EFFECT OF STRUCTURAL DISORDERING ON MAGNETIC PROPERTIES OF STOICHIOMETRIC Ni_2MnGa ALLOY FILMS

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Ni_2MnGa Heusler alloy is currently extiting considerable interest due to giant ferromagnetic shape memory effect. This property makes thin films of Ni_2MnGa promising candidates for microelectromechanical systems. We report our results concerning structure, magnetic and transport properties of nearly stoichiometric Ni_2MnGa films prepared by flash-evaporation. Two distinct substrate temperatures (150 and 720 K) were chosen to fabricate films with different long-range order. We show for the first time that ordered films deposited at 720 K exhibit the same magnetic and transport properties as those of crystalline bulk Ni_2MnGa shape memory alloys with the martensitic transformation at 200 K, Curie temperature of 380 K and saturation magnetization at room temperature of about 300 G. Disordered films deposited at 150 K are shown to behave as the highly resistive Pauli paramagnets. Annealing of the disordered Ni_2MnGa films restores the ordered structure with almost full recovery of the magnetic and transport properties of the ordered Ni_2MnGa films.

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