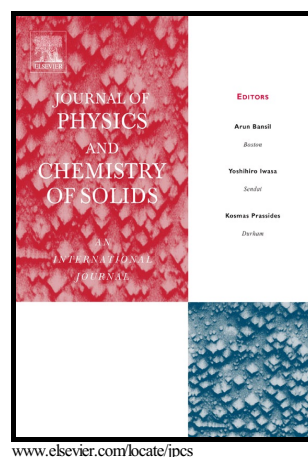


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PII: S0022-3697(16)31092-7
DOI: <http://dx.doi.org/10.1016/j.jpcs.2017.03.009>
Reference: PCS8007

To appear in: *Journal of Physical and Chemistry of Solids*

Received date: 19 November 2016

Revised date: 17 February 2017

Accepted date: 9 March 2017

Cite this article as: Dingze Lu, Hongmei Wang, Qingqing Shen, Kiran Kuma Kondamareddy and D Neena, Highly Efficient visible-light-induced photoactivity of magnetically retrievable $\text{Fe}_3\text{O}_4@\text{SiO}_2@\text{Bi}_2\text{WO}_6@\text{g-C}_3\text{N}_4$ hierarchical microspheres for the degradation of organic pollutant and production of hydrogen, *Journal of Physical and Chemistry of Solids* <http://dx.doi.org/10.1016/j.jpcs.2017.03.009>

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Highly Efficient visible-light-induced photoactivity of magnetically retrievable $\text{Fe}_3\text{O}_4@\text{SiO}_2@\text{Bi}_2\text{WO}_6@\text{g-C}_3\text{N}_4$ hierarchical microspheres for the degradation of organic pollutant and production of hydrogen

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Abstract

The new multifunctional composite $\text{Fe}_3\text{O}_4@\text{SiO}_2@\text{Bi}_2\text{WO}_6@\text{g-C}_3\text{N}_4$ (FSBG) hierarchical microspheres with $\text{Bi}_2\text{WO}_6/\text{g-C}_3\text{N}_4$ heterostructure as an outer shell and $\text{Fe}_3\text{O}_4@\text{SiO}_2$ as a magnetic core have been synthesized and characterized for photocatalytic applications. An efficient and adoptable approach of synthesizing magnetic $\text{Bi}_2\text{WO}_6/\text{g-C}_3\text{N}_4$ hierarchical microspheres of grape-like morphology is realized. The as-synthesized structures exhibit highly efficient visible-light absorption and separation efficiency of photo-induced charge. The visible-light-induced photocatalytic activity of $\text{g-C}_3\text{N}_4$, $\text{Fe}_3\text{O}_4@\text{SiO}_2@\text{Bi}_2\text{WO}_6$, and FSBG is evaluated by investigating the photodegradation of Rhodamine B (RhB) and hydrogen (H_2) out of water. The comparative study reveals that the FSBG microspheres exhibit an optimum visible-light-induced photocatalytic activity in degrading Rhodamin B (RhB), which is 3.06 and 1.92 times to that of $\text{g-C}_3\text{N}_4$ and $\text{Fe}_3\text{O}_4@\text{SiO}_2@\text{Bi}_2\text{WO}_6$ systems respectively and 3.89 and 2.31 times in the production of hydrogen (H_2) out of water, respectively. The FSBG composite microspheres also exhibit good magnetic recoverability. An alternate mechanism for the enhanced

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