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Thiophene based Conjugated Polymers for Organic Solar Cells

SOUMITRA SATAPATHI, University of Massachusetts Lowell, ROBINSON ANANDAKATHIR, Center for Advanced Materials, JAYANT KUMAR, Department of Physics — Renewable energy resources are becoming increasingly important in view of pressure on petroleum resources and concerns about global warming. One of the alternate green sources of energy is solar energy. Conjugated polymers, which are an important class of materials, are extensively used for the fabrication of solar cells. Here, we report the optical properties of some thiophene based conjugated polymers in solid film. The photoluminescence of these thiophene copolymers are completely quenched when blended with Phenyl C61 Butyric Acid Methyl Ester (PCBM) (1:1 wt ratio) indicating the probability of charge transfer from conjugated polymers to PCBM. It unveils the possibility of using these copolymers as one of the components of the active layer in bulk heterojunction solar cells. In another efforts, using Poly[(9,9-dioctylfluorenyl-2,7-diyl)-co-(bithiophene)] as a dye in dye sensitized titania cells, an open circuit voltage of 0.64V, a short circuit current of 0.36 mA/cm² with an overall power conversion efficiency of 0.12% is achieved.

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