

**PHOTOLUMINESCENCE STUDY OF ZnO ON POROUS SILICON
NANOSTRUCTURE**

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ABSTRACT

PHOTOLUMINESCENCE STUDY OF ZnO ON POROUS SILICON NANOSTRUCTURED

In this study, porous structures were formed on p-type of Si wafer by anodization in ethanoic solutions containing aqueous hydrofluoric acid. The parameter for PSi sample are fixed which are etching time and current density. ZnO deposited onto porous silicon substrates by sol-gel method were studied. The starting material of ZnO sol-gel was Zinc acetate. The room temperature photoluminescence (PL) and chemical properties of PSi before and after deposition of ZnO were investigated by using Photoluminescence spectroscopy and Fourier transforms infrared (FTIR) spectroscopy. As prepared PSi emit orange light. The peak position of PSi after deposition of ZnO shifted to blue with value is around 650 nm. Using the FTIR spectroscopy, we have observed O-H stretch mode for ZnO at 3350 cm^{-1} .

CHAPTER 1

INTRODUCTION

1.1 General Information

1.1.1 Silicon

Silicon is the chemical element in the periodic table has the symbol Si and atomic number 14. A tetravalent metalloid, silicon is less reactive than its chemical analog carbon. It is the second most abundant element in the earth's crust, making up 25.7% of it by weight. It occurs in clay, feldspar, granite, quartz and sand, mainly in the form of silicon oxide (also known as silica) and as silicates (various compounds containing silicon, Oxygen and one of other metal). Silicon is the principal component of most semiconductor devices and in the form of silica and silicates in glass, cement and ceramics. The largest of pure silicon (metallurgical grade silicon) is in aluminium silicon alloys or "light alloys" to produce cast parts, mainly for automotive industry (this represents about 55% of the world consumption of pure silicon.)

Silicon wafer is the processing of Silicon wafers to produce integrated circuits involves a good deal of chemistry and physics. In order to alter the surface