

課題番号 : F-14-NM-0054
 利用形態 : 技術代行
 利用課題名 (日本語) : GaN ナノワイヤーの位置調節選択成長と発光ダイオード応用
 Program Title (English) : GaN nanowire based multi-color LED
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1. 概要 (Summary)

This research will use multifaceted GaN nanowire arrays with InGaN/GaN multiple quantum wells (MQWs) anisotropically formed on the nanowire tip, slant, and sidewall facets for nonpolar based 3D-LED structure.

2. 実験 (Experimental)

【利用した主な装置】

- ・ FIB-SEM Dual Beam System

【実験方法】

- ・ Pulsed MOCVD growth technique

3. 結果と考察 (Results and Discussion)

The Ga-polar GaN nanowire based InGaN/GaN MQWs coaxial nanoarchitecture arrays were successfully grown by selective area MOCVD, and we investigated the structural properties of MQW coaxial nanoarrays by TEM measurements.

different growth rates of the oriented GaN planes. The average growth rate of the MQWs depended on the basal facet and decreased in the order (0002) polar > {1100} nonpolar > {1101} semipolar. The MQWs have a quantum-dot-like island structure on the c -plane. In addition, the MQWs on the {1101} semipolar plane could hardly be observed in the TEM images owing to the very low InGaN (QW) and GaN (QB) growth rates. On the other hand, the MQWs mostly grew uniformly on the entire nonpolar {1100} m -plane.

4. その他・特記事項 (Others)

Collaborators:

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5. 論文・学会発表 (Publication/Presentation)

- (1) *Jung et al.*, CrystEngComm, Vol. 16 (2014) pp. 2273-2282.
- (2) *Jung et al.*, ISGN-5th 平成 26 年 05 月 20 日 (発表日).
- (3) *Jung et al.*, 75th JSAP Autumn Meeting, 平成 26 年 09 月 19 日 (発表日).

6. 関連特許 (Patent)

なし

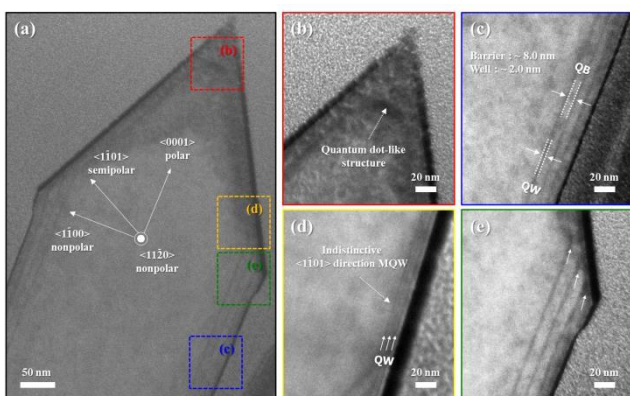


Fig 1. The TEM images of $In_xGa_{1-x}N/GaN$ MQWs on different facets of GaN nanowire.

According to the TEM cross-sectional investigation, the MQWs were formed anisotropically on GaN nanowires owing to the