Accepted Manuscript

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PII: S0304-3894(18)30786-6
DOI: https://doi.org/10.1016/j.jhazmat.2018.08.099
Reference: HAZMAT 19724

To appear in: *Journal of Hazardous Materials*

Received date: 15-6-2018
Revised date: 29-8-2018
Accepted date: 31-8-2018

Please cite this article as: Liang C, Niu C-Gang, Zhang L, Wen X-Ju, Yang S-Feng, Guo H, Zeng G-Ming, Construction of 2D heterojunction system with enhanced photocatalytic performance: plasmonic Bi and reduced graphene oxide co-modified Bi5O7I with high-speed charge transfer channels, *Journal of Hazardous Materials* (2018), https://doi.org/10.1016/j.jhazmat.2018.08.099

Construction of 2D heterojunction system with enhanced photocatalytic performance: plasmonic Bi and reduced graphene oxide co-modified Bi_5O_7I with high-speed charge transfer channels

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Highlight

1 The unique 2D heterojunction system was fabricated through a facile surface charge mediated self-assembly strategy.

2 The typical heterojunction could provide large amount of charge channels facilitating the charge separation and transfer.

3 Semimetal Bi was introduced into the heterojunction system by in-suit reduction method with PVP as protective agent.

4 The local electromagnetic field induced by SPR effect of Bi was favorable for charge pair separation.

Abstract

The efficient electron-hole charge pair separation, ultra-fast electron migration and excellent light harvest capacity are essential for semiconductor photocatalyst with superior photocatalytic performance. In this study, we constructed layered 2D/2D heterojunction composite of $Bi@Bi_5O_7I$/rGO (BiBGOI) through a facile surface charge mediated self-assembly strategy. The unique 2D/2D heterostructure with face to face contact can increase the contact area and generate a large amount of charge transfer nanochannels in the interfacial heterojunction, resulting in the enhancement of photocatalytic activity. Addition of semimetal