EFFECT OF TIME ON FORMATION SILICON DIOXIDE LAYER AND CHARACTERIZATION

AZLIZA BINTI ALI YUSUF

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University Teknology MARA

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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 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, as and 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 formation 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