

Dye-Sensitized Solar Cells Based On P(VDF-co-CTFE) Graft Copolymer Electrolytes

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A graft copolymer of poly(vinylidene fluoride-co-chlorotrifluoroethylene) with poly(oxyethylene methacrylate), i.e. P(VDF-co-CTFE)-g-POEM was synthesized via atom transfer radical polymerization (ATRP) using CTFE unit as a macroinitiator. This graft copolymer was complexed with metal salt (LiI) and ionic liquid (1-methyl,3-propyl imidazolium iodide, MPII) to produce a polymer electrolyte. Low molecular weight oligomer, poly(ethylene glycol) dimethyl ether (PEGDME, 500 g/mol) was introduced to improve an ionic conductivity and cell performances. Coordinative interactions and microphase-separated morphologies were investigated using FT-IR spectroscopy, X-ray diffraction (XRD) and transmission electron microscopy (TEM). The maximum energy conversion efficiency of the dye-sensitized solar cell (DSSC) using Li+MPII reached 4.2 % at 100 mW/cm².