

# Study of Photoluminescence Spectra of the Low-Temperature Growth ZnO Thin Films

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## ABSTRACT

The epitaxial growth ZnO films were deposited on Si substrates by rf magnetron sputtering with substrate temperature below 300 °C. The growth of thin films was performed at a pressure of 40 mtorr Ar and O<sub>2</sub> with a sputtering power of 100 W. The deposited samples were put into a quartz tube furnace to anneal with various atmospheric. The crystallinity and crystal direction of the ZnO films were investigated by the X-ray diffractometry. Scanning electron microscopy (SEM) was utilized to study the surface morphology of the ZnO films. The photoluminescence (PL) spectra of the deposited films were measured to analyze the band gaps. In this thesis, the gap states of the ZnO films grown on different condition were explored. According to the experimental results, the strongest UV emission intensity was obtained at the sample with 900 °C post-annealing in the nitrogen, and the strongest green emission intensity was obtained at the sample with 900 °C post-annealing in the oxygen ambient.

Keywords : ZnO thin film、bandgap、photoluminescence、PL、anneal

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