Desalination and Water Treatment
www.deswater.com

doi: 10.1080/19443994.2015.1012561

57 (2016) 6723–6731
March

Taylor & Francis
Taylor & Francis Group

Investigating on photocatalytic performance of CuO micro and nanostructures prepared by different precursors

S. Safa[a], R. Azimirad[b], S. Safalou Moghaddam[c], M. Rabbani[c,*]

[a]*Young Researchers and Elite Club, South Tehran Branch, Islamic Azad University, Tehran, Iran, Tel./Fax: +98 2122974546; email: sda.safa@gmail.com*
[b]*Institute of Physics, Malek-Ashtar University of Technology, Tehran, Iran, Tel./Fax: +98 2122974546; email: azimirad@yahoo.com*
[c]*Department of Chemistry, Iran University of Science and Technology, Tehran 16846 13114, Iran, Tel. +98 21 77240290; Fax: +98 21 77491204; emails: sam.safalo@gmail.com (S. Safalou Moghaddam), m_rabani@iust.ac.ir (M.Rabbani)*

Received 2 July 2014; Accepted 22 January 2015

ABSTRACT

In this paper, various morphologies of copper oxide (CuO) were synthesized from acetate, sulfate, and nitrate precursors using hydrothermal bath method. The photoluminescence spectra revealed that CuO-Ni sample contains the strongest surface defect peak which can be related to its highest active surface area. The Fourier transform infrared (FT-IR) results showed that the concentration of the surface OH^- group on the samples varies considerably according to CuO-Ac > CuO-Ni > CuO-Su. From structural results, it could be observed that all the samples crystallized into a monoclinic crystal structure. The photocatalytic activity of CuO samples was evaluated by the catalytic oxidation of methylene blue in the presence of hydrogen peroxide. Concerning the nearly same optical band gap for the samples, the best photocatalytic performance of CuO-Ni nanorods was assigned to its highest active surface area and surface hydroxyl groups.

Keywords: Copper oxide; Micro- and nano-hierarchical; Photocatalyst; Methylene blue

*Corresponding author.

1944-3994/1944-3986 © 2015 Balaban Desalination Publications. All rights reserved.