Magnetocaloric and Exchange Bias effects in Ni$_{50}$Mn$_{35.8}$Sn$_{14.2}$ alloy[1] VIJAYSANKAR KALAPPATTIL, A. BISWAS, University of South Florida, T.L. PHAN, S.C. YU, Chungbuk National University, N.H. DAN, Vietnam Academy of Science and Technology, M.H. PHAN, H. SRIKANTH, University of South Florida — Heusler alloys have been a subject of intense research because of their intriguing physical properties. We have studied magnetic and magnetocaloric properties of such an alloy with composition Ni$_{50}$Mn$_{35.8}$Sn$_{14.2}$. The system undergoes two transitions upon cooling: (i) a ferromagnetic transition in austenite phase at T$_C^A$ ~310 K and (ii) the martensitic transition at T$_{MA}$ $\sim$ 165 K. Using Maxwell's equation, the magnetic entropy change (ΔS$_M$) is calculated from the is magnetization vs. field curves following heating, cooling, and loop protocols. A large inverse magnetocaloric effect (IMCE) is observed at T$_{MA}$ in addition to the conventional magnetocaloric effect (CMCE) at T$_C^A$. While ΔS$_M$ is protocol dependent, we have demonstrated that a universal curve can be constructed to describe temperature (T) dependence of ΔS$_M$ corresponding to IMCE without rescaling of the T-axis and irrespective of measurement protocol. Such a universal behavior of IMCE is different from that of CMCE. The system also shows an exchange bias effect below T$_{MA}$ due to phase coexistence.

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