Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Properties of Bulk GaN Crystals grown from the Solution[1]

MADHU MURTHY, George Mason University, Fairfax, VA, JAIME A. FREITAS JR., MICHEAL A. MASTRO, RACHEL M. FRAZIER, Naval Research Laboratory, Washington DC, BORIS N. FEIGELSON, Naval Research Laboratory, Washington DC & SAIC, Washington DC — We investigated the structural and optical properties of bulk GaN single crystal grown from solution at temperatures $< 900°C$ and a pressure of ~ 0.3Mpa [1] on HVPE substrates. The X-ray diffraction peaks measured on both Ga- and N-face of the epitaxial film are 34.561 and 34.612 *arc-sec*, respectively, which are two orders of magnitude lower than the substrate. The photoluminescence measurements performed on both faces of the sample, showed a dominant intense emission near 3.47 eV, which is assigned to recombination process involving shallow impurities and excitons [2]. Two additional bands observed at 3.25 eV and 2.25 eV are assigned to donor-acceptor recombination process and the yellow band, respectively. The relative decrease of these bands intensities suggests a reduction of the concentration of defects incorporated in the epitaxial film, as compared with the substrate. These variations are consistent with different incorporation rate of point defects at different crystal surface polarity. [1] B.N. Feigelson, et al., J. Cryst. Growth, 281 (2005) 5. [2] M. Murthy, et al., J. Cryst. Growth, 305 (2007) 393.

[1]This work was partially supported by the Office of Naval Research. M. Murthy is supported by NSF Award # ECS-0330226.

Madhu Murthy
George Mason University, Fairfax, VA

Date submitted: 04 Dec 2007 Electronic form version 1.4