Preparation of ZnS-CdS Nanocomposite for Photoelectrochemical Hydrogen Production

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Chalcogenide nanostructures and nanocomposites as semiconductors have attracted intense attentions in various potential applications such as hydrogen production owing to their remarkable photoelectrochemical activity. In this study, ZnS-CdS nanocomposite with cubic ZnS and hexagonal CdS was synthesized with a simple wet chemical method. As can be seen from SEM and TEM images, CdS was formed on the outer layer of ZnS NPs. The hydrogen production rate of ZnS-CdS nanocomposite was much higher than that of ZnS NPs, indicating the remarkable enhancement of hydrogen production activity of photocatalyst with the addition of CdS. The hydrogen production rate increased more than 4 times after the deposition of Ru on the surface of ZnS-CdS. In addition, the as-prepared ZnS-CdS nanocomposite demonstrated an excellent stability over 50 h.

Keywords: ZnS; CdS; Photoelectrochemicallysis; Hydrogen; Nanocomposite

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