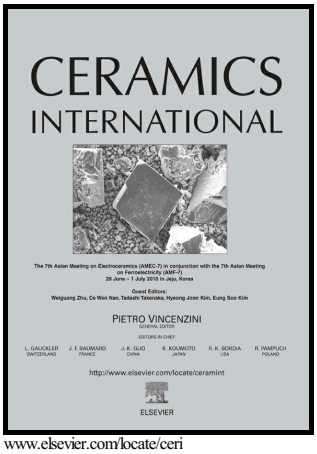

www.elsevier.com/locate/ceri

Silver nanoparticles decorated titanium dioxide-tungsten trioxide nanotube films with enhanced visible light photo catalytic activity

M.M. Momeni, Y. Ghayeb, S. Gheibee

PII: S0272-8842(16)31718-7
DOI: http://dx.doi.org/10.1016/j.ceramint.2016.09.195
Reference: CERI13855

To appear in: *Ceramics International*

Received date: 31 July 2016
Revised date: 26 September 2016
Accepted date: 27 September 2016

Cite this article as: M.M. Momeni, Y. Ghayeb and S. Gheibee, Silve nanoparticles decorated titanium dioxide-tungsten trioxide nanotube films wit enhanced visible light photo catalytic activity, *Ceramics Internationa* http://dx.doi.org/10.1016/j.ceramint.2016.09.195

Silver nanoparticles decorated titanium dioxide-tungsten trioxide nanotube films with enhanced visible light photo catalytic activity

M. M. Momeni*, Y. Ghayeb, S. Gheibee*

Department of Chemistry, Isfahan University of Technology, Isfahan 84156-83111, Iran

Abstract

A simple strategy for synthesizing silver-loaded titanium dioxide-tungsten trioxide nanotubes film for use as recyclable photo catalyst is introduced. Highly ordered and uniformly distributed titanium dioxide-tungsten trioxide nanotubes (WTNTs) on pure titanium were successfully fabricated by one-step electrochemical anodizing and silver deposited on these nanotubes by simple electrochemical method. The as-prepared samples were characterized by X-ray diffraction, field-emission scanning electron microscopy, ultraviolet-visible diffuse reflectance spectroscopy and energy dispersive X-ray spectrometer methods. The degradation of methylene blue (MB) was used as a model reaction to evaluate the photo catalytic activity of the obtained samples. Compared with the pure TiO_2 nanotubes (TNTs) and bare WTNTs, the WTNTs decorated with silver (Ag/WTNTs) showed much higher photo catalytic activity in the degradation of MB under visible light irradiation. Under the same condition, no obvious photo degradation of methylene blue was found for pure TiO_2 nanotubes. The average photo catalytic degradation efficiency of the Ag/NTNTs obtained for the degradation of MB is 2.3 times higher than those of bare NTNTs. After 6 successive cycles under 720-min visible light irradiation, Ag/WTNTs remained highly stable photo catalytic activity. The enhanced photo catalytic activity of ternary Ag/WTNTs photo catalyst was ascribed to improved

* Corresponding authors E-mail address: momeni22@gmail.com; s.gheibee@ch.iut.ac.ir