

# Director configurations in cholesteric layer with tangential-conical boundary conditions

M.N. Krakhaev<sup>1,2</sup>, O.O. Prishchepa<sup>1,2</sup>, V.S. Sutormin<sup>1</sup>, R.G. Bikbaev<sup>1,2</sup>,  
I.V. Timofeev<sup>1,2</sup>, V.Ya. Zyryanov<sup>1</sup>

<sup>1</sup>Kirensky Institute of Physics, Federal Research Center KSC SB RAS,  
50/38 Akademgorodok, 660036 Krasnoyarsk, Russia (e-mail: [p\\_oksana@iph.krasn.ru](mailto:p_oksana@iph.krasn.ru))

<sup>2</sup>Institute of Engineering Physics and Radio Electronics, Siberian Federal University,  
79/10 Svobodny pr., 660041 Krasnoyarsk, Russia

Cholesteric liquid crystals (CLC) are characterized by twisted structure of the director field, causing their unique orientation-structural and optical properties. The formed structure depends on the boundary conditions at the substrates and the ratio of cell thickness  $d$  to the cholesteric pitch  $p$ . So, the nematic or various soliton structures are observed at relatively low  $d/p$  under homeotropic anchoring at the substrates [1].

In this work we have considered the cholesteric structures forming in cells under tangential anchoring at the first substrate and the conical anchoring with the tilt angle of director  $50^\circ$  [2] at second one. It has been shown that the twisted structure is formed at  $d/p < 0.4$  and the closed loop lines are observed in the structure at  $d/p = 0.44$  (Fig.1a). The director orientation near the loop at the substrate with conical anchoring (Fig.1c) has been determined by the rotating analyzer method (Fig.1b). The corresponding structures and optical textures calculated for the cholesteric are in a good agreement with experimental data.

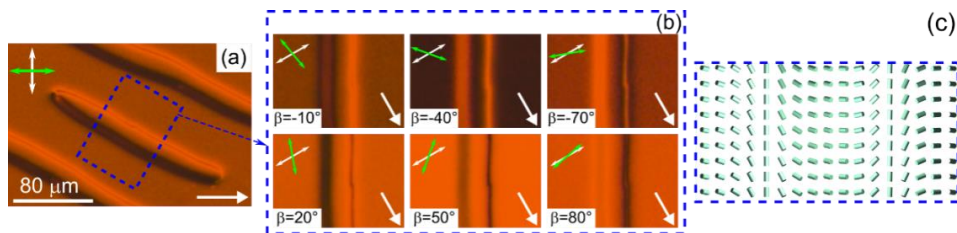


Figure 1. POM photo of CLC layer in the crossed polarizers (a), the zoomed area of sample at the variable  $\beta$  angle between rubbing direction (single arrow) and analyzer (double green arrow) (b). The calculated director alignment on the substrate with conical anchoring (c).

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[1] Oswald P., Pieranski P. Nematic and cholesteric liquid crystals: concepts and physical properties illustrated by experiments, Taylor & Francis: Boca Raton, 2005.

[2] Krakhaev M.N., Prishchepa O.O., Sutormin V.S. and Zyryanov V.Ya. Director configurations in nematic droplets with tilted surface anchoring. Liquid Crystals. Vol. 44. P. 355-363 (2017).