STUDY ON THE EFFECT OF OXYGEN GAS PRESSURE ON OXIDE THICKNESS IN WET OXIDATION PROCESS

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ABSTRACT

Wafer manufacturing normally starts out with a thermal oxidation, followed by a device isolation process. Thermal oxidation is the module that makes the so-called silicon planar process possible. During thermal oxidation, silicon is consumed from the wafer and incorporated in the growing oxide. The thickness of silicon consumed is 0.46 times the thickness of SiO_2 formed either for dry or wet oxidation.

In this study, wet oxidation was used. The relation between oxygen pressure and thickness was determined which is the pressure vary from 9 SLM to 13 SLM. From the theory, it says when pressure increasing, it will affect the thickness of wafer. Five wafers for each type of wafer orientation was used in this study to determine the result and proved the theory.

In this project, the wafer was studied by using different pressure of oxygen but the oxidation temperature was fixed. The thickness of wafer for both p-type and n-type was calculated and analyzed by using Filmetric. In other to determine the effect of the pressure to the thickness, it was determined based on the results from calculation of thickness formed after wet oxidation process completed. So, the oxygen pressure affected the wafer thickness. Also, the wafer colour matching to the theory with the respective thickness.

CHAPTER 1

INTRODUCTION

1.1 Background of study

The first integrated circuits were created in the late 1950s in response to a demand from the military for miniaturized electronics to be used in missile control systems. At the time, transistors and printed circuit boards were the state of the art electronic technology. Although transistors made many new electronic applications possible, engineers were still unable to make a small enough packages for the large number of components and circuits required in complex devices like sophisticated control systems and handheld programmable calculators. Several companies were in competition to produce a breakthrough in miniaturized electronics, and their development efforts were so close that there is some question as to which company actually produced the first IC. In fact, when the integrated circuit was finally patented in 1959, the patent was awarded jointly to two individuals working separately at two different companies.