Impact of Electrocatalytic Activities of Doping Surfactants on Polyaniline as Pt-free Counter Electrode in DSSCs

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A series of composite counter electrodes were chemically synthesized by doping surfactants with, Ganodermalucidum Polysaccharide (GLP), Sodium dodecyl sulfate (SDS) and Ethylenediaminetetraacetic acid (EDTA) disodium salt on polyaniline (PANI) for Dye-sensitized solar cells (DSSCs). Surfactants can reduce the surface tension of the liquid, along with changing the conductivity and morphology of PANI. Scanning electron microscopy (SEM) results showed that PANI electrode morphology was strongly influenced by the surfactant. The electrochemical activity of surfactant-doping PANI was investigated by cyclic voltammetry (CV) curve, electrochemical impedance spectroscopy (EIS), Tafel polarization curve and current density–voltage curves (*J*-*V*). The power conversion efficiency (PCE) of PANI-doped CE with additions of SDS, GLP and EDTA disodium salt (4.25%, 2.69% and 2.51%) were higher than 2.29% for PANI CE without doping. These results indicate a potential application of surfactants doped polyaniline as counter electrode in cost-effective DSSCs.

Keywords: Dye-sensitized solar cells; Counter electrode; Polyaniline; Surfactant; Power conversion efficiency

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