

**INVESTIGATION ON OPTICAL AND ELECTRICAL
PROPERTIES OF TIN OXIDE SnO_2 THIN FILM**

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ABSTRACT

Nowadays, in the field of power supply, industries are having a limited power source which traditionally comes from damn power generation. Research have been done to find suitable alternative energy power supply such as solar, wind, wave and nuclear. These generator already been develop but at a highly cost. Thus this project investigates and study on the characteristic of tin dioxide (SnO_2) in terms of electrical and optical properties. The objectives of this project are to study on the characteristic and imply to solar cell which has been monopoly by silicon material. This project manipulate the solution with 5 different molarity which are 0.125M, 0.25M, 0.5M, 0.7M and 0.9M in order to identify which molar is more efficient to use for solar cell. The materials that involve in this project are Tin oxide powder and absolute ethyl alcohol for solution preparation while aluminium for metal contact on top of SnO_2 thin film. Solution prepared using sol-gel method which combine powder and liquid to form a dilute solution. The solution was supply with heat and leaved spin to form a stable solution. The solution was spin coat to a glass substrate to form a transparent SnO_2 thin film. The coated thin film were then be baked in the oven at 450°C for 2 hours. The surface morphology obtains using FESEM change within different molarity. For a good solar cell material, it need to have a high absorbance as it require a highly absorption of light. Therefore, sample thin film 0.5M has the highest absorbance compare to the other 4 molarity sample with value of 0.100182 absorbance at 400nm wavelength.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

In this chapter, mainly a background of study or overview about the project will be described. Otherwise this chapter will state the problem statement and the objectives of this project. Besides that, it will also focus on the scope of the work, significant of the research and the organization of the report.

1.12 RESEARCH BACKGROUND

SnO_2 was widely used as sensor, especially gas sensor. SnO_2 thin films have been studied extensively due to their various applications, such as piezoelectric transducers, conductive gas sensors, display devices, transparent conductive electrodes, and solar cells [4–6]. There are various techniques used for preparation of SnO_2 thin films such as RF magnetron sputtering [7], Physical vapor deposition [8], Chemical vapour deposition (CVD) [9], spray pyrolysis [10] and sol–gel technique [11]. Among them sol–gel method especially associated to spin coating has received high attention because of the simple deposition procedure, easy control of chemical components and low-cost preparation to obtain high quality thin films. The sol-gel method involves many process parameters such as molar concentration of precursor, rotation speeds, pre and post heat treatment, stirring time and drying time, which directly or indirectly