PREPARATION AND CHARACTERIZATIONS OF OXIDIZED NANOSTRUCTURED POROUS SILICON

NOORSHAFARINA BT ISHAK

BACHELOR OF SCIENCE (Hons.) PHYSICS

FACULTY OF APPLIED SCIENCES

UNIVERSITI TEKNOLOGI MARA

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NoorshafarinaBinti Ishak

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ABSTRACT

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The oxidized nanostructured porous silicon were produced from thermal oxidation of porous silicon sample which first prepared by electrochemical anodization using Teflon cell at current density, J = 20 mA/cm^2. The etching time was the parameter for the preparation of porous silicon and the oxidation time was kept constant for the preparation of oxidized porous silicon. It is revealed that lowest etching time for producing porous silicon is at 6 minutes and maximum oxidation level for oxidized porous silicon is at sample of time etching 10 minutes. The characterizations are using Photoluminescence Spectroscopy, Thickness Profiler, Energy Dispersive Analysis by X-Ray, Fourier Transform Infrared and also Field Emission Scanning Electron Microscopy.

CHAPTER 1

INTRODUCTION

1.0 Introduction

Technology nowadays has given uplift to the industry by the development of nanotechnology, by research and manufacturing of atomic structure and its application in lengths of 1 - 100 nanometers. To describe a nanometer (nm), it can be stated as simple as a nanometer can be measured as a billionth of a meter. For comparison, a single human hair is about 80,000 nm wide. The nanotechnology leaves us with application of microchips, biosensor, smart materials for construction and many more.

Nanostructure material such as porous silicon (PSi) has been widely studied for its excellent integrated optical properties. PSi is a silicon wafer that has been anodized or etched in a chemical solution that causes very small pores to be produced. The pores produced can be produced with different size and number thus, PSi can be very ideal as a sensor. The photoluminescence effect produced from PSi made it desirable for its optical properties and its small band gap causes many tries to manipulate its electrical properties.