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Effects of Rare-Earth Doping on the Martensitic Transition Temperatures and Magnetocaloric and Transport Properties of $Ni_{50}Mn_{35}Sn_{15}$ Alloys[1] ANIL ARYAL, ABDIEL QUETZ, SUDIP PANDEY, SIU-Carbondale, TAPAS SAMANTA, LSU, Baton Rouge, LA, IGOR DUBENKO, DIPANJAN MAZUMDAR, SIU-Carbondale, PEGGY HILL, SEMO, Cape Girardeau, SHANE STADLER, LSU, Baton Rouge, LA, NAUSHAD ALI, SIU-Carbondale — The structural, magnetic, magnetocaloric, and transport properties of rare-earth (R) doped $Ni_{49}Sm\ Mn_{35}Sn_{15}$ and $Ni_{49}PrMn_{35}Sn_{15}$ Heusler alloys have been studied by room temperature XRD and magnetization measurements. The studied compounds show a cubic L21-type structure at room temperature. The substitution of R = Sm and Pr for Ni in $Ni_{50}Mn_{35}Sn_{15}$ resulted in the shifting of the martensitic temperature (T_M) from 160 K (for $Ni_{50}Mn_{35}Sn_{15}$) to 190 K (for Sm) and 212 K (for Pr). However the Curie temperature of the austenite phase (T_C) remained unchanged (˜325 K). Both conventional and inverse magnetocaloric effects were observed in these compounds. The maximum value of the positive magnetic entropy change (ΔS_M) near T_M with ΔH = 5T was ˜5 J/kgK and ˜12 J/kgK for R = Sm and Pr, respectively. Large values of RCP, 278 and 315 J/kg, were obtained for R = Sm and Pr, respectively. The maximum values of the magnetoresistance was found to be -18% (R= Sm) and -30% (R=Pr) for ΔH = 5T.

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