Short Communication

Photocatalytic Activities of Vertically Aligned Manganese-Doped ZnO Nanorods Synthesized on ITO Film by Electrochemical Technique

Liqun Fan, Jinhua Wang, Na Qiu, Yong Liu, Xianman Zhang*

College of Chemistry, Chemical Engineering and Materials Science, Zaozhuang University,
Zaozhuang, Shandong 277160, China

*E-mail: liuyong20049@163.com

doi: 10.20964/2019.12.09

Received: 6 June 2019 / Accepted: 5 August 2019 / Published: 29 October 2019

A facile electrochemical approach was used to one step growth of Mn-doped ZnO nanorods on indium tin oxide conductive glass. FESEM images show an increase in diameter and height of ZnO nanorods by doping Mn ions in ZnO lattice. XRD results indicate that the Mn dopant lead to a shift in the diffraction peak position toward a lower angle side compared to the undoped ZnO nanorods. Electrochemical impedance spectroscopy results proving that doping Mn ions in ZnO nanorods can lead to higher free-electron carriers that accelerate charge transfer and reduces the resistance. Photocatalytic activities of the sample were studied by degrading methylene blue under UV–vis light irradiation. The photodegradation efficiency of Mn-doped ZnO nanorods achieved for 100 min irradiation times was 81% which reveals better findings compared to previous reports. The Mn-doped ZnO nanostructures have higher rate constant and degradation efficiency as it has higher surface defects, length, and crystallinity than others.

Keywords: Mn-doped ZnO nanorods; Photocatalytic activities; Electrochemical impedance spectroscopy; Electrochemical technique

[FULL TEXT](#)

© 2019 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).