

Effect of heat treatment on photoelectrochemical performance of hydrothermally synthesised Ag₂S/ZnO nanorods arrays

ABSTRACT

Low temperature hydrothermal method was used to produce a large surface area ZnO NRs on conductive glass. The same method was used to fabricate a photoelectrode of Ag₂S quantum dots onto the nanorod arrays. Ag₂S QDs/ZnO NRAs heterostructure was employed as photoanode in a standard 3-electrodes photoelectrochemical cell. A significant enhancement in the photoelectrochemical performance was observed for the Ag₂S QDs/ZnO upon heat treatment 400 °C which displayed an impressive photoconversion efficiency of 4.08% by achieving ~10-times higher compared to bare ZnO NRAs. This enhancement was attributed to the improved morphological structure, crystallinity and optical properties of the synthesised heterostructures.

Keyword: Hydrothermal deposition; Heat treatment, ZnO nanorods; Ag₂S photoresponse; Photoconversion efficiency