Abstract

Photoinduced Electronic Interaction Between a Poly(p-phenylene vinylene)-derivative and Single Wall Carbon Nanotubes

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It is known that charge separation upon photoexcitation is very inefficient in pi-conjugated polymers, preventing applications such as organic photovoltaic. Much research effort has therefore concentrated on doping polymer films with electron acceptors that promote photoinduced charge separation. Here we report on a study of photoexcitation of single-wall carbon nanotubes (SWNT) as well as C_{60} polymer composites. We have studied the photoinduced electronic interaction between a poly(p-phenylene vinylene)-derivative (MEH-PPV) and SWNT as well as C_{60}. In our study we used various continuous wave spectroscopies such as photoluminescence (PL) and photoinduced absorption (PA). We have found evidence for electronic interaction of the photoexcited MEH-PPV and the SWNT or C_{60}, whereas there is no significant interaction in the ground state. The PL emission that originates from the polymer is considerably quenched in the composite films and the polaron PA band dramatically increases. These indicate that efficient photoinduced charge separation occurs in the composites.

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