Magnetocaloric effect in CeSi$_{1.3}$Ga$_{0.7}$ alloy

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The CeSi$_{1.3}$Ga$_{0.7}$ alloy is a ferromagnetic Kondo lattice belonging to the CeSi$_{2-x}$Ga$_x$ series, in which a competition between Ruderman–Kittel–Kasuya–Yosida (RKKY) and Kondo interactions is observed [1-5]. This material crystallizes in the tetragonal α-ThSi$_2$-type structure (space group $I4_1/amd$). The ferromagnetic phase transition is observed at the temperature of 10 K. We have investigated the physical properties of CeSi$_{1.3}$Ga$_{0.7}$ by measurements of the magnetic susceptibility, electrical resistivity, and specific heat.The analysis of the Arrott plot confirms the second order-type phase transition. The magnetocaloric effect parameters, i.e. the magnetic entropy change, ΔS_M, and adiabatic temperature change, ΔT_{ad}, were calculated using thermodynamic Maxwell's relations. The maximum ΔS_M value determined from the magnetic measurements is -5.9(1) J kg^{-1} K^{-1} at 10.9(5) K and the relative cooling power (RCP) value is 32(1) J kg^{-1}, both obtained for a magnetic field change of 5 T.

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