Accepted Manuscript

Titanium-Zinc-Bismuth Oxides-Graphene Composite Nanofibers as High-Performance Photocatalyst for Gas Purification

Carina Chun Pei, Kenneth Kin Shing Lo, Wallace Woon-Fong Leung

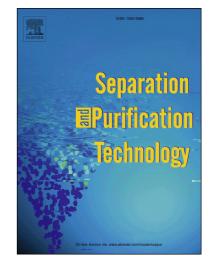
PII: S1383-5866(17)30308-8

DOI: http://dx.doi.org/10.1016/j.seppur.2017.04.016

Reference: SEPPUR 13678

To appear in: Separation and Purification Technology

Received Date: 27 January 2017 Revised Date: 11 April 2017 Accepted Date: 15 April 2017



Please cite this article as: C. Chun Pei, K. Kin Shing Lo, W. Woon-Fong Leung, Titanium-Zinc-Bismuth Oxides-Graphene Composite Nanofibers as High-Performance Photocatalyst for Gas Purification, *Separation and Purification Technology* (2017), doi: http://dx.doi.org/10.1016/j.seppur.2017.04.016

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.

ACCEPTED MANUSCRIPT

Titanium-Zinc-Bismuth Oxides-Graphene Composite Nanofibers as High-Performance Photocatalyst for Gas Purification

Carina Chun Pei, Kenneth Kin Shing Lo, Wallace Woon-Fong Leung*

Department of Mechanical Engineering, The Hong Kong Polytechnic University, Hung Hom, Hong Kong

*Correspondence to: mmleung@polyu.edu.hk

Abstract: Novel technologies have been on demand to develop improved photocatalyst for gas purification. Graphene has been used to improve the performance of photonic devices based on its high charge conductivity as well as other unique properties. Traditional approach uses discrete graphene sheets with sparse, sporadic deposition of semiconductor crystals (TiO₂) as photocatalyst, which results in poor light harvesting and electron-hole recombination at the sheet edges. In our novel configuration, the edge effect has been eliminated by having the graphene sheets being rolled into a "spiral" inserted in the 80nm TiO₂/ZnO/Bi₂O₃ (TZB) nanofiber, and free electrons can only travel unidirectional along the axis of the nanofiber. The nanofiber is fabricated with its surface packed with 10-nm sized TZB nanocrystallites that increases the surface area thereby improving light harvesting. Further, the addition of ZnO and Bi₂O₃ reduce the band-gap energy of the composite facilitating harvesting of the visible light spectrum. Other than fast transport of electrons to sites where photocatalysis is needed, the graphene roll (exposed in

Download English Version:

https://daneshyari.com/en/article/4989749

Download Persian Version:

https://daneshyari.com/article/4989749

<u>Daneshyari.com</u>