

Abstract Submitted  
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**Environmentally** **Re-**  
**sponsive Cholesteric Materials** PETR SHIBAEV, CRISTINA SCHLESIER,  
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versity, MOSCOW STATE UNIVERSITY TEAM — The majority of thermotropic  
cholesteric liquid crystals are hydrophobic and therefore not suitable for sensing  
environmental agents present in aqueous media. At the same time thermotropic  
liquid crystals (including thermotropic monomers) are easily manageable and can  
form almost ideal highly birefringent planar structures at appropriate temperatures.  
Thus, it is highly desirable to find new ways in order to modify the properties of  
thermotropic liquid crystals and make them more hydrophilic in a way that allows  
to retain their other properties. Two different ways of increasing hydrophilicity are  
suggested. The first one is a design of novel hydrophilic thermotropic mixtures con-  
taining derivatives of benzoic acids and/or cyclohexanoic acids as well as pyridine  
derivatives. The second one is a modification of thermotropic liquid crystal prop-  
erties by addition of hydrophilic nanoparticles. Both approaches result in highly  
hydrophilic materials suitable for environmental sensing. The properties of the ma-  
terials are discussed. Cholesteric sensors sensitive to changes in pH are designed  
and studied. Higher pH results in a shift of the selective reflection band towards  
longer wavelength and pronounced color changes. The surface of the sensor ana-  
lyzed by AFM also changes, which reveals the mechanism of the response. The  
semiquantitative model of response is suggested and discussed.

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