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Steady-State and Transient Photoconductivity in the Poly(2,7-Carbazole) Copolymer PCDTBT, and in Bulk Heterojunction Composites with $PC_{70}BM$ NELSON COATES, MINGHONG TONG, DANIEL MOSES, ALAN HEEGER, Physics, University of California, Santa Barbara, SERGE BEAUPRÉ, MARIO LECLERC, Chimie, Université Laval, RUSSELL GAUDIANA, Konarka Technologies Inc. — We have studied the nature of carrier generation in an alternating donor-acceptor low bandgap copolymer and in composites of that polymer with a soluble fullerene derivative, using steady-state and transient photoconductivity. The Poly(2,7-Carbazole) copolymer PCDTBT that we studied represents a class of donor-acceptor copolymers that hold promise for photovoltaic applications because of the ability to tune the electronic energy levels by changing the acceptor unit (see Blouin, N.; Michaud, A.; Leclerc, M. *Adv. Mater.* **2007**, 19, 2295 - 2300). Photovoltaic devices fabricated from PCDTBT in composites with the soluble fullerene derivative [6,6]-phenyl C70-butyric acid methyl ester ($PC_{70}BM$) have exhibited a higher solar cell power conversion efficiency than has been achieved in P3HT based devices. In PCDTBT, the absorption extends out to 700 nm, with two distinct but broad absorption bands that are centered at ∼400 nm and ∼600 nm. We have used steady-state and transient photoconductivity to investigate the carrier generation and collection efficiency of PCDTBT and its composite with $PC_{70}BM$ after photoexcitation at each of its distinct absorption bands.

Nelson Coates
Physics, University of California, Santa Barbara

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