504/E1

Preparation and characterization of size controlled nanocomposites with polyaniline

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It is expected that useful photoconducting nanocomposites can be created by combination of PANI as p-type semiconductor and n-type semiconductor nanoparticles such as CdS and TiO_2. Upon irradiation, electrons are thought to be transferred from PANI to nanoparticles. Subsequently, the charges move to the respective electrodes. We have chosen CdS and TiO_2 as n-type semiconductors.

Photovoltaic devices with CdS/PANI and TiO_2/PANI were fabricated and photovoltaic response under solar irradiation of 100 mW cm^{-2} tungsten lamp was studied. CdS/PANI nanocomposites produced a maximum short circuit current density of 24 $\mu A\ cm^{-2}$. TiO_2/PANI nanocomposites produced a short circuit current density of 40 $\mu A\ cm^{-2}$ which increased to 100 $\mu A\ cm^{-2}$ when the electrolyte KI/I_2 was introduced into the system. These nanocomposites produced a short circuit current density of 1600 $\mu A\ cm^{-2}$ and 350 $\mu A\ cm^{-2}$ with $RuI_2(OH)_2$ dye and extracts from *Dioscorea alata* respectively. The photoresponse of TiO_2/PANI nanocomposites almost doubled with exposure to UV light.

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