High Efficiency I2-Free Solid-State Dye-Sensitized Solar Cells Based On Polymerized Ionic Liquid

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A polymerized ionic liquid of poly((1-(4-ethenylphenyl)methyl)-3-butyl-imidazolium iodide) was synthesized and employed as a solid electrolyte for I2-free solid-state dye-sensitized solar cells. The electrode/electrolyte interfaces were significantly improved using a graft copolymer-directed, organized mesoporous TiO2 thin film. The conversion efficiency reached 5.93 % at 100 mW/cm2, one of the highest observed values, due to decreased interfacial resistance and enhanced electron lifetime.