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Haiyan Li, Puhui Deng, Yu Hou

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Cobalt disulfide/graphitic carbon nitride as an efficient photocatalyst for hydrogen evolution reaction under visible light irradiation

Haiyan Li^a, Puhui Deng^a, Yu Hou^{a,*}

^aCollege of Chemistry, Chemical Engineering and Biotechnology, Donghua University, 2999 North Renmin Rd., Shanghai, 201620, China.

Correspondence: houyu@dhu.edu.cn

Abstract

Photocatalytic hydrogen production from water splitting is a sustainable way to realize the solar to chemical conversion process. In this work, a CoS₂/g-C₃N₄ hybrid nanocomposite has been constructed by a facile hydrothermal method and it exhibited enhanced photocatalytic activity for hydrogen generation under visible light irradiation. The hydrogen production rate of the CoS₂/g-C₃N₄ can reach up to 1232 μmol h⁻¹g⁻¹, which is higher than that of the pure of g-C₃N₄ and CoS₂.

Key words: Cobalt disulfide; Graphitic carbon nitride; Nanocomposites; Photocatalysis; Hydrogen evolution reaction; Semiconductors

1. Introduction

At present, energy shortage and environmental pollution are the two most important issues for humanity. Hydrogen is considered as the cleanest energy which can be produced by water splitting through photocatalysis and electrocatalysis [1, 2]. The use of semiconductors to achieve photocatalytic splitting of water is one of the current research hot spots [3].

Graphitic carbon nitride (g-C₃N₄) has drawn increasing research attention due to its high

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