STRUCTURAL AND OPTICAL CHARACTERIZATION OF POROUS ZINC OXIDE (ZnO) GROWN ON DIFFERENT SUBSTRATES BY AMMONIUM HYDROXIDE (NH4OH) SOLUTION

NUR HAZWANI BINTI ABU

BACHELOR OF CHEMICAL ENGINEERING (ENVIRONMENT) WITH HONOURS

UNIVERSITI TEKNOLOGI MARA

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AUTHOR'S DECLARATION

I declare that the work in the thesis was carried out in accordance with the regulation of Universiti Teknologi MARA. It is original and is the results of my own, unless otherwise indicated or acknowledge as reference work.

I, hereby acknowledge that I have been supplied with the Academic Rules and Regulations, Universiti Teknologi MARA, regulating the conduct of my study and research.

Signed : .....

Date : 10/7/2017

Nur Hazwani Binti Abu

Student ID : 2014699608

SUPERVISOR'S CERTIFICATION

We declared that we read this thesis and in our point of view this thesis is qualified in terms of scope and quality for the purpose of awarding the Bachelor of Chemical Engineering (Environment) with Honours.

Signed : .....

Date : ....10/7/2017.....

Main supervisor

Dr. Mohd Zaki Bin Mohd Yusoff

Faculty of Applied Science

Universiti Teknologi MARA

Cawangan Pulau Pinang

13500 Permatang Pauh

Pulau Pinang

Signed : .....

Date : .....10/7/2017.....

Co-Supervisor

Dr. Mohd Muzafa Bin Jumidali

Faculty of Applied Science

Universiti Teknologi MARA

Cawangan Pulau Pinang

13500 Permatang Pauh

Pulau Pinang

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ABSTRACT

The present study reports the growth and characterization of the fabrication of porous ZnO on different substrate. Porous zinc oxide is a favorable material for various applications and it can be fabricated by wet chemical etching on the different substrates. The ZnO thin films was deposited using radio frequency (RF) sputtering method on silicon, glass, sapphire and PET substrates. The ZnO thin films was etched in the ammonium hydroxide (NH_4OH) solution for 3 minutes to form porous ZnO thin films. The Optical Microscopy, Filmetrics and Fourier Transform Infrared Spectrometer (FTIR) results have been analyzed to determine the surface morphology, refractive index and functional group correspondingly grown on different substrate which is glass, silicon, sapphire and PET substrate. The FTIR revealed that there is ZnO bond that exist on the ZnO/silicon samples and the optical microscope show that there is better formation of pores on the ZnO/silicon samples. However, for the filmetrics it shows the decreasing of reflectance due to the porosity on ZnO/silicon. The refractive index that has been obtained are 0.9301 and 0.9667 for ZnO and porous ZnO porous respectively. Meanwhile, the thickness that obtained are 365.3 A° for ZnO and 262.6 A° for porous ZnO. Finally, silicon substrate was a better substrate for the fabricating porous ZnO using ammonium hydroxide (NH_4OH) solution.