

## **Optoelectronic properties of improved GaN semiconductor on Si (111) using growth approaches and different interlayer's**

### **ABSTRACT**

The crystalline quality of wider direct band gap semiconductor (3.4 eV) h-GaN epilayer grown on Si (111) is evaluated by different growth approaches and by using different interlayer's. The investigations of GaN epilayer crystal quality for the template of converted porous GaN layer formed by novel nitridation process of thin (2 and 0.5  $\mu\text{m}$ ) GaAs layer on Si (111) and on C<sup>+</sup> ion implanted very thin SiC layer formed on Si (111) and grown ambient effect are made. Epilayer grown on thinner non-isoelectronic converted SiC templates is found to broaden its PL line width whereas epilayer grown on porously converted GaN layer formed from iso- electronic GaAs (111) layer on Si (111) is found narrow line width. H<sub>2</sub> ambient grown film better crystalline quality and higher PL Ex. peak energy is found as compared to N<sub>2</sub> ambient grown film. Low temperature PL measurement, similarity between defect related donor-acceptor peaks (DAP) to defect related yellow band luminescence at the room temperature PL measurement is also found. Grown epilayer different characterization reveals better crystalline quality h-GaN is achieved by using thin isoelectronic GaAs interlayer on Si (111) with H<sub>2</sub> grown ambient.