

Abstract Submitted
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Probing charge transfer complex (CTC) states in organic solar cells using photocurrent spectroscopy DHANASHREE MOGHE, PING YU, University of Missouri-Columbia, CATHERINE KANIMOZHI, SATISH PATIL, Indian Institute of Science, Bangalore, India, SUCHISMITA GUHA, University of Missouri-Columbia — Diketopyrrolopyrrole (DPP) containing copolymers have generated considerable amount of interest in bulk heterojunction organic photovoltaics due their high power conversion efficiency (above 10 percent) and mobility. Within a bulk heterojunction solar cell, the combination of a donor and acceptor chromophores facilitates charge transfer from the donor to the acceptor and may result in the formation of interfacial electronic state at the donor-acceptor interface. Here, we present photocurrent studies to identify the interfacial charge complex states in five DPP based copolymer (donor): fullerene devices using Fourier transform photocurrent spectroscopy (FTPS) and monochromatic photocurrent spectroscopy. The optical band gap of DPP based copolymer ranges from 1.4-1.7eV. Our studies show that a larger optical band gap difference between the donor and the acceptor prohibit the formation of a stable charge transfer complex state. Further, we also observe that devices in which no charge transfer state was observed show a better efficiency than devices in which charge transfer state is observed.

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