Highly cross linked PEGME and PEG based gel polymer electrolyte for dye-sensitized solar cells

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Generally, highly cross linked polymers have been shown to be effective in enhancing ion conductivity, better mechanical stability and also good water absorbent, and improving the interfacial contact with electrode. In this paper, we attempted to synthesize highly cross linked polymer using poly (ethylene glycol) methyl ether (PEGME) and poly ethylene glycol (PEG) in presence of inorganic salts by chemical method and used as polymer electrolyte with the addition of iodide couple. This electrolyte is showing ambient ionic conductivity of 2.35 mS/cm, it is comparably well high to reported electrolyte. Solid state DSSCs were fabricated with gel polymer electrolyte and obtained an open circuit voltage (VOC) of 0.616 volt, short circuit current (ISC) of 8.96 mA/cm2 and over all conversion efficiency of about 3% under light intensity of 100mW/cm2. These kinds of highly crosslinking polymers in electrolyte may provide the easy solidification of the electrolyte and make a good interfacial contact of electrolyte to TiO2 layer in PV cell. The prepared composite materials were characterized by XRD, FT-IR, DSC, conductivity and photovoltaic performance tests.