

Direct studies of giant magnetocaloric effect in Mn(As,P) in cyclic magnetic fields

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First order phase transition materials are considered as the most promising for magnetic refrigeration technology. In these materials both magnetic and lattice subsystems contribute to the overall magnetocaloric effect (MCE) and giant value of MCE can be observed. These materials include MnAs in which one of the highest MCE near room temperature was discovered. In this report we present results of the direct measurements of the adiabatic temperature change in MnAs compound as well as in doped MnAs_xP_{1-x} (x=0.02, 0.025, 0.03) ones in cyclic magnetic fields up to 8 T. The substitution of As by P results in a slight shift of the Curie temperature and change in width of the temperature hysteresis and more pronounce change in the MCE value. The investigations show giant MCE in all studied MnAs_xP_{1-x} and the existence of the critical magnetic field that induces reversible MCE in cyclic magnetic fields.