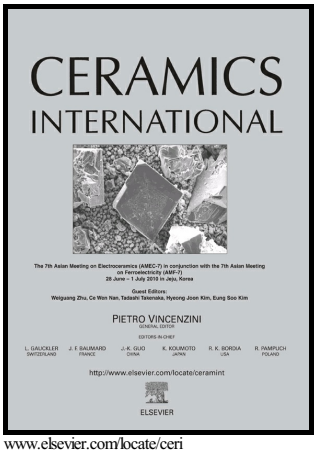

www.elsevier.com/locate/ceri

Novel lu-doped Bi_2WO_6 nanosheets: Synthesis, growth mechanisms and enhanced photocatalytic activity under UV-light irradiation

H. Ait Ahsaine, M. Ezahri, A. Benlhachemi, B. Bakiz, S. Villain, F. Guinneton, J-R, Gavarri

PII: S0272-8842(16)30025-6
DOI: http://dx.doi.org/10.1016/j.ceramint.2016.02.082
Reference: CERI12273

To appear in: *Ceramics International*

Received date: 23 November 2015
Revised date: 26 January 2016
Accepted date: 15 February 2016

Cite this article as: H. Ait Ahsaine, M. Ezahri, A. Benlhachemi, B. Bakiz, S Villain, F. Guinneton and J-R, Gavarri, Novel lu-doped Bi_2WO_6 nanosheets Synthesis, growth mechanisms and enhanced photocatalytic activity under UV light irradiation, *Ceramics Internationa* http://dx.doi.org/10.1016/j.ceramint.2016.02.082

Novel Lu-doped Bi_2WO_6 nanosheets: Synthesis, growth mechanisms and enhanced photocatalytic activity under UV-Light irradiation

H. Ait Ahsaine[1], M. Ezahri[1], A. Benlhachemi[1], B. Bakiz[1], S. Villain[2], F. Guinneton[2], J-R, Gavarri[2]

[1]Laboratoire Matériaux et Environnement LME, Faculté des Sciences, Université Ibn Zohr, BP 8106, Cité Dakhla, Agadir, Maroc
[2]Institut Matériaux Microélectronique et Nanosciences de Provence, IM2NP, UMR CNRS 6242, Université du Sud Toulon-Var, BP 20132, 83957, La Garde Cedex, France

(*) to whom correspondence must be addressed: H. Ait ahsaine a.hassan@uiz.ac.ma / Tel: +212676363621

Abstract

Polycrystalline systems of lutetium doped bismuth tungstates Bi_2WO_6: Lu (Lu at.% 0, 2, 5, 8) were synthesized using the coprecipitation method, followed by thermal treatment at 500°C. The Bi_2WO_6:Lu samples were characterized by X-Ray diffraction (XRD), scanning electron microscopy (SEM), energy-dispersive X-Ray analysis (EDS) and UV-Vis diffuse reflectance spectra (DRS). The XRD and SEM analyses showed that the as-prepared samples crystallized in the same orthorhombic structure and consist of agglomerated nanosheets. To characterize the photocatalytic activities, UV-Visible spectrometry was used to analyze the evolution of Rhodamine B photodegradation in presence of the Bi_2WO_6 : Lu photocatalysts. The characteristic absorption band of Rhodamine B at 554 nm shifted to lower wavelengths under UV irradiation. The pure Bi_2WO_6 and the 5% Lu doped Bi_2WO_6 photocatalysts presented the lowest and highest efficiencies, respectively. An interpretation of improved photocatalytic efficiencies was proposed.

Key words: bismuth tungstate, lutetium doping, nanostructures, nanosheets, photocatalytic activity, photodegradation.

1. Introduction

Recently, semiconductors have received an increasing attraction in various fields due to their potential applications on energy conversion [1,2,3], photocatalytic and electrochemical devices [4,5,6]. In this present work, we deal with photocatalytic applications for environmental depollution. Among various studied photocatalysts which are very promising in the visible light region, bismuth tungstate Bi_2WO_6, a member of the Aurivillius phase family of layered perovskites, which are structurally composed of alternating perovskite and fluorite-like blocks, of general