EFFECT OF STRUCTURAL DISORDER ON THE ELECTRONIC STRUCTURES, MAGNETIC, MAGNETO-OPTICAL AND OPTICAL PROPERTIES OF Ni$_2$MnGa AND Co$_2$MnGa HEUSLER ALLOY FILMS

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Amorphous (disordered) as well as L2$_1$-type (ordered) Ni$_2$MnGa and Co$_2$MnGa alloy films have been fabricated by flash evaporation onto substrates cooled by liquid nitrogen and warmed up to 720 K, respectively. The ordered films exhibit the physical [magneto-optical (MO), optical and magnetic] properties close to the properties of corresponding bulk alloys. The nature of the interband absorption peaks in the optical conductivity spectra for the ordered alloys was interpreted in terms of their band structures. The significant effect of the structural disorder on the optical, MO and magnetic properties of Ni$_2$MnGa and Co$_2$MnGa was experimentally observed and discussed in terms of electronic structure of alloys. Thus, for example, the disordered Ni$_2$MnGa films show no ferromagnetic ordering down 5 K, while Co$_2$MnGa ones noticeable reduce their magnetization.

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