

**STUDY ON THE EFFECT OF DOPING TIME OF MEH-PPV:I-MWNT
NANOCOMPOSITE FOR ORGANIC SOLAR CELL APPLICATION**

NOR AZIRA AKMA BT SHAARI

**Final Year Project Submitter in Partial Fulfillment of the Requirement for
the Degree of Bachelor of Electrical (Hons) Engineering (Electronics)
In the Faculty of Electrical Engineering
Universiti Technology MARA**

JULY 2013

ACKNOWLEDGEMENT

In the name of Allah, the Beneficent and the Merciful

This is such a humbling experience to be completing this work. I feel blessed and grateful. Lots of new experiences gained from this documentation.

First and foremost, I would like to acknowledge my main project supervisor Mr. Uzer Mohd Noor, my co-supervisor Puan Puteri Sarah Mohamad Saad and also my senior Miss Fazlina Zahid for all the support, encouragement, dedication and guidance from the beginning until the end. Without their opinions and suggestions, this project would be impossible to finish. To all my course mates, thanks for sharing all the knowledge and time together carrying out this project.

I also would like to thank the lab technicians, Mr. Suhaimi, Mr. Azwan and UiTM for allowing me to use the equipments prepared and the laboratory itself to do this research work. In my deepest gratitude, I have to thank my beloved family for the blessing and support even from far away. Finally not to be forgotten to anyone that contributed directly or indirectly to this reseach project. I am truthfully grateful to all of them and their willingness to help. God bless you.

Nor Azira Akma bt Shaari

ABSTRACT

The properties of nanocomposited MEH-PPV:I-MWNT thin film are reported by varying the time of doping of Iodine on multiwall carbon nanotubes (I-MWNT) in CVD (Chemical Vapor Deposition) to 15, 30, 60, 90 and 120 minutes. The iodine doping is known to change the electronic properties of carbon nanotubes. The multiwall nanotube was first annealed in oven for 30 minutes to ensure its graphitized structure is improved. The I-MWNT is then mixed with MEH-PPV solution then being sonicated for 1 hour. The yielded MEH-PPV:I-MWNT is being deposited on substrates by using spin coating technique. The characterization is to be done to investigate the optical, electrical and physical properties of the thin films. 15 minutes doping time is chosen as it exhibits the best conductivity, resistance and surface morphology.

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENT	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	vi
LIST OF FIGURES	vi
LIST OF ABBREVIATIONS	viii
ABSTRACT	ix
 CHAPTER 1: INTRODUCTION	
1.1 Background of Study	1
1.2 Problem Statement	3
1.3 Significant of Study	3
1.4 Objectives	4
1.5 Scope	4
 CHAPTER 2: LITERATURE REVIEW	
2.1 Organic Solar Cells	5
2.2 Carbon Nanotubes	6
2.2.1 Multiwall Nanotubes	7
2.3 MEH-PPV	8
2.4 Chemical Vapor Deposition	9
2.5 Iodine-Doped Multiwall Nanotubes	10
2.6 Tetrahydrofuran	11
 CHAPTER 3: METHODOLOGY	
3.1 Materials	12
3.2 Methods	13
3.2.1 Preparation of Substrates	
3.2.1.1 Glass	14
3.2.1.2 ITO	15
3.2.1.3 Silicon	17
3.2.2 Preparation of Solution	19
3.2.3 Doping Process	21
3.2.4 Metal contacts Preparation	25

CHAPTER 1

INTRODUCTION

1.1 Background of Study

Organic solar cells are known to be the most promising renewable energy sources for future sustainable ecosystem especially when the world is facing consequences from greenhouse effect. It is an essential component of the future global is by using photovoltaic to harvest solar energy. Solar cell has played an important part and went through a range of technological transformation process since the past twenty years [1]. Several studies shown that CNTs are the promising nanoelectric elements, it can outperform other conventional electric material [2]. They exhibit high mechanical strength, wide range of conductivities from insulating to conducting.