

Dynamic and static electro-optics effects in Blue Phases

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Electro-optics effects connected with the field-induced shift of the diffraction bands were investigated in Blue Phases (BPI and BPII). The measurements of diffraction lines were carried out in the transmission spectra. The samples were prepared from a mixture of cholesteric and nematic liquid crystals with positive dielectric anisotropy. The investigations were made in BPI structure with orientation [110] and in BPII structure with orientation [100] perpendicular to the plane of the optical cell. We observed change of the transmission light in electric field connected with the changes of the refractive index for the line and circular polarization of the light and with the change of the unit cell of BPI and BPII. Modulation of the plane of polarization of the light in the AC field increases essentially near the diffraction bands. The change of the interference spectra in electric field for the light reflected from the sample surfaces leads in the AC field to modulation of the light intensity outside the selective reflective bands. The shift of the diffraction bands due to the change of the refraction index is shortwavelength and characterized by short time (about 10^{-4} s). The shift of the diffraction bands due to the change of the parameters of the unit cell is longwavelength and characterized by long time (several seconds). Microscopic mechanisms of the electro-optic effects are discussed.

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