Materials Research Science and Engineering Center

2009 Summer Seminar Series

UNIVERSITY OF NEBRASKA-LINCOLN

GaN-Based Semiconductor Nanostructures for Optoelectronic and Spintronic Applications

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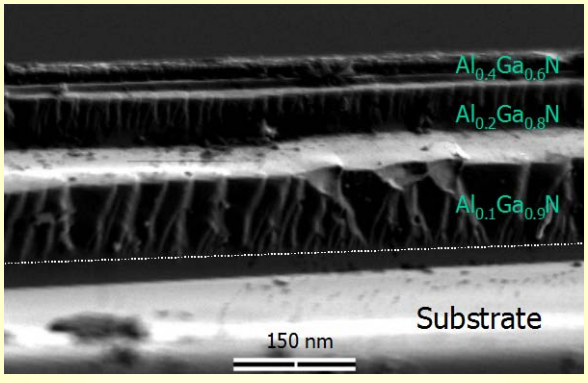
GaN is considered to be the most important semiconductor after silicon. It is widely used for the production of green, blue, UV, and white LEDs in full color displays, traffic lights, automotive lightings, and general room lighting using white LEDs. GaN-based systems also show promise for microwave and high power electronics intended for radar, satellite, wireless base stations and utility grid applications, and for a new class of spin transported electronics (spintronics) in which the spin of the charge carriers is exploited.

The talk will focus on the fabrication of quantum well structures of GaN/AlN system and the bandgap engineering (Fig.) of GaN-based semiconductor heterostructures on Al_2O_3 and Si substrates using plasma assisted molecular beam epitaxy (MBE). An attempt has been made to change the growth mechanism from 2D (film) to 3D (columnar) structures. Structural, microstructural, optoelectronic (photoluminescence, cathode luminescence, and x-ray photoelectron spectroscopy) and magnetotransport properties of the nanostructures will be discussed. The talk will also briefly cover fabrication of rare-earth doped GaN-based room temperature magnetic semiconductors and a new class of materials for spintronic applications.



Mutilayer AlGaN structures showing 3D columnar growth.

Friday, June 12, 2009
201 Brace Lab
1:30 p.m.

Host: Prof. Christian Binek

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