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CdS Quantum Dots and Dye Co-Sensitized Nanorods TiO2 Solar Cell

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Abstract

Co-sensitized solar cell was fabricated using CdS quantum dots with Lil based liquid electrolyte. The CdS quantum dots were deposited on TiO2 films by successive ionic layer adsorption and reaction (SILAR) method. The optical band gap values of the TiO2 and CdS films were determined to be 3.42 eV and 2.49 eV, respectively. The short-circuit photocurrent density (J(SC)) and the open-circuit voltage for the solar cell under AM 1.5 illumination were found to be 5.27 +/- 0.02 mA/cm(2) and 0.5 +/- 0.04 V, respectively. The efficiency of the solar cell was determined to be 1.33%. The efficiency of the solar cell is higher than that of efficiency of the co-sensitized solar cell fabricated using Ag2S/CdS quantum dots (1.27%) coupled with LiBOB-based liquid electrolyte. On the other hand, the efficiency of the solar cell is lower than that of dye-sensitized solar cell based on co-sensitization of TiO2 electrodes with CdS quantum dots and dye N719. These results indicate that the co-sensitization of TiO2 film can be provided with non-sulfur electrolyte and inorganic semiconductor QDs rather than organic dyes.

Keywords

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