Gliding of the Easy Axis in Nematic Liquid Crystals under the Influence of Non-polarized Light and Electric Field

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We present the first experimental results on reorientation (azimuthal gliding) of the easy axis of nematic liquid crystals (NLC) under simultaneous action of non-polarized light (LED at 450 nm wavelength) and "in-plane" electric field. The initial orientation of the easy axis was created by UV treatment of the azo-dye layer (SD1). It was found that separate action of mentioned above factors didn't produce any visible changes of the easy axis position. The reorientational dynamics (figure 1) shows the similar behavior as if in the case of combined action of the electric field and linearly polarized light established by us recently (1). Application of strong enough electric fields (2 V/μm) and light with intensity 0.5-1 mW/cm^2 results in memory effects where easy axis didn't return to the initial state after switching off field and light at least for two months. The easy axis can be returned to the initial state by illumination of the cell by linearly polarized light. It was possible to repeat such procedure (write/erase of optical state) at least 10 times. The theoretical description of such phenomena can be made on base of existing models (1,2).

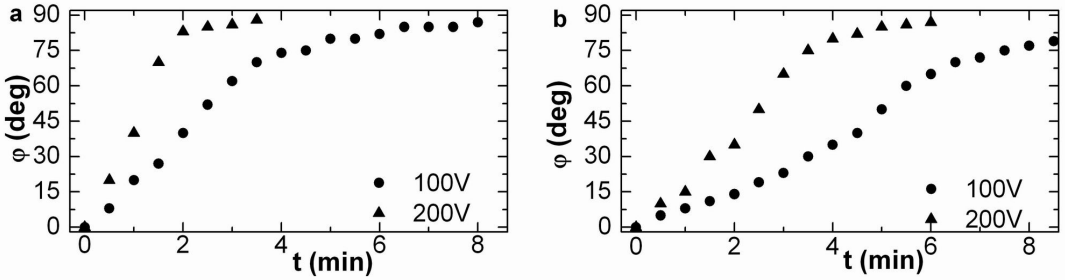

Figure 1. Gliding of the easy axis of nematic ZhK 616 under the simultaneous action of electric field and light: a) non-polarized light; b) linearly polarized light.

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References

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