

Dye-sensitized Solar Cells assembled with Polymeric Ionic Liquid and Poly(3,4-ethylenedioxythiophene) Counter Electrode

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Dye-sensitized solar cells (DSSCs) are promising alternatives to silicon solar cells due to their low cost, easy fabrication, and relatively high conversion efficiency. Recently, poly(3,4-ethylenedioxythiophene) (PEDOT) has attracted a great deal of attention as a counter electrode due to its high conductivity, catalytic activity, low cost, ease of synthesis, and environmental stability [1-3]. However, there are few reports describing highly efficient quasi-solid-state DSSCs based on polymeric ionic liquid (PIL)-based electrolytes and PEDOT counter electrodes. In this paper, we report highly efficient quasi-solid-state DSSCs assembled with a PIL-based gel polymer electrolyte and a PEDOT nanofiber counter electrode. In the PIL, the iodide anions migrate easily, while the imidazolium cations are immobilized. The PIL was important not only for increasing the concentration of Γ^- ions but also in forming the stable gel polymer electrolyte. The resulting DSSC exhibited high conversion efficiency of 8.12%, which was higher than that of the cell with liquid electrolyte and Pt counter electrode.

References

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