

Realization of Negative magnetization and Asymmetric magnetoresistance in $\text{GdFe}_4\text{MnAl}_7$ intermetallic alloy

Venkatesh Chandragiri¹ and Wei Ren¹

¹*ICQMS, Department of Physics, Shanghai University,
99 Shangda Road, Shanghai 200444, P. R. China*

The magnetization of the GdFe_5Al_7 do not show magnetic compensation as $M_R < M_{Fe}$ [1, 2]. The *Mn* doped alloy shows following significant points: (i). Although, the parent compound, GdFe_5Al_7 does not show negative magnetization and T_{comp} , the *Mn* doped alloys show negative magnetization associated with the magnetic compensation at $T_{\text{comp}} = 20$ K. (ii). The magnetic ordering (T_c) was seen in parent compound at $T = 255$ K, while doping of *Mn* leads to T_c value 175 K, indicating that the exchange interactions induced by the *Mn* doping are act opposite to the Fe sublattice interactions (according to the mean field theory). (iii). M-H loops are weakly hysteresis well below T_{comp} and no hysteresis similar to soft ferromagnetic nature were seen between the T_c and T_{comp} which is noticed for GdFe_5Al_7 at $T = 2$ K. Further, meta-magnetic transition like features were found in the M-H loops nearby T_{comp} which was typically seen for magnetic compensated analogues.

References:

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