

Preparation of Dye-Sensitized TiO₂ Photoanode with Additive Co-Polymer Materials

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The porosity of TiO₂ electrode in a dye-sensitized solar cell (DSSC) can affect light absorption and electron diffusion that govern the overall photocurrent-voltage (I-V) characteristics. In this research, TiO₂ photoanode was prepared by adding co-polymer materials, namely, styrene, n-butyl acrylate, and methacrylic acid (SBM) fabricated by soap-free emulsion copolymerization using a PEG-EEM macromonomer. From added co-polymer materials on TiO₂ electroanode, surface of TiO₂ electrode was formed many pore between TiO₂ particles, such phenomena are shown in field emission scanning electron microscopy (FE-SEM). Photocurrent-voltage properties of TiO₂ electrode with co-polymer were examined effect on an open-circuit voltage, photocurrent, fill factor, and energy conversion efficiency. At the TiO₂ thin films used the co-polymer material with PEG-EEM 4wt%, a conversion efficiency of 7.1% was obtained when measured under illumination with AM 1.5 (100mWcm⁻²) simulated sunlight.