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Cu₂O-Tipped ZnO Nanorods with Enhanced Photoelectrochemical Performance for CO₂ Photoreduction

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Abstract

The design of Cu₂O-tipped ZnO nanorods is proposed here aiming at enhanced photoelectrochemical properties. The tip-selective deposition of Cu₂O is confirmed by scanning transmission electron microscopy (STEM). The photoinduced charge behavior like charge generation, separation and transport has been thoroughly studied by UV-vis absorption analysis and different photoelectrochemical characterizations, including transient photocurrent, incident photon-to-current efficiency (IPCE), electrochemical impedance spectroscopy (EIS), intensity-modulated photocurrent spectroscopy (IMPS), and Mott-Schottky measurements. The photoelectrochemical characterizations clearly indicate that ZnO/Cu₂O structures exhibit much higher performance than pristine ZnO, due to the formation of p-n junction, as well as the tip selective growth of Cu₂O on ZnO. Photocatalytic CO₂ reduction in aqueous solution

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