Nanocomposites and nanomaterials

Modification of cholesteric-nemtic mixtures by carbon nanotubes for active medium of CO_2 optical sensor

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Carbon dioxide is well known greenhouse gas which is bounded with global climate change. There is a need to identify and quantify the CO_2 concentration in anthropogenic flows of gas (e.g. flue gas, gas synthesis, biogas, etc.), which contain high levels of CO_2 before releasing it into the atmosphere [1].

We investigated the spectral characteristics of cholesteric-nemtic mixtures (CNM) doped by the carbon nanotubes as phase sensitive material for CO_2 optical sensors.

We use the CNM on the base of BLO-61 cholesteric liquid crystal and 5CB nematic liquid crystal (25-35 %). The resulting mixture was doped by a single, double and multi-walls carbon nanotubes with 0.1 %-0.5 % concentrations and with 0.1 % step. The experimental specifics were described in papers [2,3].

The dependence the minimum transmittance of wavelength versus CO_2 concentration was obtained. For the nanocomposites on the base of CNM with 0.5% double-wall carbon nanotubes the maximum value of coefficient spectral sensitivity is 0.6 nm/ppm.

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