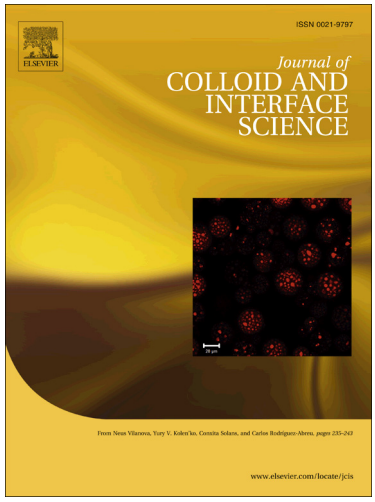
Accepted Manuscript



Regular Article

Dahlia-shaped $biocl_xi_{1-x}$ structures prepared by a facile solid-state method: evidence and mechanism of improved photocatalytic degradation of rhodamine b dye

Jing Xie, Yali Cao, Dianzeng Jia, Yizhao Li

PII: S0021-9797(17)30536-2
DOI: http://dx.doi.org/10.1016/j.jcis.2017.05.016
Reference: YJCIS 22323

To appear in: *Journal of Colloid and Interface Science*

Received Date: 21 March 2017
Revised Date: 5 May 2017
Accepted Date: 8 May 2017

Please cite this article as: J. Xie, Y. Cao, D. Jia, Y. Li, Dahlia-shaped $biocl_xi_{1-x}$ structures prepared by a facile solid-state method: evidence and mechanism of improved photocatalytic degradation of rhodamine b dye, *Journal of Colloid and Interface Science* (2017), doi: http://dx.doi.org/10.1016/j.jcis.2017.05.016

Dahlia-shaped $BiOCl_xI_{1-x}$ Structures Prepared by a Facile Solid-state Method: Evidence and Mechanism of Improved Photocatalytic Degradation of Rhodamine B Dye

Jing Xie, Yali Cao*, Dianzeng Jia*, Yizhao Li

Key Laboratory of Energy Materials Chemistry, Ministry of Education, Key Laboratory of Advanced Functional Materials, Autonomous Region, Institute of Applied Chemistry, Xinjiang University, Urumqi, Xinjiang 830046, China.

Abstract

A rapid and cheap solid-state chemical process was employed to synthesize $BiOCl_xI_{1-x}$ (x=1.0, 0.75, 0.5, 0.25, 0) solid solutions with dahlia-shaped hierarchitectures. The dahlia-shaped $BiOCl_xI_{1-x}$ hierarchitectures were effectively constructed by nanoplates with a thickness about 5-13 nm. The band gap structure of the solid solutions can be modulated by adjusting the composition ratio of Cl and I, which has a significant effect on the photocatalytic activity of the solid solutions. The dahlia-shaped $BiOCl_xI_{1-x}$ (x=0.75) solid solution exhibits excellent adsorption and effective photocatalytic performances for rhodamine B (RhB) under visible light irradiation, which degraded more than 98% of RhB within 60 min under the visible light irradiation, it is higher than the reported bismuth oxyhalides materials. The trapping experiments confirmed that $\cdot O^{2-}$ and h^+ played the major role in the photocatalytic process and the possible photocatalytic reaction mechanism was illustrated.

Keywords: Solid-state reaction; Hierarchical structure; Bismuth compound; Photocatalysis.

*Corresponding author. Tel: +86-991-8583083; Fax: +86-991-8588883; Emails: caoyali523@163.com; jdz@xju.edu.cn