

カソードルミネッセンスによる InGaN/GaN 多重量子殻に関する評価

Cathodoluminescence study on InGaN/GaN multiple quantum shell

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For the development of optical devices using core-shell GaN Nanowires (NWs), we propose a systematic characterization technique using cathodoluminescence (CL) and STEM. InGaN/GaN multiple quantum shell (MQS) structures were grown on GaN nanowires by MOVPE (Meijo Univ.). Five parts of MQS on different facets are distinguished and named as shown in figure 1 (a). The whole SE and CL imaging of NW (b) as well as the cross-sectional SE and CL imaging (c) revealed the variation of MQS luminescence in energy and positions. The *Top* MQS occasionally show emission. The *Neck* MQS do not show emission. The *Shoulder*, *Chest*, and *Body* MQS give intense but inhomogeneous emissions ranging from 2.8 – 3.2 eV. These origins are attributed to the variation of MQS structure depending on the facets as shown in the STEM image in (d). The variation of the MQS energies is originated in the MQS thickness and indium (In) concentration, while the inhomogeneity may be attributed to the roughness of MQS layers. The optimization of the emission from *Body* part is necessary to improve the performance of MQS-NW devices.

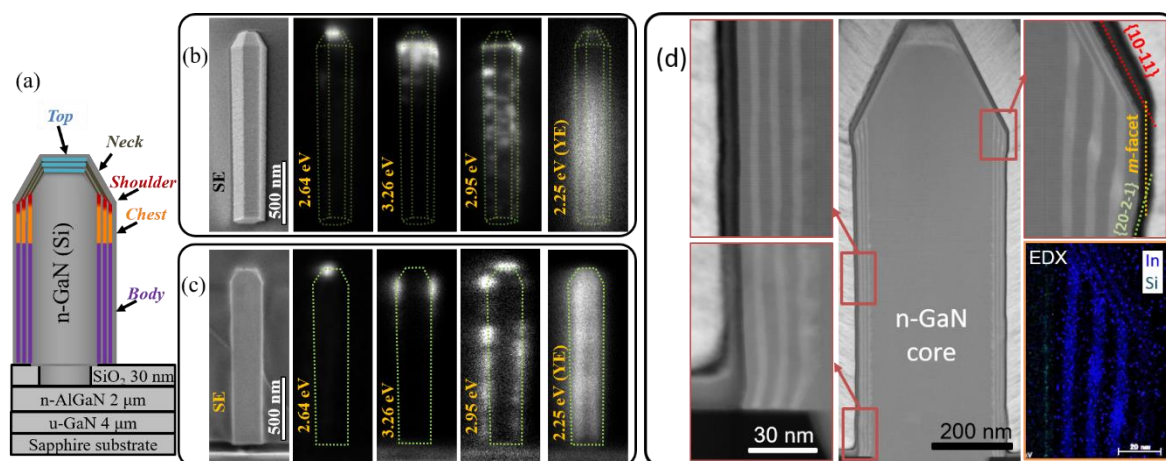


Figure. 1. (a) Sketch of a core-shell InGaN/GaN NW with layer substrate structure. Monochromatic CL mapping of full NW (b) and cross-sectional NW (c). (d) HAADF-STEM image and EDX mapping.

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