

Accepted Manuscript

TiO₂ inverse opal photonic crystals: Synthesis, modification, and applications - A review

Jie Yu, Juying Lei, Lingzhi Wang, Jinlong Zhang, Yongdi Liu



PII: S0925-8388(18)32858-5

DOI: [10.1016/j.jallcom.2018.07.357](https://doi.org/10.1016/j.jallcom.2018.07.357)

Reference: JALCOM 47073

To appear in: *Journal of Alloys and Compounds*

Received Date: 6 May 2018

Revised Date: 30 July 2018

Accepted Date: 31 July 2018

Please cite this article as: J. Yu, J. Lei, L. Wang, J. Zhang, Y. Liu, TiO₂ inverse opal photonic crystals: Synthesis, modification, and applications - A review, *Journal of Alloys and Compounds* (2018), doi: 10.1016/j.jallcom.2018.07.357.

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.

TiO₂ inverse opal photonic crystals: synthesis, modification, and applications - a review

Jie Yu ^a, Juying Lei ^{a*}, Lingzhi Wang, Jinlong Zhang ^{b*}, Yongdi Liu ^{a,c*}

^aState Environmental Protection Key Laboratory of Environmental Risk Assessment and Control on Chemical Process, School of Resources and Environmental Engineering, East China University of Science and Technology, Shanghai, P.R. China, 200237. Email: leijuying@ecust.edu.cn ; ydliu@ecust.edu.cn

^bKey Lab for Advanced Materials and Institute of Fine Chemicals, School of Chemistry and Molecular Engineering, East China University of Science and Technology, Shanghai , P.R. China, 200237. Email: jlzhang@ecust.edu.cn

^cShanghai Institute of Pollution Control and Ecological Security, Shanghai, P.R. China, 200092.

ABSTRACT: TiO₂ inverse opal photonic crystal (TiO₂ IO PCs) that possesses the advantages of titanium dioxide including non-toxicity, high refractive index (>2.5), good biocompatibility etc. and the optical characteristics of photonic crystals containing the band gap, photonic localization, slow light effect, super prism effect and negative refraction effect has attracted tremendous interest. Its synthetic methods are usually chemical vapor deposition, atomic layer deposition, electrochemical deposition and sol-gel method. To meet the needs of the applications in chemical sensors, solar cells, photocatalysis, high efficient microwave wire, photonic crystal fiber etc., lots of research focused on the modifications of TiO₂ IO PCs by means of noble metal deposition, non-metal elements or metal ion doping, quantum dot sensitization and semiconductor composite. This paper aims to review the up-to-date synthesis, modification, and applications of TiO₂ IO PCs and forecast its future development direction.

Keywords: TiO₂; Inverse opal; Preparation; Modification; Application

1 Introduction

TiO₂, as a kind of stable, non-toxic, harmless and low price of materials, has a wide range of uses in the environment, energy and many other aspects. For example, in the field of photocatalysis, TiO₂ as a photocatalyst has been widely used in photocatalytic degradation, photosynthesis, water splitting etc. [1]; in the field of

Download English Version:

<https://daneshyari.com/en/article/7990068>

Download Persian Version:

<https://daneshyari.com/article/7990068>

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