

Accepted Manuscript

Title: Copper oxide nanocrystallites fabricated by thermal oxidation of pre-sputtered copper films at different temperatures and under oxygen and argon flows

Authors: M.A. Awad, N.M.A. Hadia

PII: S0030-4026(17)30653-8
DOI: <http://dx.doi.org/doi:10.1016/j.ijleo.2017.05.106>
Reference: IJLEO 59255

To appear in:

Received date: 15-3-2017
Revised date: 30-5-2017
Accepted date: 30-5-2017

Please cite this article as: M.A.Awad, N.M.A.Hadia, Copper oxide nanocrystallites fabricated by thermal oxidation of pre-sputtered copper films at different temperatures and under oxygen and argon flows, *Optik - International Journal for Light and Electron Optics* <http://dx.doi.org/10.1016/j.ijleo.2017.05.106>

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.



Copper oxide nanocrystallites fabricated by thermal oxidation of pre-sputtered copper films at different temperatures and under oxygen and argon flows

M. A. Awad, N. M. A. Hadia

Physics Department, Faculty of Science, Sohag University, 82524 Sohag, Egypt

Corresponding author: e-mail: arwamadeha@yahoo.com

Tel./Fax: +2 01121391790/+2 093 4601159

Abstract

Copper oxide nanocrystallites were synthesized from Cu thin films via controlled thermal treatment under O₂ and Ar flows. The nanocrystallites were synthesized at 350, 400 and 500°C. XRD revealed that substoichiometric copper oxides such as Cu₄O₃ and Cu₆₄O were emerged with Cu and CuO for samples treated at 350°C and 450°C, respectively, whereas single monoclinic CuO was emerged for the samples treated at 500°C. EDAX quantitative analysis confirmed the presence of both Cu and oxygen in the films with slightly excess oxygen for films treated at 400 and 500°C. SEM examinations confirmed the nanocrystallite morphologies for the examined samples and that more coalescent nanocrystallites, with diameters in the range 42-75 nm, were obtained for the samples treated at 500°C. With increasing treatment temperature from 350 to 500°C, the films vary from highly reflecting reddish brown color to highly transparent. The estimated band gap values for the mixed copper oxide phases, samples treated at 450°C, and pure CuO phase were 1.27 eV and 2.00 eV, respectively. High refractive index and moderate extinction coefficient values were calculated for the samples containing mixed phases which may find new application in optoelectronics. The refractive index values for pure CuO were matched with the previously reported

Download English Version:

<https://daneshyari.com/en/article/5025177>

Download Persian Version:

<https://daneshyari.com/article/5025177>

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