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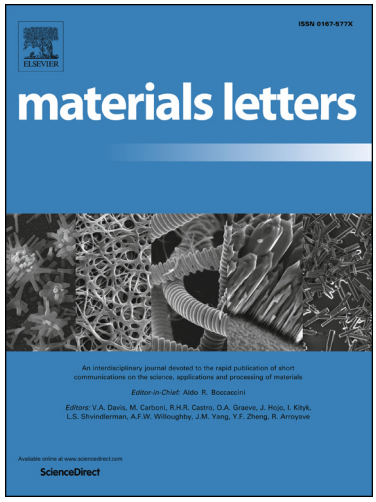

Facile two-step hydrothermal synthesis of a novel visible-light photocatalyst made from Bi_2O_3 modified by 4-Bromothiophenol

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Facile two-step hydrothermal synthesis of a novel visible-light photocatalyst made from Bi_2O_3 modified by 4-Bromothiophenol

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Abstract

A novel photocatalyst of Bi_2O_3 modified by 4-Bromothiophenol was first prepared via a facile two-step hydrothermal method. The obtained photocatalysts were characterized by XRD, SEM, EDS, EDS, PL and UV–vis, respectively. It can be observed that the new photocatalyst made from Bi_2O_3 modified by 4-Bromothiophenol exhibited a fiber-shaped structure, and its crystalline phase didn't change by adding 4-Bromothiophenol, but its photocatalytic property was tremendously improved. The highly photocatalytic activity of this novel photocatalyst was tested by degradation of malachite green (MG) with its initial concentration of 35 $mg \cdot L^{-1}$, and the result showed that the MG degradation rate up to 99.4% after irradiation for 80 min.

Keywords: Bi_2O_3; 4-Bromothiophenol; Composite materials; Photocatalyst; Semiconductors

1. Introduction

Due to their cheap cost and good performance, some metal-oxide semiconductor photocatalysts have been the research focus in the fields of water splitting and organics degradations [1]. In those photocatalysts, bismuth oxide (Bi_2O_3) is a kind of narrow-band-gap semiconductor, and shows potential applications in wastewater treatment because of its chemical stability and non-toxicity [2]. However, single Bi_2O_3 has high recombination rate of photogenerated electron-hole pairs, which