

Quantum dot-sensitized solar cell based on nano-TiO₂ electrodes

ABSTRACT

Quantum dots-sensitized solar cell (QDSSC) is one of the third generation solar cell that is the most promising low cost, easy to manufacture and highly efficient solar cell. Compared to Dye-sensitized solar cell (DSSC), quantum dots (QDs) of QDSSC has a narrow bandgap and possess excellent properties such as tunable band gaps, strong light absorption and high multiple electron generation. Titanium dioxide or titania (TiO₂) is an oxides semiconductor material that is frequently used as a photoanode in this photovoltaic system due to high stability under visible light illumination. TiO₂ is also known as a good photocatalyst and an excellent choice in environmental purification. The efficiencies of electron injection and light harvesting in QDSSC are affected by the nature, size morphology, and quantity of this nanomaterial. In this review, the concept and principles of the QDSSCs are reviewed. The preparation and fabrication method of TiO₂ electrode in QDSSC are also discussed. It is worthwhile to know the architecture of TiO₂ in order to enhance the efficiency of QDSSC.

Keyword: Quantum dots-sensitized solar cell; Titanium dioxide; Quantum dots