

Effect of e-beam irradiation on the properties of PEGME-TiO₂ electrolytes and photovoltaic performance of dye sensitized solar cells

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Recently, polyether and polyester based electrolytes have given much attraction due to their high thermal stability and stable ionic conductivity at ambient temperature. In this study, we prepared a novel composite electrolytes with polyethylene glycol methyl ether (PEGME) and titania (TiO₂) and introduce electron beam (e-beam) radiation for the improvement of the thermal, mechanical and ionic conductivity properties of PEGME-TiO₂ electrolytes. A DSSCs fabricated with modified PEGME-TiO₂ electrolytes (200kGy) showed a high overall conversion efficiency of 3.35% with VOC of 0.588 volt and ISC of 9.68 mA/cm² at 100mW/cm² illumination. As can be seen, the physicochemical properties of PEGME-TiO₂ electrolytes was enhanced, which improved (about 13%) the photovoltaic performance of DSSCs in compare with the non-irradiated composite electrolytes based DSSCs.