

**THE STRUCTURAL, OPTICAL AND ELECTRICAL
PROPERTIES OF NANOCOMPOSITED
MEH-PPV: Nb DOPED TiO₂ THIN FILM**

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ABSTRACT

This report presents the synthesis and characterization of niobium doped TiO₂ nanoparticle prepared by sol-gel immerse heater method and the deposition of MEH-PPV: Nb doped TiO₂ nanoparticle. The mixed Nb-TiO₂ with MEH-PPV were deposited at 6 different parameter which is 0wt%, 5wt%, 10wt%, 15wt%, 20wt%, 25wt% by spin coating deposition method. Then the thin film was characterized by electrical and optical properties, and surface morphology. The current-voltage measurements show the relationship between conductivity and resistivity of the thin film. Degree of slope determines resistance and resistivity values. For electrical properties, it was found that the conductivity of nanocomposites MEH-PPV: Nb doped TiO₂ thin films increase as doping of Nb doped TiO₂ is increase but it also have the limit. The U-V VIS measurement used for transmittance, absorption and optical band gap energy as optical properties. But for structural properties we used the field emission scanning electron microscopy. The electrical, optical and structural properties of these films have been studied.

CHAPTER 1

INTRODUCTION

1.1 Background of Study

1.1.1 Solar Cell

Solar cell is a pn junction device with no voltage directly applied across the junction. The solar cell converts photon power into electrical power and delivers this power to a load. These devices have long been used for the power supply of satellites and space vehicles, and also as the power supply to some calculators. But it is different compare with organic solar cell. An organic solar cell or plastic solar cell is a type of polymer solar cell that uses *organic electronics*, a branch of electronics that deals with conductive organic polymers or small organic molecules, for light absorption and charge transport to produce electricity from sunlight by the photovoltaic effect.

Solar cells based on soluble conjugated polymers are of interest because they offer several advantages. Conjugated polymers can exhibit modulation in their electronic properties by molecular engineering, making cell processing easy leading to a low manufacturing cost. But compared to inorganic semiconductors, polymeric devices have low carrier mobilities