Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Optics of Confined Liquid Crystals for Gas Detection WILLIAM CHARLES, DANIEL CARROZZI, LEE ANNE VIGILIA, XIAOYURUI WANG, VIOLET GUZMAN, PETR SHIBAYEV, Fordham Univ, FORDHAM UNIVERSITY STUDENTS OF UNDERGRADUATE PHYSICS TEAM — Cholesteric liquid crystals (CLCs) of a wide range of viscosities were studied experimentally in relation to their use as gas sensors and sensors of volatile organic compounds (VOCs), specifically ethanol, cyclohexane, toluene, acetic acid, and pyridine. CLCs were obtained by mixing low molar mass liquid crystals (MBBA and cholesterol derivatives with siloxane based oligomers). The droplets of CLCs were placed in containers with controlled atmospheres. The shift of the selective reflection band, predominantly from shorter to longer wavelengths, and the color changes were observed in the CLC illuminated by light coming from the various directions. Visible optical changes were observed in droplets with viscosities of CLCs ranging from c.a. 4 Pa*s to 10^5 Pa*s. The most responsive droplets in which the shift of the selective reflection band occurs at lower concentrations of VOCs were prepared from CLC mixtures with the lowest viscosities. Higher viscosities of CLCs lead to a slower response to VOCs, but the rate of response is different for each pair of VOC and CLC with a certain viscosity. This finding opens a possibility for selective detection of VOCs by CLCs with different viscosities. The mechanism of VOCs diffusion, interaction with CLC matrix and optical changes is discusse

William Charles
Fordham Univ

Date submitted: 10 Nov 2016 Electronic form version 1.4