Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Effect of *Trans-Cis* Photoisomerization on Phase Equilibria and Phase Transition of Azobenzene Chromophore and Reactive Mesogenic Diacrylate Mixtures[1] NAMIL KIM, Unversity of Akron, QUAN LI, Kent State University, THEIN KYU, University of Akron — Photoisomerization-induced phase transition of neat liquid crystalline azobenzene chromophore (LCAC) and its mixtures with reactive mesogenic diacrylate monomer (RMDA) has been investigated experimentally and theoretically. Upon irradiation with UV light, the nematic phase of LCAC transformed to isotropic while the crystal phase showed the undulation on the surface (i.e., ripples). The phase transition temperatures and corresponding morphologies of the blends have been measured by means of differential scanning calorimetry and optical microscopy. Theoretical phase diagram of binary nematic and crystalline system was constructed by self-consistently solving the combined free energies of Flory-Huggins, Maier-Saupe, and phase-field theory. It displayed various coexistence regions such as nematic + isotropic (N_1 + I_2), crystal + isotropic (Cr_1 + I_2), crystal + nematic (Cr_1 + N_2), and crystal + crystal (Cr_1 + Cr_2) over the broad range of compositions and the single phase nematic (N_1, N_2) at the RMDA and LCAC rich compositions. The calculated liquidus lines were in good accord with the mesophase transition points. Of particular interest is that the *trans-to-cis* isomerization of LCAC has led to suppression of N_1 + I_2 coexistence regions and disappearance of the N_2 phase of LCAC.

[1]Supported by American Chemical Society Petroleum Research Fund.

Namil Kim
Unversity of Akron

Date submitted: 20 Nov 2009 Electronic form version 1.4