

**EFFECT OF TIME ON FORMATION SILICON DIOXIDE LAYER  
AND CHARACTERIZATION**

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**Final Year Project Report Submitted in Partial Fulfillment of the  
Requirements for the Degree of Bachelor of Science (Hons.) Physics in the  
Faculty of Applied Sciences  
University Teknologi MARA**

**NOVEMBER 2008**

## ACKNOWLEDGEMENT

Alhamdulillah, praise be to Allah s.w.t, the All Mighty God who has given me the strength, ability and guidance in all the effort to complete this project paper. At this valuable opportunity, I would like to express our greatest gratitude to Miss Farah Liyana Binti Muhammad Khir and Mr. Azlan Zakaria for her and his guidance and constructive advice in preparing this project paper.

I also would like to thank to all people that have involved in this project for their cooperation and information given. I also would like to express my thanks to the students of AS 203, group ASB5HD for their ideas, information and guidance and assistance throughout the project. Without their support, it would be impossible for me to complete the project successfully.

Finally, this peace of work is dedicated to my families for their unwavering support and invaluable encouragement. Thank you.

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## ABSTRACT

Nowadays, Silicon Dioxide is very important for making integrated circuits and other devices. Its thickness also plays important role to characterize the device. Hence, this study is to investigate how the effect of time on the forming of the silicon dioxide layer. For this study, the silicon dioxide had formed by using dry thermal oxidation process. This process is useful to growth the silicon dioxide and its ability to produce more uniform and denser thermal oxide compared to the other process. Then, spectrophotometer had used to characterize the silicon dioxide layer. This tool examines the oxide thickness characterization (dependent variable) at different time intervals (independent variable). The hypotheses that had built for this project is the oxide thickness growth has linear relationship with time and also its growth have the uniform thickness. These hypotheses are actually based on the theory that related to this study. The result of this study shown that the oxide thickness had growth has linear relationship with time. This study also found that the silicon dioxide is not growth with uniformly.

## **CHAPTER 1**

### **INTRODUCTION**

#### **1.1 Background and problem statement**

Silicon is a metalloid, which is an element with properties of both metals and non-metals. It belongs to group IV element which is metal oxide along with germanium, tin, and lead in periodic tables. Silicon is about electropositive as tin, and is decidedly more positive than germanium or lead. Silicon dioxide does not conduct electricity. There are not any delocalized electrons. All the electrons are held tightly between the atoms, and are not free to move.

Controlling the quality (the desired thickness with no contaminant) of silicon dioxide layers is important in manufacturing the semiconductor devices. This is because the number of charge carriers is determined by the amount of impurities [1]. There are several techniques available to form a silicon dioxide layer; first, thermal oxidation; second, wet anodization; third, chemical vapor deposition; fourth, plasma oxidation. Of the four techniques, thermal oxidation tends to yield the cleanest oxide layer with the