



SEMINAIRE EXCEPTIONNEL

(de 11 h à 12 h, salle Belledonne, IMEP, MINATEC,
ouvert aux chercheurs des autres laboratoires)

Vendredi 21 mai 2010

“Investigation of the Nanoscale Epitaxial Lateral Overgrowth Technique
for the Fabrication High-quality GaN-based LEDs”

by Charles SURYA

Abstract: A five-period GaN/InGaN multiple quantum wells (MQWs) were fabricated on nano-scale epitaxial lateral overgrown (NELO) layers by MOCVD technique using SiO₂ growth mask with nanometer-scale windows. The optoelectronic properties of the MQWs were characterized by detailed examination of the electroluminescence which indicated substantial improvement in the EL intensity. The improvement in the EL peak intensity is associated with a 15 nm blue shift in the EL peak wavelength for the NELO LEDs compared to the control devices which is attributed to stress relaxation at the GaN/InGaN MQWs leading to the reduction in the quantum confinement Stark effect. This is in agreement with the experimental results on the high-resolution X-ray diffraction (HXRD) characterization of the MQWs. Generation of defects within the MQWs due to hot-electron injection was investigated by detailed monitoring of the thermoreflectance and low-frequency fluctuations. The improvement in the hot-electron hardness of the structure is also attributed to the relaxation of strain in the MQWs.

Professor Charles Surya is a dean of the Department of Electronic and Information Engineering of the Hong Kong Polytechnic University, Hong Kong. His research interests lie mainly in the domain of electronics devices, their structure, technology, and static and noise properties. More recent studies of the team he directs at the Hong-Kong Polytechnics are focused on photoelectric properties of nano-scale III-V compounds devices.

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