BIREFRINGENCE IN $PbGa_2S_4$ AND $CdGa_2S_4$ CRYSTALS

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To modulate the laser pulses are used crystals of niobate lithium $LiNbO_3$ with the properties of gyrotropy and birefringence. Cadmium thiogallate $CdGa_2S_4$ has a coefficient of nonlinear susceptibility is five times greater than the coefficient of nonlinear susceptibility of niobate lithium [1]. The dispersion of birefringence in $CdGa_2S_4$ and $PbGa_2S_4$ crystals studied at room temperature in the region of transparency (0,5 - 3 eV). In both crystals, the intersection of the spectral characteristics n_{II} and $n_{\perp}$ are observed. In crystals of cadmium thiogallate refractive indices intersect at a wavelength 4857Å. When passing through this point in the long wavelengths $CdGa_2S_4$ crystal, from an optically positive ($n_{II} > n_{\perp}$) becomes optically negative ($n_{II} < n_{\perp}$), and at λ = 485Å becomes optically isotropic ($n_{II} = n_{\perp}$).

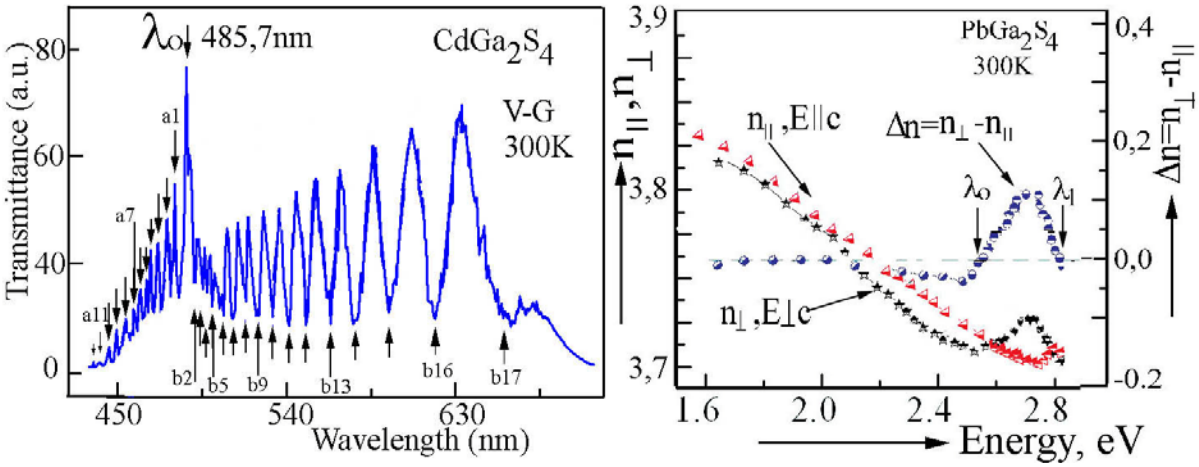

Fig.1. *The transmission spectra of $CdGa_2S_4$ crystals in the crossed polarizers and the refractive indices of $PbGa_2S_4$ crystals.*

In the transmission spectra of $CdGa_2S_4$ crystals with a thickness 5 mm, placed between crossed polarizers, series of lines a1-a11 and b1-b17 are observed, who come running to the isotropic wavelength λ_0 = 4857Å, fig.1. This device is a comb filter in the visible wavelengths range. Similar effects are observed in the transmission spectra of lead thiogallate $PbGa_2S_4$ crystals. From the interference spectra, spectral dependence of the refractive index n_{II} and $n_{\perp}$ and their difference $\Delta n = n_{II} - n_{\perp}$ are calculated. With the passage of light through a crystal, light waves "fast-n_{II}" and "slow-$n_{\perp}$", polarized parallel to the crystal axis have some delay between the components [2 The phase delay, proportional to the birefringence of the crystal, to create narrow-band filters are needed with a large birefringence crystals $\Delta n = n_{II} - n_{\perp}$. In the lead thiogallate crystals this value varies with the wavelength in the range 0-0,2, which is close to the record values.

[1] L. Suslikov, Z. Goldmasi, I. Kopinet, V. Slivka, *Optica and spectroscopia*, **51** (2), (1981),
[2] A. Yariv, P. Yen, *Optical wavesw in crystals*, Edition published by John Wiley&Sons, Inc.1984