THE EFFECTS OF UV LIGHT ON THE POLYMERIZATION OF PHOTORESIST

HUSNA AHMAD TARMIZI

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This Final Year Project Report entitled "**The effects of UV light on the polymerization of photoresist**" was submitted by Husna Binti Ahmad Tarmizi, in partial fulfillment of the requirement for the Degree of Bachelor of Science (Hons.) Industrial Physics, in the Faculty of Applied Sciences, and was approved by

Madam Aniszawati Azis
Supervisor
B.Sc. (Hons.) Industrial Physics
Faculty of Applied Sciences
Universiti Teknologi MARA
40450 Shah Alam
Selangor

PM Dr Md Yusof Bin Theeran
Project Coordinator
B.Sc. (Hons.) Industrial Physics
Faculty of Applied Sciences
Universiti Teknologi MARA
40450 Shah Alam
Selangor

PM Dr Mohd Salleh Bin Mohd Deni
Head School of Physics and Materials Studies
Faculty of Applied Sciences
Universiti Teknologi MARA
40450 Shah Alam
Selangor

Date: 20 JUL. 2012

TABLE OF CONTENTS

ABSTRACT

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In this study, the p-type and n-type silicon wafer is coated with positive photoresist. Both coating process is using spin on photoresist. The effects of UV light exposure and etching time is studied between thin and thick photoresist thickness on both type of silicon wafer. The photoresist thickness will be fixed using only 2.5ml volume liquid photoresist when the UV exposure time is varied at 5s, 10s, 15s, 20s, 25s, 30s, 35s, 40s, 45s and also 50s. The same applies when the photoresist thickness is fixed using only 5.0ml volume liquid photoresist, the same UV exposure time is varied. Other parameters that had been fixed are spin-coat speed and time; at 1000 rpm for 10 seconds in order to get uniform photoresist thickness throughout the wafer surface. After photoresist coating process and UV exposure via Wafer Photoresist Module (WPM) and Aligner and Exposure respectively, the etching time or known as development time will be taken using stop watch. Data of polymerization or known as etching rate versus UV exposure time is plotted into graphs and had been compared between thin and thick photoresist and also different types of silicon wafer.

CHAPTER 1

INTRODUCTION

1.1 Background and Problem Statement

A good photolithography technology is the prerequisite for device manufacturing and technology migration since it enables circuit patterns to be transferred from masks to wafers. A photolithography process involves several steps which are divided into three blocks: pre exposure, exposure and post exposure. The key element of photolithography is the imaging step with an exposure system. With the exposure system, the mask pattern is imaged onto a resist-coated wafer surface as a latent image. The semiconductor industry cannot sail forward without photolithography technology. The capability or limitation of each technology node is essentially defined by photolithography. (Chue San Yoo, 2008) Photolithography is a process used in micro fabrication to selectively remove parts of a thin film or the bulk of a substrate. It uses light to transfer a geometric pattern from a photo mask to a light-sensitive chemical known as photo resist, or simply resist on the substrate. A series of chemical treatments then either engraves the exposure pattern into or