Abstract Submitted
for the TSF10 Meeting of
The American Physical Society

Enhancing Optical Anisotropy and Thermal Stability of Liquid Crystals by Nanoparticles KAREN VARDANYAN, ROBERT WALTON, RICHARD JIMENEZ, Rutgers-Camden — The proper electro-optical performance of devices utilizing Liquid Crystal materials require high optical/dielectric anisotropy, low threshold voltage, fast switching, and high thermal stability. Among these devises are liquid crystal displays, guided-wave switches for wavelength division multiplexing, etc. One can tailor LC material parameters for a particular application by using chemical synthesis or mixing several LC materials. However, in the most cases, enhancing one parameter can cause the other parameters to change as well and mostly in undesirable direction. For instance, increase of dielectric anisotropy of the materials usually causes increase in the threshold voltage and switching times. Moreover, in many cases the enhancement process accompanies with decrease in the thermal stability of the materials. We obtained novel binary mixtures of certain type nematic LC with gold nanoparticles. We found that at certain concentrations of gold the dielectric anisotropy, i.e. birefringence, of LC materials increase twice, while the threshold voltage and switching time remain low. More importantly, at the same concentrations of gold the thermal stability of the materials increases in about 15 degrees of Celsius.

Karen Vardanyan
Rutgers-Camden

Date submitted: 23 Sep 2010 Electronic form version 1.4