

Abstract Submitted  
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**Ultrafast Photo Physics of P3HT/PCBM blends for Organic Photovoltaic applications** BILL PANDIT, SANJEEV SINGH, ZEEV VALY VARDENY, Department of Physics and Astronomy, University of Utah, Salt lake City, Utah, 84112 — We studied the ultrafast dynamics of photoexcitations in pristine polymer films of regio-regular polythiophene, regio-random polythiophene, and their blends with the fullerene derivative C<sub>61</sub>-PCBM using the pump-probe photomodulation (PM) spectroscopy with  $\sim 150$  fs time resolution. Our transient PM spectrum covers the broad spectral range of 0.25 – 2.4 eV using two different laser systems; which allows us to simultaneously monitor the dynamics of various photoinduced absorption bands such as intrachain excitons, charge transfer excitons, and polaron-pairs. Surprisingly, we have been able to monitor the decay of intrachain exciton on the polymer chains in films of polymer/fullerene blends, but unable to detect the subsequent generation of polarons in the donor (D) and acceptor (A) materials up to  $\sim 1$  ns. We explain this finding considering that the excitons in the polymer chains form charge transfer excitons upon reaching the D-A interface, rather than undergo a more direct dissociation on the D-A materials. The understanding of charge separation at the D-A interface is crucial for improving the power conversion efficiency of organic solar cell devices. Supported in part by the DOE grant No. DE-FG02-04ER46109.

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