

New and novel graphene- polyethylene oxide composite solid electrolyte for solid state dye sensitized solar cells

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In this work, the effective composite electrolytes were prepared by the mixing the graphene (Gr) and polyethylene oxide (PEO) for the fabrication of solid electrolyte of dye sensitized solar cells (DSSCs). Morphological characterization revealed that Gr sheets were uniformly coated by the PEO layer through the ester carboxylate bonding. The Gr-PEO composite electrolyte exhibited the enhanced generation of iodide ions in redox couple. From conductivity properties, Gr-PEO composite electrolyte with 0.5 wt% Gr presented a higher ionic conductivity ( $3.32 \text{ mS}\cdot\text{cm}^{-1}$ ) than those of PEO and other composite electrolytes at room temperature. A high overall conversion efficiency ( $\sim 5.23\%$ ) with very high short circuit current (JSC) of  $18.32 \text{ mA}/\text{cm}^2$ , open circuit voltage (VOC) of  $0.592 \text{ V}$  and fill factor (FF) of  $0.48$  was achieved in DSSCs fabricated with Gr-PEO composite electrolyte.