

Magnetic, Magnetocaloric, and Electrical Properties of Pr_{0.7}Ca_{0.3}Mn_{0.9}M_{0.1}O₃

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Abstract : Investigation of magnetic and magnetocaloric properties of Pr_{0.7}Ca_{0.3}Mn_{0.9}M_{0.1}O₃ perovskite manganites (M=Cr and Ni) has been carried out. Our compounds were prepared by the conventional solid-state reaction method at high temperatures. Rietveld refinement of X-ray diffraction pattern using FULLPROF method shows that all compounds adopt the orthorhombic structure with Pnma space group. The partial substitution of Mn-site drives the system from charge order state to ferromagnetic one with a Curie temperature T_C=150K, 118K and 116K for M=Cr and Ni, respectively. Magnetization measurements versus temperature in a magnetic applied field of 0.05T show that all our samples exhibit a paramagnetic-ferromagnetic transition with decreasing temperature. From M(H) isotherms, we have deduced the magnetic entropy change, which present maximum values of 2.37 J/kg.K and 2.94 J/kg.K, in a magnetic field change of 5T for M=Cr and Ni, respectively.

Keywords : manganites, magnetocaloric, magnetic, refrigeration

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