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Developments in conducting polymer based counter electrodes for dye-sensitized solar cells - An overview

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Abstract

Conducting polymers (CPs) have been widely investigated and applied in various applications such as sensors, supercapacitors, energy storage devices, dye-sensitized solar cells (DSSCs) and others. They are pseudo-capacitive materials and can undergo fast redox reactions. Counter electrode (CE) is an important component in DSSCs. The counter electrode function as an electron transfer agent as well as the regenerator of redox couple. So far various methods and materials are used to prepare different counter electrodes. This paper reviews the conducting polymers and their composites as counter electrodes which offer a valuable insight to find out the appropriate alternative to costly platinum (Pt) counter electrode for DSSCs. Furthermore, it also outlines the desirable properties for good counter electrode materials and their evaluation methods such as cyclic voltammetry (CV), electrochemical impedance spectroscopy (EIS), Tafel polarization and chronoamperometry with photovoltaic performance studies for DSSCs.

Keywords: Counter electrode; Dye sensitized solar cell; Conducting polymer; Photovoltaic performance; Cyclic voltammetry; Polyaniline.

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