials; Praseodymium compounds; Magnetic entropy; Magnetic refrigerators; Magnetocaloric effects; Perovskite

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