JOURNAL OF APPLIED PHYSICS 113, 093902 (2013)

Investigation of the critical behavior in $Mn_{0.94}Nb_{0.06}CoGe$ alloy by using the field dependence of magnetic entropy change

J. C. Debnath,[1,a)] P. Shamba,[2] A. M. Strydom,[1] J. L. Wang,[2,3] and S. X. Dou[2]
[1]*Department of Physics, University of Johannesburg, P.O. Box 524, Auckland Park 2006, South Africa*
[2]*Institute for Superconducting and Electronic Materials, University of Wollongong, Squaire Way, North Wollongong, Wollongong, NSW 2500, Australia*
[3]*Bragg Institute, Australian Nuclear Science and Technology Organization, Lucas Heights, NSW 2234, Australia.*

(Received 1 February 2013; accepted 19 February 2013; published online 1 March 2013)

The critical behaviour of $Mn_{0.94}Nb_{0.06}CoGe$ alloy around the paramagnetic-ferromagnetic phase transition was studied based on the field dependence on magnetic entropy change. By using the obtained exponents, the modified Arrott plot is consistent with that by using conventional method. These critical exponents are confirmed by the Widom scaling relation. Based on these critical exponents, the magnetization, field and temperature data around Tc collapse into two curves obeying the single scaling equation $M(H, \varepsilon) = \varepsilon^{\beta} f \pm (H/\varepsilon^{\beta+\gamma})$. The calculated critical exponents