VARIOUS PHYSICAL PROPERTIES OF MAGNETIC SHAPE-MEMORY Ni_2MnGa ALLOY

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9.7 cm

The optical, magneto-optical, magnetic and transport properties of Ni_2MnGa alloy in the martensitic and austenitic states were investigated. The stoichiometric Ni_2MnGa alloy was prepared. The magnetic and transport properties of Ni_2MnGa alloy were investigated at various temperatures. The magnetic susceptibility shows an abrupt increase at 220 K upon heating and stays almost constant. The susceptibility steeply decreases to zero when temperature is higher than 380 K. The temperature coefficient of resistivity exhibits two kinks at the structural and magnetic phase transitions. Electron-magnon and electron-phonon scatterings are dominant for the electronic transport in the martensitic and austenitic states, respectively. The calculated optical-conductivity (OC) spectrum reasonably reproduce the experimental one. The real part of off-diagonal dielectric function shows two sharp peaks (one at 1.9 eV and the other at 3.2 eV) and a broad shoulder at 3.5 eV. It is found that the structural transition plays a more important role for the changes in OC spectrum than the thermal-expansion effect. The results of the transport properties were analyzed in connection with magnetic properties as well as electronic structures of the alloy.

13.4 cm

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