

課題番号 : F-16-IT-0003
利用形態 : 技術代行
利用課題名(日本語) :
Program Title (English) : Fabrication of silicon photonic waveguides for optical assembly test
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1. 概要(Summary)

Silicon Photonics is driving great attentions in both academia and industry recently. Due to the promising low-power consumption, low-cost and compact device size, silicon photonic technology have been applied in optical transceivers for data transmission. In this work, we fabricated samples such as edge couplers and evanescent wave 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 (スピンコータ・現像装置・ホットプレート・オープン・ドラフトチャンバ・電子ビーム露光データ加工ソフトウェア等を含む)、電子ビーム露光データ加工ソフトウェア、触針式段差計、リアクティブイオンエッチング装置

【実験方法】

Silicon waveguides and adiabatic mode converters were fabricated by electron beam lithography and RIE facilities. The fabricated waveguide parameters were estimated by SEM images.

3. 結果と考察(Results and Discussion)

Passive Si waveguides and adiabatic silicon structures were designed and fabricated to test the required coupling conditions. Figure 1 shows the typical microscopic structures of the fabricated waveguides. The fabricated 400 nm to 500 nm widths of silicon waveguide matches the single mode condition at c-band wavelength. Figure 2 is the microscope image of the sample for evanescent wave coupling.

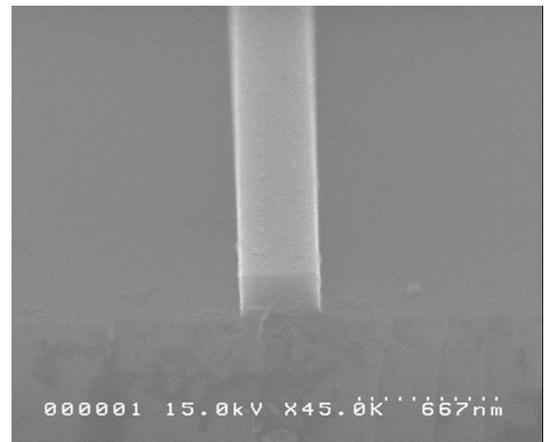


Fig. 1 SEM images of fabricated Si waveguide

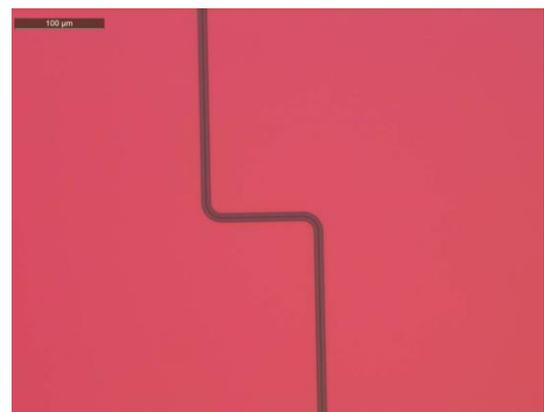


Fig. 2 Fabricated Si waveguide with adiabatic structures for evanescent wave coupling

The experimental results indicate that mode converting and optical I/O coupling loss can be reduced to less than 1.5 dB/facet by optimizing the adiabatic structures.

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。