

課題番号 : F-18-UT-0082
利用形態 : 機器利用、技術補助
利用課題名(日本語) :
Program Title (English) : Research on Photonic Integrated Circuits for OFDR sensing system
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キーワード / Keyword : OFDR, Photonic integrated circuit, interferometer

1. 概要(Summary)

The main goal of our research is to develop an interferometer based on integrated photonics circuit for Optical Frequency Domain Reflectometry (OFDR) sensing system in order to reduce size, weight and cost of current system.

In this work we designed and fabricated components of the interferometer such as Y-branches, mirrors, delay lines, directional couplers and Bragg gratings.

2. 実験(Experimental)

【利用した主な装置】 超高速大面積電子線描画装置, 汎用 ICP エッチング装置, 8 インチ汎用スパッタ装置, ステルスダイサー

【実験方法】

Design and simulation of interferometer components was performed using OptiFDTD software (Fig. 1). All components were fabricated on single 2x7 mm SOI chip (Fig. 2). In fabrication process we used ADVANTEST F7000S-VD02 for electron beam lithography, ULVAC CE-300I for etching, ULVAC SIH-450 for sputtering and DFL7340 for dicing.

3. 結果と考察(Results and Discussion)

We designed and fabricated a photonic integrated circuit containing 25 components for interferometer, including 3 designs of Y-branch, 5 designs of loop mirror, 5 designs of delay line, 4 designs of directional coupler, 3 designs of Michelson interferometer, 5 designs of Bragg grating.

As a next step all fabricated components will be tested in order to select best performing designs. After selection these components will be used in development of new interferometer for OFDR sensing system.

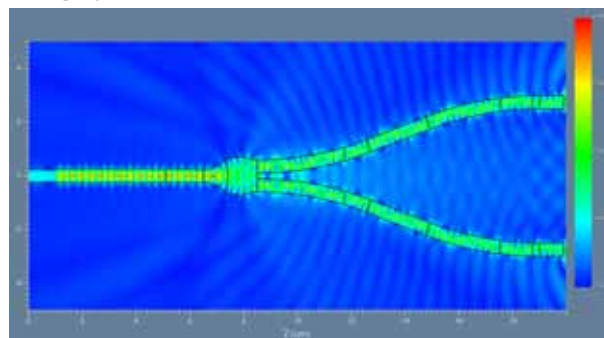


Figure. 1. Simulation of Y-branch in OptiFDTD.



Figure 2. Fabricated photonic integrated circuit with 25 components of interferometer.

4. その他・特記事項(Others)

We would like to acknowledge support of Assoc. Prof. Yoshio Mita, Dr. Akio Higo, Mr. Makoto Fujiwara and Dr. Eric Lebrasseur during design and fabrication of the sample.

5. 論文・学会発表(Publication/Presentation)

なし

6. 関連特許(Patent)

なし