Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Donor-acceptor conjugated polymers used as electron acceptors in bulk heterojunction photovoltaics CHRISTOPHER BAILEY, BARNEY TAYLOR, JIANGUO MEI, JOHN REYNOLDS, JOHN HENDERSON, BENJAMIN LEEVER, MICHAEL DURSTOCK — Synthetic control over the Highest Occupied Molecular Orbital (HOMO) and Lowest Unoccupied Molecular Orbital (LUMO) has been of significant importance in organic photovoltaics due to the nature of charge separation in donor/acceptor blends. One technique for obtaining tunability of the HOMO and LUMO levels with polymer synthesis is to combine electron donating and electron accepting moieties separated by a conjugated linkage unit. This technique has been utilized to produce highly efficient devices reaching power conversion efficiencies above 8% in polymer/fullerene blends. In this work, we report the characterization of poly(2,7divinylene fluorenecobenzothiadiazole) (F10DVBT), and performs best as an electron acceptor when mixed with poly(3-hexylthiophene) (P3HT) with an open circuit voltage of 1.2V. A combination of morphological and photo-physical studies highlights interesting properties of this material and its interactions with P3HT. The donor-acceptor conjugated structure of F10DVBT appears to strongly affect the photocurrent of these devices, and may result from the interactions between intramolecular and intermolecular charge transfer processes.

Christopher Bailey
Air Force Research Lab

Date submitted: 26 Nov 2010 Electronic form version 1.4