Short Communication

Effect of WO₃ Morphological Structure on its Photoelectrochemical Properties

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The influence of WO₃ morphological structure either as nanorods or nanoplates synthesized via facile hydrothermal treatment on its photoelectrochemical properties has been investigated. The morphological structure of the prepared WO₃ samples has been confirmed by TEM and SEM analysis. The average diameter of prepared WO₃ nanorods was measured to be 7 nm with length up to 700 nm, while the WO₃ nanoplates were found to have a wide width up to 700 nm. The BET specific surface area of the nanoplates sample was found to be higher than that of the nanorods one with about 5 m² g⁻¹. The electrochemical impedance spectroscopy (EIS) measurements of the prepared WO₃ samples revealed that the nanoplates structure have lower charge transfer resistance compared with nanorods structure. These results imply that the contact between the nanoplates is better than the nanorods, which surely could enhance the conductivity and electron transfer through the material. This behavior was confirmed by the photocurrent-voltage and chronoamperometry measurements. It was indicated that the generated photocurrent by the nanoplates sample was enhanced compared with the nanorods sample giving a photocurrent density of 350 and 400 μA cm⁻² for nanorods and nanoplates respectively. This study emphasizes on the effect of the morphological structure of WO₃ on its photoelectrochemical properties which have a high importance in photocatalytic applications.

Keywords: WO₃, Nanoparticles, Nanorods, Photocatalysis and Photoelectrochemical measurements.

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