Spin glass-like behavior, giant magnetocaloric and giant magnetoresistance effect in PrPb manganites

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Abstract: The Pr$_{1-x}$Pb$_x$MnO$_3$ (x=0.1-0.5) perovskites have been fabricated by solid-state reaction. The X-ray diffraction patterns show that the samples are of single phase with orthorhombic structure. The field-cooled (FC) and zero-field-cooled (ZFC) thermomagnetic curves measured at low field and low temperatures exhibit the spin glass-like state. The Curie temperature of samples increased with increase in Pb content. The maximum magnetic entropy change $|\Delta S_{m, max}|$ reaches the giant values of 3.91 and 3.68 J/kg K for quite low magnetic field change of 1.35 T for the samples x=0.1 and 0.4, respectively. The resistance measurements show that there is insulator-metal phase transition on the R(T) curves for samples with x$\geq$0.3. The giant magnetoresistance effect is also observed for all samples studied. © 2006 Elsevier B.V. All rights reserved.

Author Keywords: Magnetocaloric effect; Manganites; Spin glass-like state

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