CORRELATION STUDY BETWEEN DOPING TECHNIQUES TOWARDS DIFFUSION RATE AND OXIDATION RATE

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ABSTRACT

This paper is to investigate correlation between doping technique towards diffusion rate and oxide growth rate. There are two types of doping technique that has been investigated such as Solid Source, SS and Spin on Dopant, SOD. Four inches wafers were used to investigate the effects of doping technique towards diffusion rate and oxidation rate. The resistivity of silicon substrate is measured by using 4-point probe while the oxide thickness is measured by an Ellipsometer. From this experiment, it can be concluded that diffusion rate of Solid Source is about 86% better than Spin on Dopand. While the oxide growth of Solid Source, SS is 3.6% better than Spin on Dopant.

Keywords– Solid Source (SS), Spin on Dopant (SOD), concentration, resistivity, diffusion, oxide thickness

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CHAPTER 1

INTRODUCTION

1.1 OBJECTIVES

The main objectives of this research are to determine the effect of doping techniques towards diffusion and oxidation rate, to measure the concentration and oxide thickness by using different types of dopant, and to investigate the effect of temperature towards diffusion and oxidation rate.

1.2 PROBLEM STATEMENT

Most important and critical part in device fabrication is the oxide layer. This layer will affect the device characteristic and its performance. The aim of this research is to investigate the effect of doping technique towards diffusion and oxidation rate at three different temperatures which are 900°C, 1000°C and 1050°C. Oxide thickness is depending on the diffusion rate, oxidation rate and the temperature applied. Ion implantation is commonly used as doping technique at industry but it has some disadvantage which it can damage the crystallographic of the silicon wafer.