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Polarity and Chirality in Soft Matter

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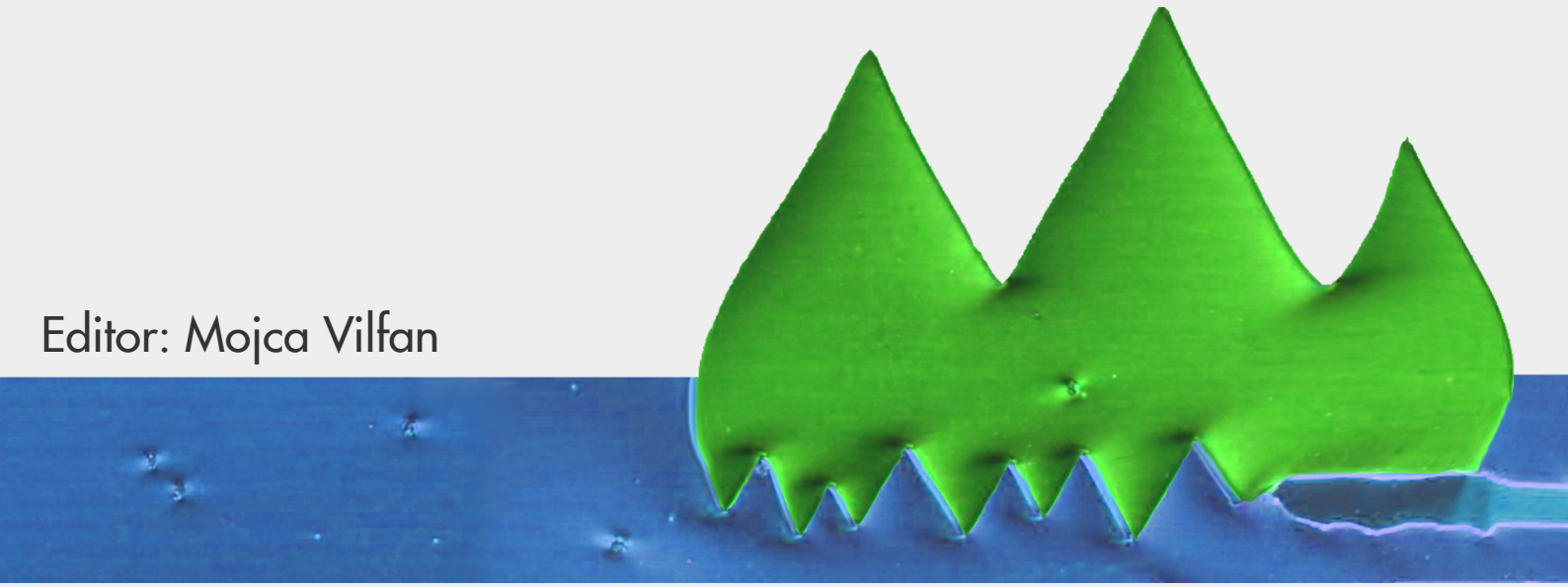
Book of Abstracts



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Periodic structures of linear defects in cholesteric layer with conical-planar anchoring under electric field

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Cholesteric liquid crystals (CLCs) having a helicoid structure with a period p attract attention due to their ability to form the various textures in electric field. The cholesteric structure depends mainly on the anchoring conditions at the interface. Now, CLC structures with homeotropic, planar or hybrid homeo-planar boundary conditions have been studied in detail [1,2]. Recently, new director configurations in cholesteric layers with conical-planar anchoring have been investigated for different ratios of the layer thickness d to the helix pitch p_0 [3]. In present paper we consider the periodic structures in cholesteric layer with conical-planar anchoring and their transformation under applied electric field. The experimental findings are supported by the calculation data. The given structures are the set of alternating over- and under-twisted defect lines whose azimuthal director angles differ by 180°. The U^+- and U^--defects of periodicity, which are the smooth transition between the defect lines, are observed at the edge of electrode area. The growth direction of defect lines forming a diffraction grating can be controlled by applying a voltage in the range of $0 \le V \le 1.3$ V during the process (Fig.1) [4]. Resulting orientation and distance between the lines don't change under voltage. However, at $V > 1.3$ V U-defects move along the defect lines away from the electrode edges, and finally, the grating lines collapse at the cell's centre. These results open a way for the use of such cholesteric material in applications with periodic defect structures where a periodicity, orientation, and configuration of defects should be adjusted.

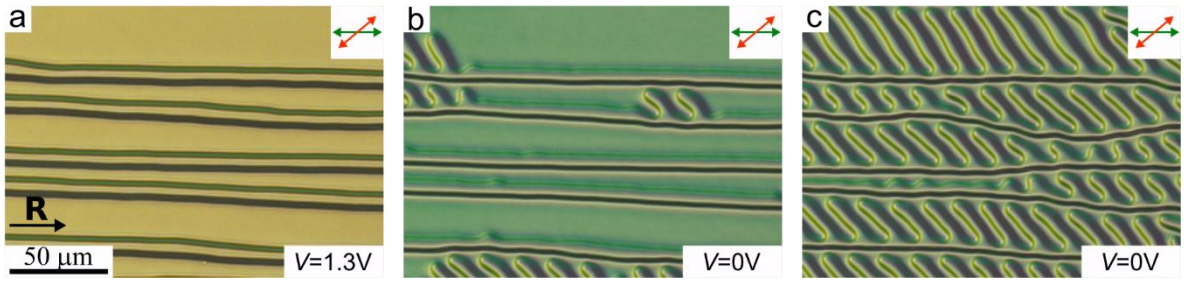

Figure 1: POM photos of CLC layer with the defect lines formed nearly parallel to the rubbing direction **R** under V = 1.3 V (a) and in 9.2 sec (b), 46.8 sec (c) after switching off the field. The analyzer is oriented to the polarizer at 40° angle [4]

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