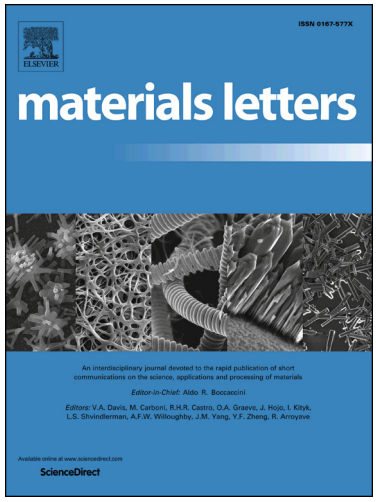
Accepted Manuscript



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PII: S0167-577X(18)30791-2
DOI: https://doi.org/10.1016/j.matlet.2018.05.043
Reference: MLBLUE 24343

To appear in: *Materials Letters*

Received Date: 30 January 2018
Revised Date: 4 May 2018
Accepted Date: 9 May 2018

Please cite this article as: J. Pan, C. Chi, M. You, Z. Jiang, W. Zhao, M. Zhu, C. Song, Y. Zheng, C. Li, The three dimensional Z-scheme $Ag_3PO_4/Ag/MoS_2/TiO_2$ nano-heterojunction and its sunlight photocatalytic performance enhancement, *Materials Letters* (2018), doi: https://doi.org/10.1016/j.matlet.2018.05.043

The three dimensional Z-scheme $Ag_3PO_4/Ag/MoS_2/TiO_2$ nano-heterojunction and its sunlight photocatalytic performance enhancement

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Abstract: The 3D Z-scheme $Ag_3PO_4/Ag/MoS_2/TiO_2$ nano-heterojunction is synthesized via electrospinning-hydrothermal-chemical co-deposition method. Compared with the unmodified samples, the photocatalysis of the $Ag_3PO_4/Ag/MoS_2/TiO_2$ nano-heterojunction exhibits a remarkable enhancement by the degradation of methylene blue(MB) in sunlight. Further, the Z-scheme heterojunction is considered as the main reason for the enhancement.

Keywords: Nanocomposites, Functional, Interfaces, Porous materials

1 Introduction

Currently, the semiconductor nano-photocatalyst, with low cost, complete degradation and recycle, has been considered as a promising way to purify the environment, such as SnO_2, TiO_2, CuInZnS, etc[1-3]. Especially the silver phosphate(Ag_3PO_4), with easy preparation, environment friendly and visible-light response, has been the current focus[4-5]. However, restricted by the high recombination of photon-generated carriers and stability, the Ag_3PO_4 could hardly been applied for practical application. For these issues, the composite modification would be efficient options, especially the heterojunction modification, with easy preparation and high carriers separation, has been reported as the hotspot, for instance, Wang groups have synthesised the remarkable Ag_3PO_4/carbon-nanotube photocatalyst[6], Teng groups have reported the novel Ag_3PO_4/MoO_3 heterojunction photocatalyst[7], etc. In addition, the heterojunction structure could reduce the photodecomposition of Ag_3PO_4, which is another advantage[8].

On the other hand, the molybdenum disulfide(MoS_2), with high visible-light response and laminar structure, has been the current central issue[9]. Particularly the laminar MoS_2, with large specific surface area, could provide sufficient load sites for the modification and photocatalysis,

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