

Physico-chemical nanomaterials science

Induced helical nanostructures in ferroelectric liquid crystals

**V.V. Mikhailenko¹, E.V. Popova¹, S.A. Gamzaeva¹,
E.P. Pozhidaev², V.V. Vashchenko¹**

¹ State Scientific Institution "Institute for Single Crystals, NAS of Ukraine,
Kharkov, Ukraine

E-mail: mikhajlenko_v_v@mail.ru

² PN Lebedev Physical Institute, RAS, Moscow, Russia.

The possibility of practical display applications of ferroelectric liquid crystals (FLC) based on the deformed helix ferroelectric (DHF) effect is conditioned, among other things, by availability of FLC materials with high spontaneous polarization (P_S) and short helical pitch of 100 nm or less [1]. In turn, the most appropriate way to elaborate such suitable FLC materials is to combine a chiral dopant (or a combination of thereof) and an achiral LC host. Furthermore, the ultrashort helical pitch less than 100 nm in induced FLC is tightly coupled to other practically significant physical properties such as spontaneous polarization and flexoelectric effect determined by the interaction between chiral dopant molecules.

In this work, several chiral dopants **1** and **2** for the short-pitch FLC for DHF applications were designed and elaborated by varying chiral moieties at the terphenyl dicarboxylic acid core. The influence of the novel compounds on the properties of the resulted induced FLC mixtures was studied.



Moreover, in this work a method is provided for measurement of short helical pitches by measurement of second maxima of selective light reflection in the ultraviolet region.

I. Srivastava A.K., Chigrinov V.G., Kwok H.S. Ferroelectric liquid crystals: Excellent tool for modern displays and photonics // J. Soc. Inform. Display -2015.-23.- P. 253-257.