

課題番号 : F-18-OS-0050  
利用形態 : 機器利用  
利用課題名(日本語) :  
Program Title (English) : Waveguide-coupled monolithically fabricated ZnO nanolaser  
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キーワード/Keyword : He-FIB, ZnO, nanogap, 形状・形態観察・分析

## 1. 概要(Summary)

To fabricate a few tens of nanometers subwavelength-structure, focus ion beam etching process has been well-developed. However, during the etching process of the Ga-based focus ion beam equipment, the contamination of Ga-doping results in a critical problem, especially for the optical property of the samples. Here we fabricated a tens-of-nanometers nanogap in a Al/ZnO plasmonic cavity by using Helium ion microscope. After the etching process, a 20-nm nanogap was fabricated successfully and the ZnO cavity shows the same photoluminescence intensity.

## 2. 実験(Experimental)

### 【利用した主な装置】

高精細集束イオンビーム装置  
(ZEISS ORION NanoFab)

### 【実験方法】

To observe the fabricated Al/ZnO nanocavity by Helium ion microscope (ZEISS ORION NanoFab) without ion contamination in ZnO. Then to fabricate a few tens of nanometers nanogap in the nanocavity by using the same ion microscope.

## 3. 結果と考察(Results and Discussion)

Figure 1: The nanogap is fabricated in a Al/ZnO cavity. The cavity width is about 200 nm, the cavity length is a few tens of micrometers, and the nanogap is less than 50 nm. Figure 2: The nanogap is fabricated and the cavity edges are polished. The cavity width after polishing is about 180 nm, and the nanogap is about 30 nm.

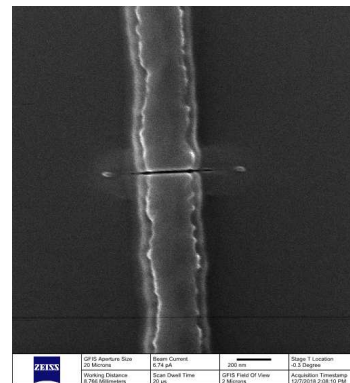


Figure 1: The nanogap fabricated in a Al/ZnO cavity.

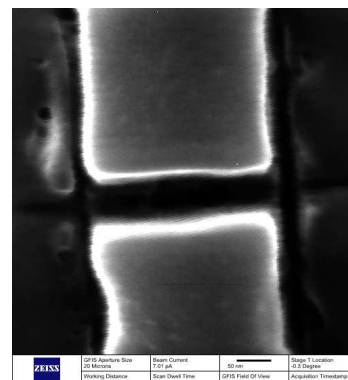


Figure 2: The nanogap fabricated in a Al/ZnO cavity after edges polishing.

## 4. その他・特記事項(Others)

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## 5. 論文・学会発表(Publication/Presentation)

なし。

## 6. 関連特許(Patent)

なし。