

Abstract Submitted  
for the MAR08 Meeting of  
The American Physical Society

**Environmental Mode SEM Studies of Liquid Crystal Droplets**

KASHMA RAI, ADAM FONTECCHIO, Drexel University — An in-depth understanding of the liquid crystal nanometer scale structure of the holographic polymer dispersed liquid crystals (HPDLCs) is essential to optimally improve its diffraction efficiency. In this work the liquid crystal (LC) droplets are imaged for the first time in HPDLCs without LC removal using environmental mode SEM (ESEM). The field controllable HPDLCs have periodic layers of LC droplets and polymer matrix. Their applications include photonic crystals, optical pressure sensors, reconfigurable mirrors, wavelength filters and displays. Hi-vac mode SEM is a well-known technique used for high-resolution structural analysis of HPDLCs where the LC is removed prior to imaging. This results in the contraction and sometimes collapsing of grating structure. ESEM imaging aids in the study the LC microscopic structure without LC removal. A comparison of morphology features such as grating thickness, droplet structure is made between the images obtained by ESEM and hi-vac SEM.

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Date submitted: 02 Dec 2007

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