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# Ag<sub>2</sub>S quantum dot sensitized Zinc Oxide photoanodes for environment friendly photovoltaic devices

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## Abstract:

Simple and a facile chemical solution strategy was utilized for the synthesis of ZnO nanoparticles (NPs) and then Ag<sub>2</sub>S quantum dots (QDs) were deposited on the surface of ZnO NPs by a successive ionic layer adsorption and reaction deposition method. The formation of Ag<sub>2</sub>S QDs on ZnO films significantly improved the performance of quantum dot sensitized solar cells (QDSCs). The higher photoconversion efficiency, 2.41% was achieved for the ZnO–Ag<sub>2</sub>S 6-cycles photoanode which corresponds to an increase of 35% when compared with bare ZnO electrode. The improved photoconversion efficiency of the ZnO–Ag<sub>2</sub>S QDSCs is attributed to the Ag<sub>2</sub>S sensitization which broadened the absorption into visible light region and exhibits higher short-circuit current density ( $J_{sc}$ ) values.

## Keywords:

Nanoparticles; Solar energy materials; ZnO films; Ag<sub>2</sub>S quantum dot sensitization; SILAR deposition; Photoconversion efficiency.

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