RHEED Observation of c-GaN on 3C-SiC/Si(001) Template Grown by RF-MBE

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Cubic gallium nitiride, c-GaN, can be used to grow on a cubic substrate with a suitable latice constant for lattice matching. Cubic silicon carbide, 3C-SiC, which was formed by the carbonation of Si surface using a C_2H_2 jet nozzle[1], was used as a substrate for the epitaxial growth of c-GaN. The grown c-GaN layer was analyzed by reflection high energy electron diffraction (RHEED), electron microscopic techniques, and X-ray diffraction (XRD) techniques.

For the growth of the GaN layer, a specially designed RF-ECR type N radical source of 13.56 MHz was used to efficiently eliminate N ions and electrons from the surface [2]. The initial carbonization and initial growth of a LT buffer layer of c-GaN were monitored using RHEED during growth. The GaN was found to have the (2x2) surface structure. A GaN layer 1.5-mm thick grew epitaxially on the (001) face. The relative intensity ratio between cubic (002) and hexagonal(h) (10-11) XRD peaks from the GaN was 0.95:0.05.

[1] Kikuchi T., et. al, *J. Crystal Growth,* 2005, **275***, in press*. [2] Ohachi T., et. al., *J. Crystal Growth*, 2005, **275**, *in press*.

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