

課題番号 : F-15-IT-0024  
利用形態 : 技術代行  
利用課題名(日本語) :  
Program Title (English) : Waveguides fabrication on SOI  
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## 1. 概要(Summary)

Great efforts have been contributed to silicon photonics in academia during the past decade. Due to the promising low-power consumption and low-cost solution, various products based on silicon photonic technology have been announced in recent years. Assembly of the optical components is one of the key issues to achieve a complete photonic product. In this work, we fabricated samples such as edge couplers for optical components assembly test, aiming at the demonstration of optical components assembly technology.

## 2. 実験(Experimental)

### 【利用した主な装置】

電子ビーム露光装置、走査型電子顕微鏡、触針式段差計、リアクティブイオンエッチング装置、電子ビーム露光データ加工ソフトウェア

### 【実験方法】

Electron beam lithography and RIE facilities were used to fabricate Si waveguides and inverted Si tapers for optical mode conversion. The fabricated waveguide parameters were estimated by SEM images.

## 3. 結果と考察(Results and Discussion)

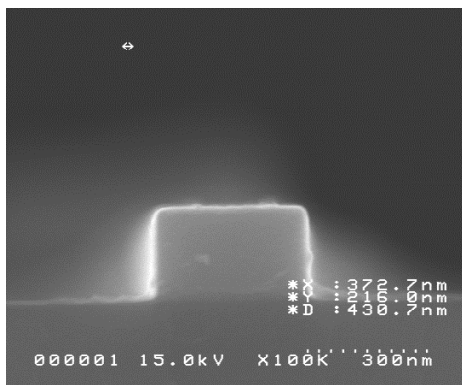


Fig. 1 SEM images of fabricated Si waveguide

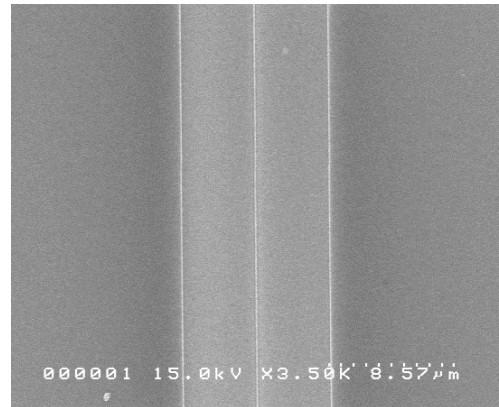


Fig. 2 SEM images of Si taper with typical tip width of 100 nm to 140 nm

Photonic chip to fiber coupling is important in the process of optical assembly. In this work we fabricated passive Si waveguides with mode converter to test the required coupling conditions. The typical microscopic structures of the fabricated waveguides and tapers are illustrated by Fig. 1 and Fig. 2. Our testing results indicate that due to the small mode field of conventional spot size converter, one micrometer of chip to fiber alignment precision is required to suppress the extra coupling loss to less than 1 dB.

## 4. その他・特記事項(Others)

We thank Professor Nobuhiko Nishiyama for the fabrication of the test samples.

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

なし。

## 6. 関連特許(Patent)

なし。