Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Detection of harmful vapors and biological agents by means of liquid crystals JON GUSTAFSON, PETR SHIBAEV, Fordham University, Department of Physics — Orientation of liquid crystals is determined by surface energy and molecular orientation at the surface. This opens a possibility of exploring liquid crystals as gas sensors. In this work the simple model that takes into account gas concentration, absorption rate and material characteristics of liquid crystals (MBBA and pentylcyanobiphenyl) is experimentally tested in order to determine the sensitivity of the method. Thin films and droplets of chiral and non-chiral liquid crystals were used to detect vapors of volatile organic solvents. It was found that sensitivity of the method depends on the chemical nature of gas and structure of liquid crystal. Modification of liquid crystalline composition by means of additions of specifically tailored compounds (for example, hydrogen bonded acids) can lead to significant increase in sensitivity of liquid crystal to harmful vapors. The method was also tested for detection of biological molecules.

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Date submitted: 15 Nov 2013 Electronic form version 1.4