Thesis Titel	Study of The Luminescence Properties of Porous Silicon Layer
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ABSTRACT

This thesis presents research on structure and photoluminescence properties of a porous silicon performed at a room temperature. The porous silicon layer is formed by electrochemical etching reaction of silicon wafers in hydrofluoric solution which is called anodization. When the porous silicon was excited by 365 nm of ultraviolet light , the photoluminescence was observed. The experiment showed study of structure and photoluminescence properties of a porous silicon under various anodization conditions. Additionally , effect of temperature on photoluminescence was studied as well as stability of photoluminescence under variation of surrounding gases.

It is found that the varying one of anodization conditions such as increasing the resistivity of p-type silicon , decreasing the resistivity of n-type silicon , increasing the current density, decreasing the concentration of hydrofluoric solution or increasing the anodization time. It can decreases nanostructure and photoluminescence wavelength of porous silicon which attributed to the quantum size effect. The study on the effect of ambient temperature in the range from 300 to 20 K. It is found that the photoluminescence intensity increases with decreasing temperature. In addition , the study on the effect of ultraviolet illumination and various ambient gases such as nitrogen , oxygen , air and vaccum. It is found that ultraviolet illumination to porous silicon for a long time causes decrement in its photoluminescence intensity. The photoluminescence intensity decreases rapidly when porous silicon is illuminated in oxygen gas. This experiment supports that the photoluminescence of porous silicon occurs from radiative recombination of carriers at surface of nanoporous silicon. Finally , The porous silicon was applied to be optoelectronic device such as a porous silicon photodetector , which can response to visible light.