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Photoconductivity in the Poly(2,7-Carbazole) Copolymer PCDTBT, and in Bulk Heterojunction Composites with PC₇₀BM NELSON COATES, MINGHONG TONG, DANIEL MOSES, ALAN HEEGER, Physics, University of California, Santa Barbara, SERGE BEAUPRÉ, MARIO LECLERC, Chimie, Université Laval — We have studied the 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 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. Photovoltaic devices fabricated from PCDTBT with the soluble fullerene derivative [6,6]-phenyl C₇₀-butyric acid methyl ester (PC₇₀BM) have exhibited a higher solar cell power conversion efficiency than has been achieved in P3HT based devices. In PCDTBT, the absorption extends out to 1.75 eV, with two distinct but broad absorption bands that are centered at ~ 2 eV and ~ 3 eV. We have used steady-state and transient photoconductivity to investigate the carrier generation and collection efficiency of PCDTBT and its composite with PC₇₀BM after photoexcitation at each of its distinct absorption bands.

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