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Effect of SILAR Techniques on Photovoltaic Properties of PbS Quantum Dot Sensitized Solar Cells

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PbS quantum dots (QDs) have been received attention as a photosensitizer for quantum dot sensitized solar cells (QDSSCs) due to their narrow band gaps, quantum size effect, and multiple exciton generation (MEG). In this work, we prepared PbS QDSSCs by successive ionic layer adsorption and reaction method (SILAR) with PbS QDs deposited onto titanium dioxide (TiO_2), then the PbS QDs have been investigated the effect of SILAR cycles on photovoltaic properties. The power conversion efficiency (PCE) of the solar cells is dependent on SILAR cycles and an optimal SILAR cycle is two cycles. The PbS QDSSCs achieve the PCE of 1.79% with the photocurrent of 16.39 mA/cm^{-2}. Moreover, the optical properties were investigated by UV-visible absorption spectroscopy, which reveals a SILAR cycle affecting a band gap of PbS QDs.

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