PHOTOCONDUCTIVITY OF MEH-PPV/TiO_2 NANOCOMPOSITE THIN FILMS

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ABSTRACT

This paper investigates the photoconductivity of the MEH-PPV/TiO_2 nanocomposite thin films by varying the weight ratio of TiO_2 and was deposited on the glass substrates by using spin coating technique. The influence of the amount of TiO_2 in the nanocomposite heterojunctions and photoconductivity as prepared blends compared to the single component of MEH-PPV was characterized by using Voltage/Current (I-V) measurement in dark and under illumination, UV-VIS spectrophotometer and Field Emission Scanning Electron Microscopy (FESEM). For electrical properties measurements in dark and under illumination show that, the resistivity decreases and conductivity increases when the amount of TiO_2 increases. While for optical properties measurements shows the optical band gap increases when the amount of TiO_2 increases. The surface morphology images also shows that the MEH-PPV/TiO_2 particles uniformly shaped but there are some large clusters were observed between the surface nanostructures.

Keywords: MEH-PPV/TiO_2 nanocomposite, Current-Voltage measurement, Optical band gap, Surface Morphology.

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CHAPTER 1

INTRODUCTION

1.1 Overview of MEH-PPV

The organic composite that usually been used is conjugated polymers which are poly (p-phenylene vinylene) (PPV) and its derivatives have attracted a great deal of attention because of their particular structure and their highly interesting electroluminescent properties. However, this polymer is insoluble, intractable, and infusible and thus cannot be easily processed by conventional spin coating. One of the most recent study PPV derivatives is poly [2-methoxy, 5-(2'-ethyl-hexyloxy)-phenylenevinylene] (MEH-PPV) [1]. MEH-PPV polymer has been considered as one of the most potential conducting polymers for various optoelectronic applications such as organic light emitting diodes (OLED), sensors and organic solar cells because of its good environmental stability, easy conductivity control and cheap production in large quantities [2].

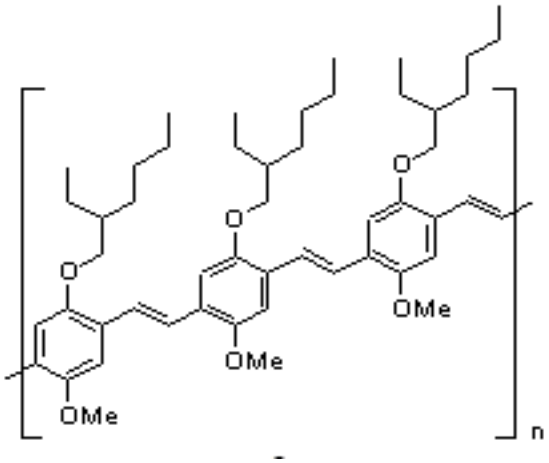

Figure 1.1: MEH-PPV molecule structure