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CdS/ZnS Quantum Dots Sensitized TiO2 Solar Cell

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Abstract

Quantum dots (QD)-sensitized solar cells have recently attracted growing interests as an alternative to dye-sensitized solar cell due to their band gap tuning, large light absorption coefficient, and multiple exciton generation. Herein, we report fabrication and photo-response of QD-sensitized TiO2 solar cell using CdS/ZnS as co-sensitizer. QD-sensitized TiO2 solar cell was prepared by successive ionic layer adsorption and reaction (SILAR), and sol gel spin process. The current voltage characteristics of the solar cell as a function of light intensity were studied. It was observed that the efficiency of the CdS/ZnS based solar device depends on the light intensity. The transient photocurrent of the device was studied. It was observed that the photocurrent increases with illumination and reach back to original value after turning off the illumination. The maximum efficiency of 3.27% was achieved under standard 1-sun illumination of 100 mW cm⁻². The high efficiency of the QD-sensitized TiO2 solar cell is due to cascading energy provided by ZnS. This result suggests that ZnS in combination with CdS quantum dots could lead to fabrication of high efficiency solar cells.

Keywords

Author Keywords: Solar Cell; TiO2; Quantum Dots; CdS; ZnS; Solar Efficiency

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