

Improvement of photoelectrochemical and optical characteristics of MEH-PPV using titanium dioxide nanoparticles

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Abstract: The use of bulk heterojunctions can increase the efficiency of exciton dissociation in polymer-based photovoltaics. We prepared and characterized bulk heterojunctions of poly[2-methoxy-5-(20-ethylhexyloxy)-p-phenylenevinylene] (MEH-PPV) and titanium dioxide nanoparticles deposited by spin coating on indium tin oxide substrates. The surface morphology of the MEH-PPV/TiO₂ composite films revealed that addition of TiO₂ nanoparticles increased the film roughness. The effect of TiO₂ nanoparticles on the photoelectrochemical and optical characteristics of MEH-PPV polymer heterojunctions was studied. Addition of TiO₂ nanoparticles improved the absorbance of MEH-PPV composite films. Moreover, the photocurrent of the composite devices increased with the TiO₂ nanoparticle concentration. These observations provide an insight into new approaches to improve the light collection efficiency in photoconductive polymers

Keywords : Organic–inorganic compounds MEH-PPV Morphology Photoelectrochemical properties