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ELECTRICAL TRANSPORT PROPERTIES OF NI 1.92 MN 1.56 SN 0.52 MAGNETIC SHAPE MEMORY MATERIAL

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The Ni 1.92 Mn 1.56 Sn 0.52 belongs to a family of Heusler alloys with peculiar magnetic, structural and transport properties that can be potentially useful for applications. They show structural transition from high temperature cubic austenite (A) to low temperature orthorhombic martensite (M) with significant changes of volume, magnetization, resistivity and Hall effect. We have performed study of temperature dependence of electrical resistivity, Hall coefficient and heat conductivity of Ni 1.92 Mn 1.56 Sn 0.52 in temperature region between 4 K and 400 K. The ferromagnetic ordering accompanied by sharp change of resistivity T-derivative was established below T C = 320 K. Structural A-M transition at cooling, T A-M = 282 K, induces a large increase of resistivity and vice versa, M-A transition at heating, T M-A = 294 K, induces a decrease of resistivity. It is worth to note that A-M transition is associated with transition from ferromagnetic austenite to martensite with almost zero magnetization. The re-entrance of magnetization at T c = 235 K is accompanied with any resistivity anomaly. The maximum of resistivity around 150 K is followed by a shallow T 2 resistivity dependence. An unusual character of temperature dependence of the Hall effect points to dramatic changes in electronic structure during the structural transition.

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