

Abstract Submitted
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Optical fibers based on compositions of polymers and liquid crystals for gas detection. PETR SHIBAEV, ANTHONY TANTILLO, Fordham University, Department of Physics — Optical fibers based on compositions of methacrylic and vinyl polymers mixed with low molar mass liquid crystals were prepared and studied as promising gas sensors. A range of concentrations producing anisotropic fibers that are mostly sensitive to the vapors of organic solvents was determined. The fibers were prepared by stretching gel-like compositions of polymers and liquid crystals. Mechanical properties of the compositions leading to the most stable fibers were studied. It was found that under certain conditions the fibers develop multilayered structure with anisotropic (mostly liquid crystalline) core. These fibers are very sensitive to changing gaseous atmosphere and to the presence of organic solvent vapors. The sensitivity of different types of fibers to a variety of organic solvents vapors was determined. Some fibers were crosslinked by using hydrogen bonding molecules. The behavior of these optical fibers with respect to the influence of organic vapors with and without hydrogen donor/acceptor moieties was also analyzed. It was shown that hydrogen bonding increases the mechanical strength of the fibers but does not affect substantially their sensitivity to gases. Optical calculations and model discussion accompany the presentation of experimental data.

Petr Shibaev
Fordham University

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