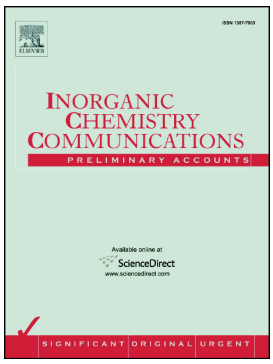

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Facile synthesis of CoO nanorod/C_3N_4 heterostructure photocatalyst for an enhanced pure water splitting activity

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ABSTRACT

A heterostructured nanocomposite composed of two visible light responsive semiconductors of C_3N_4 and CoO nanorod was successfully synthesized via a facile hydrothermal method followed by thermal annealing. The high-resolution transmission electron microscopy (HR-TEM) results show a close interface between C_3N_4 and CoO heterojunction. The photocatalytic activity was evaluated by hydrogen and oxygen evolution from water splitting under visible light illumination. The optimum CoO nanorod/C_3N_4 photocatalyst exhibits the highest hydrogen evolution of 92 μmol h^{-1}. This enhancement in performance might be ascribed to the heterojunction established between the interfaces of CoO nanorod and C_3N_4, which greatly promoted efficient separation and transformation of photogenerated charges.

Keywords: CoO nanorod; C_3N_4; heterostructures; pure water splitting

1. Introduction

Since the global energy crisis and environmental pollutions, the demand for clean energy and improvements towards environmental management are becoming global issues [1-3]. Photocatalytic water splitting, as an environment friendly and prospective approach to produce green energy, could be a good choice [4]. The overall reaction appears to involve two steps. In brief, the photocatalytic semiconductor absorbs photons with energies greater than its band gap energy to