TWIST–DEFORMATION OF NEMATIC IN THE DISULPHOINDANTRONE (DSI)–WATER (H_2O) SYSTEM IN MAGNETIC FIELD ARBITRARY ORIENTATION

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The process of nematic reorientation in DSI–H_2O system having negative diamagnetic anisotropy in magnetic fields of arbitrary orientation has been investigated experimentally. The system investigated has large absorption absorption dichroism. In this connection the reorientation process was studied through light of certain polarization absorption changes in magnetic field. During the experiment changes in optical density of the system were calculated. Changing of the sample optical density at sudden magnetic field switch in case when $\beta(\vec{n}_0 \hat{;} \vec{H}) = 0$ and $\beta(\vec{n}_0 \hat{;} \vec{H}) \neq 0$ ($\vec{n}_0$ – director, $\vec{H}$ – magnetic field) corresponds to the law, accordingly:

$$\Delta D = D_0(e^{2t/\tau_{on}} - 1),\ \Delta D = D_0(e^{2t/\tau_{on}} - e^{t/\tau_{on}}). \qquad (1)$$

By using formulas (1) time of reorientation process τ_{on} switch was calculated. Dependence of switch time on magnitude of the magnetic field applied in case when $\beta \neq 0$ is determined by the following expression [1]:

$$\tau_{on} = \left(d^2\gamma_1/\pi^2 K_{22}\right)\left[1/((H^2/H_C^2)\cos 2\beta - 1)\right], \qquad (2)$$

where H_C – is Frederiksz critical field for T-deformation. The experiment results and their approximation by formulas (2) are presented on the plot.

References

(1) A. Golovanov et al. *Ultrasound and thermodynamic properties substance,* Scientific proceedings collection, Kursk, **2002**, p. 5