First order tunable liquid crystal filters

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Liquid crystal mixtures consisting isothiocyanato tolane and isothiocyanato terphenyl liquid crystals have been widely developed in our University. Some of them have got both: high optical ($\Delta n \leq 0{,}45$) and high dielectric ($\Delta\varepsilon \leq 20$) anisotropies and relatively low viscosity γ. Appling the mentioned above, LC mixtures in HG (**H**omo**G**eneously aligned) cells with thicknesses d below 1 μm, one can obtain the possibilities to develop the first order ETLCFs (**E**lectrically **T**unable **L**iquid **C**rystal **F**ilters). This type of filter will be suitable for electronic imaging devices, such as charge-coupled devices (CCDs) and wave tunable-focus lens.

- Due to electrically controlled (by applying U voltage) optical anisotropy $\Delta n(U)$ and the cell gap d (suppressing to 1 μm or less) the ETLCF can (easily) select the wanted wavelength $\lambda(U)$ not only from visible but near infrared range as well.
- Due to high dielectric anisotropy $\Delta\varepsilon$, relatively low viscosity γ and thin thickness d of the HG cell, the ETLCF should achieve the response time shorter then 1 ms.

In this paper we describe and discusses our efforts in developing and optimization the ETLCF.