FABRICATION AND OPTIMIZATION OF CHLORIDE SENSOR BASED ON ZnO NANOSTRUCTURE

NUR AZYAN BINTI MOHAMAD ARIFIN

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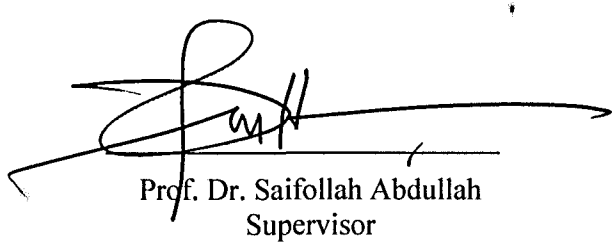
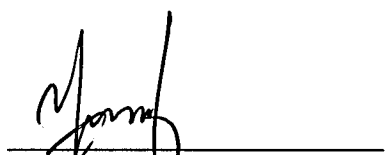
This Final Year Project Report entitled "**Fabrication And Optimization Of Chloride Sensor Based on ZnO Nanostructure**" was submitted by Nur Azyan Binti Mohamad Arifin, in partial fulfillment of the requirements for Degree of Bachelor of Science (Hons.) Industrial Physics, in the faculty of Applied Sciences, and was approved by

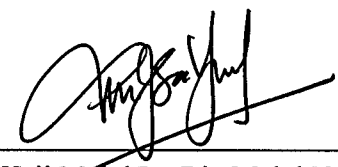


Prof. Dr. Saifollah Abdullah
Supervisor
NANO-SciTech Centre
Institude of Science
Faculty of Applied Science
Universiti Teknologi MARA
40450 Shah Alam
Selangor

Prof. Dr. Mohd Rusop Mahmood
Co-Supervisor
NANO-SciTech Centre
Institude of Science
Faculty of Electrical Engineering
Universiti Teknologi MARA
40450 Shah Alam
Selangor



Assoc. Prof. Md.Yusof Theeran
Project Coordinator
B. Sc. (Hons.) Industrial Physics
Faculty of Applied Sciences
Universiti Teknologi MARA
40450 Shah Alam
Selangor



Tn. Haji Mohd Isa Bin Mohd Yusof
Head of Programme
B. Sc. (Hons.) Industrial Physics
Faculty of Applied Sciences
Universiti Teknologi MARA
40450 shah Alam
Selangor

Date : 01 Febuary 2013

DECLARATION

I hereby declare that the final year project report is based on my original work except for quotation and citations, which have been duly, acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UiTM or other institutions.

Nur Azyan binti Mohamad Arifin

Date: 1st Febuary 2013

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ABSTRACT

The fabrication of chloride detector based on zinc oxide(ZnO) nanostructures which have a sensitivity toward a chlorine gas. Zinc oxide nanostructure can be grown with various method. In this experiment, ZnO nanostructure were grown by the catalytic immersion method using Zinc Nitrate Hexahydrate ($Zn(NO_3)_26H_2O$) as a precursors and Urea(CH_4N_2O) as a stabilizer in which growth on silicon substrate with phosporus layer as a catalyst with different molarity concentration has been taken in the molarity. The morphology of the zinc oxide nanostructures was characterized using field emission scanning electron microscope (FESEM) and photoluminescene (PL). The result on surface morphology and optical properties including UV emission are presented and discussed. Based on the result from zinc oxide nanostructures with the changing molarity concentration, it can be seen nanoflakes are formed with the highest energy band gap is 3.21 eV. The sample of 0.05 M shows it has the low molarity concentration where it is most sensitive to chlorine gas with 90 % of sensitivity revealed by the (I-V) measurement which have smaller size on nanostructures and higher energy band gap. Based on the results, these samples are categorized as the most sensitive sample of chlorine gas and it is proposed that lower concentrations are potential candidates for the chloride detector and optical devices.