Using Q.266nm photoluminescence for characterizing nitride-based wide-bandgap materials and devices. Although there are many lasers currently available to characterize nitride based on wide-bandgap material, it is very important to use a proper laser for an accurate measurement. Nitride-based wide-bandgap material requires high-energy excitation to overcome QCE (Quantum Confinement Stark Effect) and band-tailing effects, especially in high-indium InGaN QWIs. Therefore, we used a high energy quick switched 266nm laser and compared the results with those of a pulsed 265nm laser.

Fabrication and electric characterization of transparent MOS-stacked epitaxial ZnO/AISTGaN film by pulsed laser deposition. In this work, we demonstrated the fabrication of epitaxial AlN(ZnO)/InGaN multiple quantum wells (MQW) films by pulsed laser deposition on transparent metal-oxide-semiconductor (MOS) on top of GaN. The films were characterized by photoluminescence and electron microscopy techniques. The results showed high-quality epitaxial growth and good optical properties.

Comparison of optical properties between GaN-on-patterned silicon and sapphire substrates. GaN thin films grown on silicon substrates showed better optical properties compared to GaN-on-sapphire substrates. The GaN-on-patterned silicon substrates showed lower defect densities and better crystalline quality.

The epitaxial relations of films were analyzed by x-ray phi-scan and pole figure measurements. Optical transmittance of resultant film in visible-spectral range showed over 85%. Charge accumulation-depletion behaviors of the films were characterized by C-V measurement. It may also be possible to serve signal from MOS-C and to restore information to MOS-C. Finally, TMOS can help us understand the switching phenomena in GaN-based MMRF.

+Authors to whom correspondence should be addressed: e-mail: cacs@unist.ac.kr.

This work was supported by grant No. R01-2003-00010027-0 from the Korea Science & Engineering Foundation.
band observed, the band edge emission at 3.4 eV correp-
sonding to the exciton recombination, and the blue one
around 2.8 eV, respectively. Blue luminescence is related
to the transition from free excitons in conduction band or
shallow donors to deep acceptor levels associated with in-
tinsic defects such as oxygen and hydrogenated gallium
vacancies. To compare the optical properties between ver-
tical and lateral overgrowth of GaN layer, micro-PL was
performed at different positions. This result shows that
the intensity of the near edge band emission that comes from
lateral overgrowth is higher than that of vertical overgrowth.
We also observed that the peak of the blue
luminescence on lateral overgrown region nearby dis-
appeared, but PL spectra of vertical overgrowth included
the blue band as well as the near edge band. We con-
clude that enhancement of optical properties on lateral
overgrowth of GaN layers results from decrease of dis-
location density.

Exciton-localization effect in quaternary AlGaN epilayer
KMD Jeong-Ch, KWON Min-Ki, PARK Il-Kyu, KIM Ja-Eun, HA Ga, YOUNG Chang-Gyu, Institute of Science and Technology, Department of Materials Science and Engineering.) AlGaN alloys have an attention for efficient ultra-violet (UV) light-emitting
sources due to an excitonic-localization effect. Therefore, it is important to investigate the exciton-localization effect in
quaternary AlGaN alloys. In this study, we investigated the excition-localization effect in quaternary AlGaN epilayers
which were grown by metalorganic chemical vapor
deposition (MOCVD). High resolution x-ray diffraction
(HXRD) was performed to measure the composition and
structural quality of the quaternary AlGaN epilayers. The temperature-dependent photoluminescence peak shift showed
so-called S-shape variation which typically appears in the
InGaN alloy resulting from exciton-localization effect. And the degree of exciton-localization in the AlGaN epilayers
was measured from the bandtail model. The de-
gree of exciton-localization effect was closely related to
the alloy composition in the quaternary AlGaN epilayer and
cured a significant effect on the UV LED.

Exciton-localization effect in quaternary AlGaN epilayer

Multilayer stacking heterojunction InGaN/GaN
P2.98-93 Exciton-localization effect in quaternary AlGaN epilayer: KMD Jeong-Ch, KWON Min-Ki, PARK Il-Kyu, KIM Ja-Eun, HA Ga, YOUNG Chang-Gyu, Institute of Science and Technology, Department of Materials Science and Engineering.) AlGaN alloys have an attention for efficient ultra-violet (UV) light-emitting sources due to an excitonic-localization effect. Therefore, it is important to investigate the exciton-localization effect in quaternary AlGaN alloys. In this study, we investigated the exciton-localization effect in quaternary AlGaN epilayers which were grown by metalorganic chemical vapor deposition (MOCVD). High resolution x-ray diffraction (HRXRD) was performed to measure the composition and structural quality of the quaternary AlGaN epilayers. The temperature-dependent photoluminescence peak shift showed so-called S-shape variation which typically appears in the InGaN alloy resulting from exciton-localization effect. And the degree of exciton-localization in the AlGaN epilayers was measured from the bandtail model. The degree of exciton-localization effect was closely related to the alloy composition in the quaternary AlGaN epilayer and cured a significant effect on the UV LED.

K2-98-93 Exciton-localization effect in quaternary AlGaN epilayer

K2-98-94 Multilayer stacking heterojunction InGaN/GaN epilayer: KMD Jeong-Ch, KWON Min-Ki, PARK Il-Kyu, KIM Ja-Eun, HA Ga, YOUNG Chang-Gyu, Institute of Science and Technology, Department of Materials Science and Engineering.) AlGaN alloys have an attention for efficient ultra-violet (UV) light-emitting sources due to an excitonic-localization effect. Therefore, it is important to investigate the exciton-localization effect in quaternary AlGaN alloys. In this study, we investigated the exciton-localization effect in quaternary AlGaN epilayers which were grown by metalorganic chemical vapor deposition (MOCVD). High resolution x-ray diffraction (HRXRD) was performed to measure the composition and structural quality of the quaternary AlGaN epilayers. The temperature-dependent photoluminescence peak shift showed so-called S-shape variation which typically appears in the InGaN alloy resulting from exciton-localization effect. And the degree of exciton-localization in the AlGaN epilayers was measured from the bandtail model. The degree of exciton-localization effect was closely related to the alloy composition in the quaternary AlGaN epilayer and cured a significant effect on the UV LED.

Multilayer stacking heterojunction InGaN/GaN epilayer

K2-98-95 New Approach for the Extraction of Sub-band Structure from an Integrated Photodiode in Quantum Dot Structure
NAM Hyung-Gyu, SONG Jin-Deg, CHOI Won-Joo, YANG Hae Suk, CHO Yong-Hee, LEE Jong-Keun, JIN Kyoung-Hoon, Institute of Science and Technology, Department of Materials Science and Engineering.) AlGaN alloys have an attention for efficient ultra-violet (UV) light-emitting sources due to an excitonic-localization effect. Therefore, it is important to investigate the exciton-localization effect in quaternary AlGaN alloys. In this study, we investigated the exciton-localization effect in quaternary AlGaN epilayers which were grown by metalorganic chemical vapor deposition (MOCVD). High resolution x-ray diffraction (HRXRD) was performed to measure the composition and structural quality of the quaternary AlGaN epilayers. The temperature-dependent photoluminescence peak shift showed so-called S-shape variation which typically appears in the InGaN alloy resulting from exciton-localization effect. And the degree of exciton-localization in the AlGaN epilayers was measured from the bandtail model. The degree of exciton-localization effect was closely related to the alloy composition in the quaternary AlGaN epilayer and cured a significant effect on the UV LED.

New Approach for the Extraction of Sub-band Structure from an Integrated Photodiode in Quantum Dot Structure

K2-98-96 New Approach for the Extraction of Sub-band Structure from an Integrated Photodiode in Quantum Dot Structure
NAM Hyung-Gyu, SONG Jin-Deg, CHOI Won-Joo, YANG Hae Suk, CHO Yong-Hee, LEE Jong-Keun, JIN Kyoung-Hoon, Institute of Science and Technology, Department of Materials Science and Engineering.) AlGaN alloys have an attention for efficient ultra-violet (UV) light-emitting sources due to an excitonic-localization effect. Therefore, it is important to investigate the exciton-localization effect in quaternary AlGaN alloys. In this study, we investigated the exciton-localization effect in quaternary AlGaN epilayers which were grown by metalorganic chemical vapor deposition (MOCVD). High resolution x-ray diffraction (HRXRD) was performed to measure the composition and structural quality of the quaternary AlGaN epilayers. The temperature-dependent photoluminescence peak shift showed so-called S-shape variation which typically appears in the InGaN alloy resulting from exciton-localization effect. And the degree of exciton-localization in the AlGaN epilayers was measured from the bandtail model. The degree of exciton-localization effect was closely related to the alloy composition in the quaternary AlGaN epilayer and cured a significant effect on the UV LED.

New Approach for the Extraction of Sub-band Structure from an Integrated Photodiode in Quantum Dot Structure