Structure, magnetic, magnetocaloric and magnetoresistance properties of $La_{1-x}Pb_xMnO_3$ perovskite

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Abstract: $La_{1-x}Pb_xMnO_3$ (x = 0.1, 0.2, 0.3, 0.4, and 0.5) perovskites were prepared by a solid-state reaction. Except for x = 0.5 (cubic) and x = 0.4 (rhombohedral), the structure of the other compositions was pseudo-rhombohedral with P1 symmetry. The particle size of the grains is depending on the Pb content of the samples. The Curie temperature T_c increases from 235 K for x = 0.1-310 K for x = 0.2 and is almost constant (about 360 K) for $x \geq 0.3$. The field-cooled and zero-field-cooled thermomagnetic curves measured at low field show a split below a so-called irreversibility temperature T_r, which is somewhat smaller than T_c except for x = 0.1, where it is 270 K. From a series of magnetic isotherms the magnetic entropy changes $\delta S(T)$ were determined for a field step of 500 Oe. The maximum value of δS_{max} increases with increasing x till x = 0.3 and then decreases with further increasing x. The conductivity of perovskites is metallic at low temperatures and semiconducting at high temperatures. Magnetoresistance measurements have been performed.

Author Keywords: Magnetic oxides; Magnetocaloric effect; Perovskite structure
Index Keywords: Coercive force; Composition; Entropy; Isotherms; Lanthanum compounds; Magnetic properties; Magnetoresistance; Particle size analysis; Magnetocaloric effects; Perovskite

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