Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Illumination of Conjugated Polymer in Solution Alters its Conformation and Thermodynamics: The Role of Incident Light Intensity, Wavelength and Exposure Time BRIAN MORGAN, University of Tennessee , MARK DADMUN, University of Tennessee, Oak Ridge National Laboratory — The importance of chain structure in conjugated polymer-based material active layers and its relation to device efficiencies in OPVs, organic field transistors, and OLEDs, has been well established. However the influence of light absorption on the conjugated polymer structure is not well understood. We have employed small angle neutron scattering to investigate structural changes occurring in solutions of poly(3-hexylthiophene-2,5-diyl) with exposure to white light. Our previous results indicate significant change in the structure of the polymer upon illumination, an effect we attribute to an alteration in the thermodynamic interactions of the polymer with the surrounding solvent. In order to further our understanding of this phenomenon, we have studied the modulation of these light/dark structural changes as a function of solvent choice, incident light intensity, illumination wavelength, and light exposure duration. Analysis of this data allows refinement and increased control of these light-initiated effects, moving our efforts closer to the development of a powerful, non-destructive, and tunable method for controlling polymer conformation in solution and novel light-responsive materials.

Brian Morgan
University of Tennessee

Date submitted: 06 Nov 2015 Electronic form version 1.4