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Controlled synthesis of novel 3D CdS hierarchical microtremella for photocatalytic H₂ production

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Abstract: In this paper, a novel three dimensional (3D) CdS hierarchical microtremella (MT) is fabricated by a facile solvothermal method at 60 °C with the assistance of EDA. Field emission scanning electron microscope (FESEM), UV-Vis diffuse reflectance spectroscopy (DRS), energy dispersive spectrometer (EDS) and X-ray diffraction (XRD) are used to investigate the crystal structure and optical properties of CdS MTs. The results indicated that the size of CdS MTs, in the form of nanosheets, is 0.5~1.5 μm and the samples are very pure. 0.6wt%Pt is used as co-catalyst, the H₂ generation rate of CdS MTs under visible light illumination is 2.76 mmol h⁻¹ g⁻¹, which is 2.2 times more than CdS nanoparticles without EDT. This work provides insight into the structure design of 3D photocatalysts and offers a new approach to broadband clean energy field.

Keywords: Semiconductors; Powder technology; Structural; Synthesis; Photocatalytic activity

1. Introduction

Photocatalytic H₂ evolution (PHE) has received great attention as an effective pathway to

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