

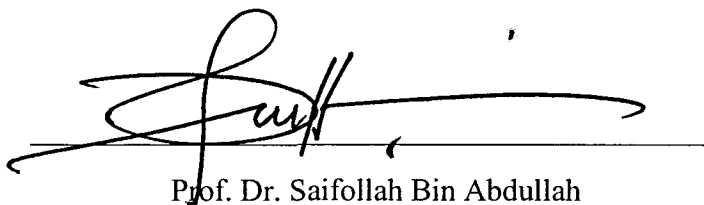
**THE STUDY AND OPTIMIZATION OF TITANIUM DIOXIDE (TiO₂)
NANOSTRUCTURES BY RF MAGNETRON SPUTTERING**

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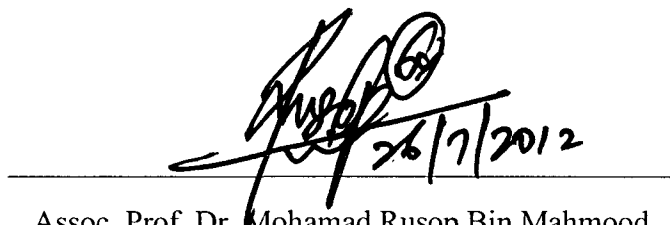
**Final Year Project Report Submitted
in Partial Fulfillment of the Requirements
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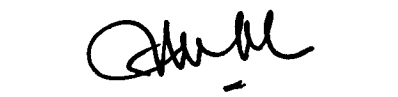
This Final Year Project entitled “The Study and Optimization of Titanium Dioxide (TiO₂) Nanostructures by RF Magnetron Sputtering” was submitted by Nur Amierah Binti Mohd Asib, in partial fulfillment of the requirements for the Degree of Bachelor of Sciences (Hons.) Physics, in the Faculty of Applied Sciences, and was approved by



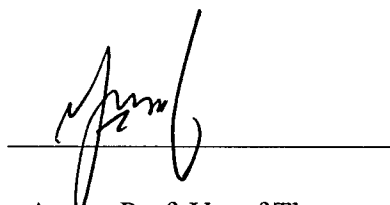
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ABSTRACT

THE STUDY AND OPTIMIZATION OF TITANIUM DIOXIDE (TiO₂) NANOSTRUCTURES BY RF MAGNETRON SPUTTERING

Radio Frequency (RF) magnetron sputtering is one of the method to produce Titanium dioxide (TiO₂) nanostructures. Where, mixture of argon and oxygen gas are used as the main sputtering to strike the solid target material which is pure TiO₂, to eject the atoms in the target material for deposition of TiO₂ nanostructures. Meanwhile, to study the optimization of TiO₂ nanostructures, it can be deposited by controlling the parameters of RF magnetron sputtering such as RF power and sputtering pressure. Then, the properties of TiO₂ nanostructures can be determined by using Atomic Force Microscope (AFM), Field Emission Scanning Electrons Microscope (FESEM) and Ultraviolet-visible Spectroscopy (UV-Vis).

For the samples of varies RF power, the optimum TiO₂ nanostructures was deposited at 200 W (P20). Where, the sample of P20 has the lowest surface roughness (0.166 nm) and the smallest TiO₂ size particles (36.3 nm) with the indirect optical band gap of 3.39 eV. While for the samples of varies RF pressure, the optimum TiO₂ nanostructures was deposited under working pressure of 11 mTorr (P11) which also has the lowest surface roughness (0.202 nm), the smallest TiO₂ size particles (24.1 nm) with the value of indirect optical band gap of 3.41 eV.

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENT	i
TABLE OF CONTENT	ii
LIST OF FIGURES	iv
LIST OF TABLES	viii
LIST OF ABBREVIATIONS	ix
ABSTRACT	x
ABSTRAK	xi
CHAPTER 1 INTRODUCTION	
1.1 Introduction	1
1.2 Problem Statement	3
1.3 Objectives	4
1.4 Significance of Study	4
CHAPTER 2 LITERATURE REVIEW	
2.1 Titanium dioxide	5
2.2 RF Magnetron Sputtering	8
CHAPTER 3 METHODOLOGY	
3.1 Preparation of Glass Substrate	17
3.2 Deposition of TiO ₂ Nanostructures	18
3.2.1 RF Magnetron Sputtering	18
3.2.2 Annealing Chamber	21
3.3 Characterization of TiO ₂ Nanostructures	22
3.3.1 Atomic Force Microscope (AFM)	22
3.3.2 Field Emission Scanning Electrons Microscope (FESEM)	22
3.3.3 Ultraviolet–Visible Spectroscopy (UV–Vis)	23