

**P09****✓ Properties of Strain in GaN Layer Grown on Si (100) Substrate  
and Its Porous Structure****S. N. Waheeda<sup>1</sup>, N. Zainal<sup>1</sup>, Z Hassan<sup>1</sup>, R. E. L. Powell<sup>2</sup>, A. V. Akimov<sup>2</sup>, A. J. Kent<sup>2</sup>****<sup>1</sup>Institute of Nano Optoelectronics Research and Technology (INOR), School of Physics  
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We report an investigation of strain effects in GaN layer grown on a Si (100) substrate. From temperature dependent PL measurements, it was found that the strain may influence the value of the binding energy of donors and acceptors in the GaN layer. Estimation based on Raman spectroscopy measurements showed that the stress level in the GaN layer about 0.07 GPa. The coherency of the GaN layer was confirmed through reciprocal space mapping (RSM) measurement. Next, a series of x-ray diffraction (XRD) measurements revealed that the strain level in the GaN layer was around 0.0216 and -0.0241, along the c-axis and a-axis, respectively. In an attempt to minimize the strain effect, few micrometers of the GaN layer was fabricated into a porous structure with two types of preparation; 1) without annealing treatment and 2) with the annealing treatment at 800 °C prior to the etching. Our observations showed that the porous samples have smaller strain level, especially for the porous GaN/GaN sample with the annealing treatment. With proper etching conditions, better porous GaN sample can be produced to serve as a template for 'sinking' more strain and defects from overgrown layers.