

High Efficiency of I₂ free DSSCs with facile process using solid state polymerizable PEDOT

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In general, conventional solid-state synthesis of highly conducting poly(ethylenedioxythiophene) i. e. PEDOT have been reported for so many paper. Facile solid state polymerized HTM electrolytes have a high conductivity compared to that of oxidant polymerization..

It reports an easily accessible and widely applicable fabrication method of I₂-free solid-state dye-sensitized solar cells with high performance through the introduction of solid-state polymerizable monomer. Conducting polymer as a hole transporting material is effectively penetrable into TiO₂ pores and polymerizable by heating process. ¹H NMR, FT-IR spectroscopy, and differential scanning calorimetry(DSC) results present the successful solid state polymerization in the TiO₂ pore. Field emission scanning electron microscopy (FE-SEM) results show the monomer well-penetrated structure into the TiO₂ pore and well-polymerized. From this process, the fabricated DSSCs exhibited the highest energy conversion efficiency of 5.44 %. This process is able to apply various conducting polymer regardless of oxidation potential of conducting polymer and kind of dye.