

課題番号 : F-18-UT-0129
利用形態 : 機器利用、技術補助
利用課題名(日本語) : グラフエンをを用いたシリコンフォトニクスの研究
Program Title (English) : Graphene-based Silicon Photonic Devices
利用者名(日本語) : ゴラン コバセビッチ¹⁾, 呉秉昌¹⁾, セット ジイヨン²⁾
Username (English) : Goran Kovasevic¹⁾, Bingchang Wu¹⁾, Sze Y. Set²⁾
所属名(日本語) : 1) 東京大学大学院電気系研究科, 2) 東京大学先端科学技術研究センター
Affiliation (English) : 1) The University of Tokyo, EEIS, 2) The University of Tokyo, RCAST
キーワード/Keyword : シリコンフォトニクス、光変調器、グラフエーン、リソグラフィ・露光・描画装置

1. 概要(Summary)

In Yamashita-Set Lab we are working on high speed on chip-optical devices, integrated with graphene. Final goal is the fabrication and testing of high speed graphene modulators and photodetectors on silicon waveguides.

2. 実験(Experiment)

【利用した主な装置】超高速大面積電子線描画装置

【実験方法】

In the Takeda cleanroom, we use F7000s e-beam machine and negative and positive resists to fabricate silicon waveguides and functional devices of sub-micron sizes. Figure 1 shows the optical image of the waveguide and Figure 2 shows the image of the resonate region.

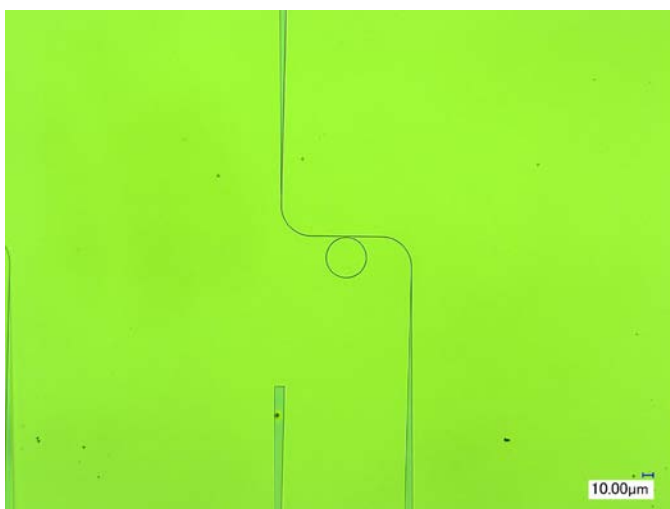


Figure 1 bus waveguide with micro-ring resonator

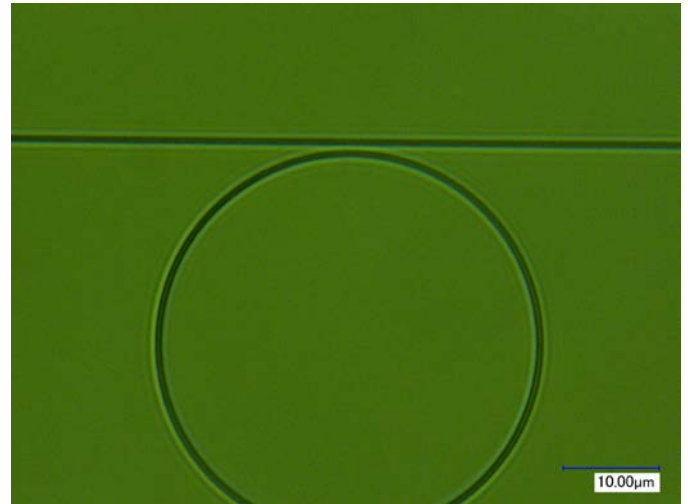


Figure 2 resonate part of fabricated devices

Both images have been taken using the optical microscope in the Takeda CR1.

The waveguides have been fabricated by using the DRIE etcher in the Takeda CR. The etching was conducting after e-beam exposure and resist development.

3. 結果と考察(Results and Discussion)

We are relatively new to the Takeda CR so for now we have only fabricated silicon waveguides. However, our future plan is to utilize the machines in the CR to build entire graphene-based devices.

4. 論文(Papers)

Kovacevic, G., Shirahata, T., Wu, B., Xiao, T. H., Jin, L., Inoue, T., & Yamashita, S. (2018, September). Patterned Graphene on SiN Waveguides with NPR for Fiber Laser Mode-Locking. In *Frontiers in Optics* (pp. FTu4B-2). Optical Society of America.

5. 論文・学会発表(Publication/Presentation)

なし

6. 関連特許(Patent)

なし