

[23-S12]

Optical and magneto-optical properties of Ni₂MnGa alloy

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The optical and magneto-optical (equatorial Kerr effect : EKE) properties as well as the transport and magnetic properties of Ni₂MnGa alloy were measured at various temperatures. Lorentz mode was employed to fit the spectra for the optical conductivity (σ) and the real part ($\epsilon_{1,xx}$) of diagonal component of the dielectric function. The transport and magnetic measurements revealed a structure transformation and a Curie transition at 210 and 370 K, respectively. The fitting results show that the σ and $\epsilon_{1,xx}$ spectra consist of one Drude term and two oscillators. The zero crossing of $\epsilon_{1,xx}$ was found in the spectrum at 293 K and disappeared at 78 and 293 K. All the σ spectra have two peaks that correspond to different oscillators. It is found that the amplitude and the broadening factor of oscillators are dependent on temperature while the center energy of oscillators is independent on temperature. The EKE and σ spectra show the similar shapes and peak positions. It is attributed to the half-metallic behavior of this Heusler alloy.