# Magnetocaloric and magnetotransport properties of metamagnetic $Dy_6Fe_2Si_3$ compound

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We investigated the structural, thermodynamic, magnetic, and magnetotransport properties of novel $Dy_6Fe_2Si_3$ compound. This compound crystallizes in two different phases($Dy_5Si_3$ and $DyFe_2$) having metamagnetic transition below $T_c$ (∼49 K) from antiferromagnetic (AFM) to ferromagnetic (FM) around a field of 1 T. The isothermal magnetization curve for T = 2 K reveals the presence of two field induced metamagnetic transitions at $H_{c1}$ = 0.5 T and $H_{c2}$ = 6 T. A large negative magnetoresistance (MR) of 28 % at 2 K for 9 T is observed and this may be attributed to the Kondo effect. The magnetic entropy change, $\triangle S_m$, computed from the isothermal magnetization data shows a maximum $\triangle S_m$ of -7.5 J/kg.K (for a field change, $\triangle$H = 20 kOe) and 2.39 J/kg.K (for $\triangle$H = 70 kOe) at 4 K and 49 K respectively. Large magnetocaloric effects and large MR suggest that this material is interesting for magnetic cooling and sensing applications.