

عنوان مقاله:

Fabrication and Characterization of Inorganic-Conducting Polymer-Based BHJ Polymer Solar Cells

محل انتشار:

دومین کنفرانس بین المللی یافته های نوین پژوهشی در شیمی و مهندسی شیمی (سال: 1395)

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خلاصه مقاله:

In this work TiO₂ and Ag-TiO₂ nanoparticles were synthesized via sol-gel process and applied as electron acceptors in the fabrication of polymer solar cells. Researches show that compositing of conducting polymers as an important component of polymer solar cells with inorganic nanoparticles can improve the charge dissociation in the active layer. It can also enhance the interfaces between the active layer and the metal electrode which in turn this leads to a higher charge collection at the electrodes and higher power conversion efficiency. The synthesized nanoparticles were characterized by x-ray diffraction spectroscopy and scanning electron microscopy equipped with energy dispersive x-ray (EDX) unit. Results confirmed the successful synthesis of anatase TiO₂ and Ag-TiO₂ nanoparticles with a homogenous size distribution of approximately 20 nm. The variations in the band gap of the polymer as a function of the type of applied nanoparticles were monitored using cyclic voltammetry. In order to study the effect of the type of inorganic nanoparticles on the photovoltaic performance of the polymer solar cells the following devices were prepared: ITO/TiO₂ paste/P3HT/Au, ITO/TiO₂ paste/P3HT:TiO₂/ Au and ITO/TiO₂ paste/P3HT:Ag-TiO₂/ Au. The J-V characterization of these devices showed that Ag-TiO₂ possessed the most improving impact on J_{sc}, V_{oc} and FF of the devices.

کلمات کلیدی:

Conducting polymers, Polymer solar cells, Bulk hetero junction, Nanocomposite

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