

**Effect of TiO<sub>2</sub> nanotubes as nanofiller in Polyethylene glycol based composite electrolyte on the performances of dye sensitized solar cells**

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The efficient inorganic-organic composite electrolyte was prepared by using TiO<sub>2</sub> nanotubes (TiNTs) as filler in polyethylene glycol (PEG) for the fabrication of solid-state dye-sensitized solar cells (DSSCs). The morphologies, chemical interactions of PEG and TiNTs in TiNT-PEG composite electrolytes and their performances to the DSSCs were studied extensively by field emission scanning electron microscopy (FESEM), differential scanning calorimetry (DSC), and X-ray photoelectron spectroscopy (XPS) and J-V curves measurements respectively. The 10wt% TiNT-PEG composite electrolyte exhibited the strong bonding between O-Ti of TiNTs and glycol of PEG. Significantly high conversion efficiency ~ 4.5% achieved by DSSCs fabricated with 10wt%TiNT-PEG composite solid electrolyte. Several experiments were performed by various PEG-TiNTs composite electrolytes and found that that the appropriate ratios of TiNTs and PEG are important to obtain higher overall conversion efficiency.