

GaN 기반 LED구조의 *p*-GaN층 성장온도에 따른 광학적, 결정학적 특성 평가

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Optical and microstructural behaviors in the GaN-based LEDs structures with the *p*-GaN layers grown at different growth temperatures

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Abstract : Blue light emitting diode structures consisting of the InGaN/GaN multiple quantum wells were grown by metalorganic chemical vapor deposition at different growth temperatures for the *p*-GaN contact layers and the influence of growth temperature on the emission and microstructural properties was investigated. The I-V and electroluminescence measurements showed that the sample with a *p*-GaN layer grown at 1084 °C had a lower electrical turn-on voltage and series resistance, and enhanced output power despite the low photoluminescence intensity. Transmission electron microscopy (TEM) revealed that the intense electroluminescence was due to the formation of a *p*-GaN layer with an even distribution of Mg dopants, which was confirmed by TEM image contrast and strain evaluations. These results suggest that the growth temperature should be optimized carefully to ensure the homogeneous distribution of Mg as well as the total Mg contents in the growth of the *p*-type layer.

Key Words : *p*-GaN, LEDs, Mg doping