The influence of nanotutubes on the cholesteric liquid crystals parameters

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The subject of our investigation is the influence of carbon nanotubes on the electrophysical characteristics of cholesteric liquid crystals of gomological rows of cholesterol ester of monoatomic carbon acids – cholesterol propionate, cholesterol kaprilate, cholesterol miristate.

It is known, that the adding of nano dopands, with the sizes are proportional to the intermolecular force radius, into liquid crystal medium caused a significant changes in physical parameters of liquid crystal materials.

The production of homogeneous materials is a great problem of samples preparing. The method of samples preparing of cholesteric with the nanotubes are based on following. The inputting materials with the defined components concentration are grinded in mortar untill the uniform substance is formed. After then, this mixture is warmed up to the temperature, which is on 2-3 degree higher than the temperature of isotropic state is occured. In these conditions, the mixture is processed in the ultrasound bath during 3-4 hours with the aim to destroy the nano tubes coagulants. After that, the mixture is cooling in to the room temperature and it is crystalized. In this case our samples are ready to the investigations.

The temperature changes of phase transitions and the transmission in visible and infrared range of spectrum are investigated. The adding the dopands of nanotubes in to the cholesteric liquid crystals leads to the decreasing of temperature of phase transitions and to the changing of transmission spectra. In visible range of spectrum theshift of minimum of transmission in to more long-wawe range are observed for the all investigated cholesterol ester. In 700-2000 sm^{-1} frequency range the greatest changes are observed for 1700-174 sm^{-1} frequency range, which correspond to the valence oscillations C-O bond. The both the frequency changes and their half-width are occurred.