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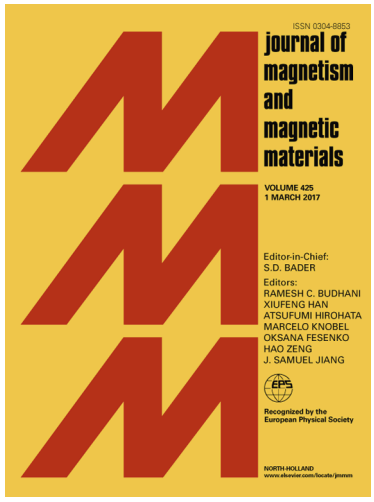

Evidence for reentrant spin glass behavior in transition metal substituted Co-Ga alloys near critical concentration

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Evidence for reentrant spin glass behavior in transition metal substituted Co-Ga alloys near critical concentration

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Abstract

In the present study magnetic and electrical transport properties of transition metal substituted Co-Ga alloys (near critical cobalt concentration) have been investigated. Analysis of temperature and field dependence of dc magnetization and *ac* susceptibility (ACS) data suggests an evidence of reentrant spin glass (RSG)phase in $Co_{55.5}TM_3Ga_{41.5}$ (TM = Co, Cr, Fe, Cu). The magnetic transition temperatures (T_C and T_f) are found to depend on the nature of TM element substitution with the exchange coupling strength Co-Fe>Co-Co>Co-Cu>Co-Cr. From magnetization dynamics precise transition temperatures for the glassy phases are estimated. It is found that characteristic relaxation times are higher than that of spin glasses with minimal spin cluster formation. The RSG behavior has been further supported by the temperature dependence of magnetotransport studies. From the magnetic field and substitution effects it has been established that the magnetic and electrical transport properties are correlated in this system.

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