Interference of birefractive waves in CdGa$_2$S$_4$ crystals

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Abstract

In CdGa$_2$S$_4$ crystals the Fabry–Perot and birefringence interference spectra were investigated. Spectral dependences of refraction indexes for ordinary (n_o) and extraordinary (n_e) light waves are defined. The spectral dependence $\Delta n = n_e - n_o$ from the short and long-wavelength parts of isotropic wavelength $\lambda_0 = 485.7$nm (300K) is determined. It is established that at $\lambda > \lambda_0$ Δn is positive and at $\lambda < \lambda_0$ Δn is negative. Wavelength $\lambda_0 = 485.7$nm shifts with decreasing temperature to short-wavelengths. The phase difference of ordinary and extraordinary light waves for $\lambda > \lambda_0$ and $\lambda < \lambda_0$ was determined. The band in reflection spectra observed at the isotropic wavelength has a small halfwidth ($\sim$3–5Å). Another isotropic wavelength was found in the short-wavelength region (433nm) for crystals obtained by iodine transport method.