

Abstract Submitted  
for the MAR10 Meeting of  
The American Physical Society

**Optical Probes of MEH-PPV films at High Hydrostatic Pressure<sup>1</sup>**

E. OLEJNIK, S. SINGH, B. PANDIT, V. MORANDI, J. HOLT, C.-X. SHENG, Z.V. VARDENY, Department of Physics, University of Utah — We investigate the primary and long-lived photoexcitations in  $\pi$ -conjugated polymer films with increased interchain coupling by studying the photophysics of substituted PPV derivative thin films, namely 2-methoxy-5-(2'-ethylhexyloxy) [MEH-PPV] at high hydrostatic pressure, P up to 120 kbar in a diamond anvil cell, using both ultrafast transient mid- and near-IR spectroscopies with 0.1 ps resolution, and cw optical techniques (photo induced absorption (PA) and photoluminescence (PL) in a broad spectral range from 0.2 to 2.2 eV). With increasing P the cw PL band weakens, broadens, and red-shifts by  $\sim 2$  meV/kbar; whereas the triplet PA red shifts to a lesser extent. The ultrafast PA band of the singlet exciton at  $\sim 0.95$  eV at ambient splits, blue shifts and acquires a much longer decay component. A second, weak PA band at  $\sim 0.33$  eV at ambient, dramatically blue-shifts ( $\sim 3$  meV/kbar) and substantially intensifies with P. These pressure-induced effects are discussed considering the interplay of two phases in the MEH-PPV film: a disordered phase with large PL efficiency, and PA that does not change much with P; and a less emissive ordered phase that increases with P, where the interchain coupling substantially increases with P.

<sup>1</sup>Supported in part by the DOE grant 05-03172 and NSF DMR 08-03325.

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Date submitted: 17 Dec 2009

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