T2-P013

Demonstration of Nonpolar a-plane Light Emitting Diodes on r-plane Sapphire Substrate by MOCVD

Ji-Su Son[1,2], Kwang-Hyeon Baik[1], Hooyoung Song[1], Ji Hoon Kim[1], Tae-Geun Kim[2], Sung-Min Hwang[1]*

[1]Energy-nano Center, Korea Electronics Technology Institute, Gyeonggi-do 463-816, Korea,
[2]Department of Electronic Engineering, Korea University, Anam-dong, Seoul 136-713, Korea

High crystalline nonpolar a-plane (11-20) nitride light emitting diodes (LEDs) have been fabricated on r-plane (1-102) sapphire substrates by metalorganic chemical-vapor deposition (MOCVD). The multi-quantum wells (MQWs) active region is consists of 4 periods the nonpolar a-plane InGaN/GaN (a-InGaN/GaN) on a high quality a-plane GaN (a-GaN) template grown by using the multibuffer layer technique. The full widths at half maximum (FWHMs) of x-ray rocking curve (XRC) obtained from phiscan of the specimen that was grown up to nonpolar a-plane GaN LED layers with double crystal x-ray diffraction. The FWHM values were decreased down to 477 arc sec for 0° and 505 arc sec for -90°, respectively. After fabricating a conventional lateral LED chip which size was 300 x 600 μm^2, we measured the optical output power by on-wafer measurements. N-electrode was made with Cr/Au contact, and ITO on p-GaN was formed with Ohmic contact using Ni/Au followed by inductively coupled plasma etching for mesa isolation. The optical output power of 1.08 mW was obtained at drive current of 20 mA with the peak emission wavelength of 502 nm.

Keywords: nonpolar LED