

# **Electrical and Optical Properties of Nanocomposited MEH-PPV: CNTs Organic Solar Cell Thin Film**

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## ABSTRACT

This research focused on the electrical and optical properties of nanocomposited MEH-PPV: CNTs organic solar cell thin film with different composition ratio of CNTs. The project are focusing on adding 0 wt%, 1 wt%, 2 wt%, 3 wt% and 4 wt% of the CNTs in order to observe the effect on it. The toluene been used as solution to dissolve the MEH-PPV and CNTs. The thin film was deposited on 2cm x 2cm glass substrate by using spin coating technique. The electrical properties characterize been done by using two point probe solar simulator to measured the current-voltage characteristic. The optical properties of the thin film were characterized using UV-VIS/NIR spectrophotometer to observe the absorption and transmittance characteristic. The current-voltage was measure in two condition, which is in dark and illumination condition. The highest value of conductivity among the 5 concentration is at 4wt% concentration of CNTs with  $0.02738 \text{ Sm}^{-1}$ . The smaller optical band gap among the 5 concentration was recorded at 4wt% concentration of CNTs which is at 2.00eV.

**Keywords:** MEH-PPV, CNTs, nanocomposited MEHPPV: CNTs, Spin Coating

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# CHAPTER 1

## INTRODUCTION

### 1.1 ORGANIC SOLAR CELL

An organic solar cell is the cells that use organic compounds as electronic substance. It is also known as a branch of the electronics associated with the organic polymer. Organic solar cells must have a conductive material or a small organic molecule that is used as an absorption component to the light and as the electron conductive. The green technology that been produce while using organic compound. The advantages of the organic material is the low production cost, it can be large scale production and flexibility of organic material. Combination of polymer with the flexibility organic molecules, this makes it potentially lucrative for solar cell application. Molecular engineering like changing the length and functional group of polymer can change the energy gap, which allows chemical change in these materials. The optical absorption coefficient of organic molecules is high so a large amount of light can be absorbed with a small amount of materials. The main disadvantages associated with organic solar cells are the low efficiency, low stability and low strength compared to inorganic solar cells.

Green technology that been developed today is really rapidly grow. The advantages of organic materials is the low production costs, therefore it can be produced with a larger scale and the flexibility of an organic material itself. The combination of polymer with organic molecules would result in term of potentially lucrative an organic substance for the solar cell applications. Organic molecular elasticity and the ability to change form of functional groups will help increase the quality of a solar