

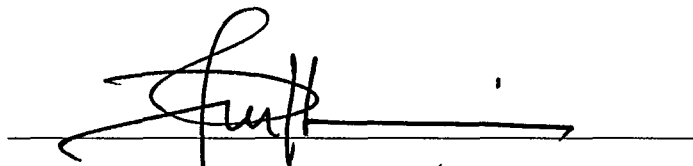
**PREPARATION AND CHARACTERIZATION
OF NANOHYBRID PMMA/TiO₂**

NOOR AADILA BINTI ABD AZIZ

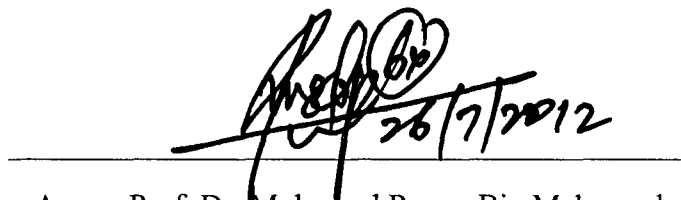
**Final Year Report Submitted in
Partial Fulfillment of the Requirement for the
Degree of Bachelor of Science (Hons.) Physics
in the Faculty of Applied Sciences
Universiti Teknologi MARA**

JULY 2012

This Final Year Project entitled “**Preparation and Characterization of Nanohybrid PMMA/TiO₂**” was submitted by Noor Aadila Binti Abd Aziz, 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



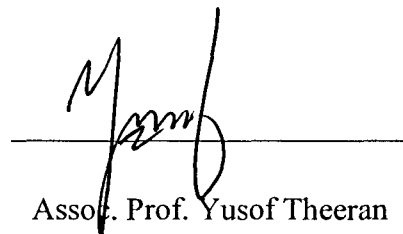
Prof. Dr. Saifollah Bin Abdullah
Supervisor
Faculty of Applied Sciences
Universiti Teknologi MARA
40450 Shah Alam
Selangor



Assoc. Prof. Dr. Mohamad Rusop Bin Mahmood
Co-Supervisor
Institute of Sciences
Universiti Teknologi MARA
40450 Shah Alam
Selangor



Assoc. Prof. Dr. Ab Malik Marwan Ali
Head of Programme
B. Sc. (Hons.) Physics
Faculty of Applied Sciences
Universiti Teknologi MARA
40450 Shah Alam



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

Date: 26 JULI 2012

TABLE OF CONTENTS

Title	Page
ACKNOWLEDGEMENTS	II
TABLE OF CONTENTS	III
LIST OF TABLES	V
LIST OF FIGURE	VI
LIST OF ABBREVIATIONS	IX
ABSTRACT	X
ABSTRAK	XI
CHAPTER 1: INTRODUCTION	
1.1 Introduction	1
1.2 Problem statements	3
1.3 Objectives	3
1.4 Significant of project	4
CHAPTER 2: LITERATURE REVIEW	
2.1 Titanium Dioxide (TiO ₂)	5
2.2 Properties of Titanium Dioxide (TiO ₂)	5
2.3 Titanium Dioxide (TiO ₂) nanoparticles	6
2.4 Poly (methyl methacrylate) (PMMA)	8
2.5 Properties of Poly (methyl methacrylate) (PMMA)	9
2.6 Titanium Dioxide (TiO ₂)/polymer hybrid	10
CHAPTER 3: METHODOLOGY	
3.1 Materials	13
3.1.1 Chemicals	13
3.1.2 Apparatus and instruments	13
3.2 Experimental	14
3.2.1 Preparation glass substrate	15
3.2.1.1 Cutting glass substrate	15
3.2.1.2 Cleaning glass substrate	15
3.2.2 Preparation TiO ₂ -PMMA sol	16
3.2.2.1 Preparation TiO ₂ by sol gel method	16
3.2.2.2 Preparation PMMA solution	17
3.2.2.3 Hybrid TiO ₂ with PMMA solution	17
3.2.3 Spin coating process	18
3.2.4 Drying process	19

ABSTRACT

PREPARATION AND CHARACTERIZATION OF NANOHYBRID PMMA/TiO₂

Titanium Dioxide (TiO₂) is the material with wide application due to its optical and electronic properties. Titanium dioxide nanoparticles were synthesized by the sol-gel method. Poly methyl methacrylate (PMMA) is one of the best organic optical materials, and has been widely used to make a variety of optical devices. Nanohybrid PMMA/TiO₂ are characterized by Field Emission Scanning Electron Microscope (FESEM), Atomic Force Microscope (AFM), Ultraviolet Visible Spectroscopy (UV-Vis) and Raman Spectroscopy.

CHAPTER 1

INTRODUCTION

1.1 General background

Most of the definitions of nanotechnology are the study and control of phenomena and materials at length scales below 100 nm and quite often they make a comparison with a human hair, which is about 80,000 nm wide. A size limitation of nanotechnology to the 1-100 nm range, the area where size-dependant quantum effects come to bear, would exclude numerous materials and devices, especially in the pharmaceutical area, and some experts caution against a rigid definition based on a sub-100 nm size. The most important requirement for the nanotechnology definition is that the nano-structure has special properties that are exclusively due to its nanoscale proportions. Nanotechnology today is basic research and development that is happening in laboratories all over the world. Nanotechnology products such as carbon nanotubes and nanocomposites structures that are on the market today are mostly gradually improved.

Hybrid have many branches of definitions such are biology, electrical power generations, electronics, film, vehicles and other uses such mythology, gemstone and so on. In the dictionary, the meaning hybrid is 'a mongrel' or 'a thing' that made from combining two different materials. In term of science, hybrid means something that is obtained by mixing different types of materials. The study of nanohybrid particles can provide important