Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Infrared spectroscopy of organic semiconductors modified by self-assembled monolayers O. KHATIB, University of California, San Diego, B. LEE, V. PODZOROV, Rutgers University, J. YUEN, A.J. HEEGER, University of California, Santa Barbara, Z.Q. LI, M. DI VENTRA, D.N. BASOV, University of California, San Diego — Recently, self-assembled monolayers (SAMs) were used to modify electronic surface properties of organic single crystals, leading to several orders of magnitude increase in the electrical conductivity[1]. Motivated by this discovery, the same technique was applied to polymers. Here we present a thorough spectroscopic investigation of organic semiconductors based on poly(3-hexlthiophene) (P3HT) that have been treated with a fluorinated trichlorosilane SAM. Infrared spectroscopy offers access to details of charge injection, electrostatic doping, and the electronic structure that are not always available from transport measurements, which can be dominated by defects and contact effects. In polymer films, the SAM molecules penetrate into the bulk, leading to a rich spectrum of electronic excitations in the mid-infrared energy range. [1] M. F. Calhoun, J. Sanchez, D. Olaya, M. E. Gershenson, V. Podzorov, *Electronic functionalization of the surface of organic semiconductors with self-assembled monolayers*, Nature Mater. **7**, 84–89 (2008)

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Date submitted: 20 Nov 2008 Electronic form version 1.4