

Accepted Manuscript

Title: Photocatalysis oxidation activity regulation of Ag/TiO₂ composites evaluated by the selective oxidation of Rhodamine B

Authors: Huijun Liang, Zhichao Jia, Hucheng Zhang, Xiaobing Wang, Jianji Wang



PII: S0169-4332(17)31566-0
DOI: <http://dx.doi.org/doi:10.1016/j.apsusc.2017.05.211>
Reference: APSUSC 36146

To appear in: *APSUSC*

Received date: 13-2-2017
Revised date: 20-5-2017
Accepted date: 24-5-2017

Please cite this article as: Huijun Liang, Zhichao Jia, Hucheng Zhang, Xiaobing Wang, Jianji Wang, Photocatalysis oxidation activity regulation of Ag/TiO₂ composites evaluated by the selective oxidation of Rhodamine B, Applied Surface Science <http://dx.doi.org/10.1016/j.apsusc.2017.05.211>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Photocatalysis oxidation activity regulation of Ag/TiO₂ composites evaluated by the selective oxidation of Rhodamine B

Huijun Liang,^{a,b} Zhichao Jia,^a Hucheng Zhang,^{*,a} Xiaobing Wang^a and Jianji Wang^{*,a}

^a Collaborative Innovation Center of Henan Province for Green Manufacturing of Fine Chemicals, Key Laboratory of Green Chemical Media and Reactions, Ministry of Education, School of Chemistry and Chemical Engineering, Henan Normal University, Xinxiang, Henan 453007, P. R. China

^b College of Chemistry and Chemical Engineering, Xinxiang University, Xinxiang, Henan 453003, P. R. China

Highlights

1. The photooxidation activity of Ag/TiO₂ can be adjusted by visible and ultraviolet.
2. Rhodamine B can be selective oxidized by Ag/TiO₂ only under visible light.
3. The role change of Ag in Ag/TiO₂ can adjust the effect of different radicals.
4. Improving the effect of superoxide anion radicals is help to form Rhodamine 110.
5. The as-prepared Ag/TiO₂ has ultrahigh specific surface areas of about 400 m² g⁻¹.

Abstract: With the aid of TiO₂ and Ag/TiO₂ composites with ultrahigh specific surface areas (about 400 m² g⁻¹), we demonstrated a facile controlled strategy to adjust the photooxidation activity of Ag/TiO₂ in the photocatalysis degradation process of Rhodamine B (RhB). A series of photocatalysis experiment results indicated that the selective oxidation of RhB could be performed through changing irradiation light. When the as-prepared unannealed Ag/TiO₂ was used as photocatalyst, Rh-110 was produced only under visible light irradiation. Instead, RhB would be oxidized completely under ultraviolet irradiation or using the annealing Ag/TiO₂. Although there were many photocatalysis degradation mechanisms of RhB in previous literatures, we have not found an appropriate mechanism to explain this phenomenon. Radical-trapping tests indicated that the effect of superoxide anion radical was more important than hydroxyl radical in the forming process of Rh-110, and hence the selective oxidation mechanism of Ag/TiO₂ was suggested according to the role changing of Ag nanoparticles on the composites under visible and ultraviolet irradiation.

Download English Version:

<https://daneshyari.com/en/article/5347512>

Download Persian Version:

<https://daneshyari.com/article/5347512>

[Daneshyari.com](https://daneshyari.com)