

課題番号 : F-21-KT-0135
 利用形態 : 機器利用
 利用課題名(日本語) : ナノスケール共振器の作製および電気機械特性研究
 Program Title (English) : Fabrication and electromechanical study of nanoscale resonators
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1. 概要(Summary)

Nanomechanical resonator devices are potential candidates for building ultra-sensitive sensors of various physical quantities. Developing ultra-sensitive sensors based on nano-resonators for sensitive and selective sensing of gases is one of our major goals. To achieve high-sensitivity, the following two factors are necessary: (a) miniaturizing the device size, and (b) achieving high resonance quality factor. Therefore, we are taking advantage of high patterning resolution of electron beam lithography process to miniaturize our resonator devices down to nanometer scale. At the same time, we aim to reduce damping in the resonator to achieve a high resonance quality factor. Therefore, our research focuses on fabricating nano-mechanical device with unique designs and evaluating their electromechanical behavior.

2. 実験(Experimental)

【利用した主な装置】

レーザー直接描画装置、両面マスクアライナー装置、深堀りドライエッチング装置 2、高速高精度電子ビーム描画装置、マイクロシステムアナライザ

【実験方法】

Using lithography techniques (e.g., Laser, electron-beam writer, mask aligner exposure system, etc.) and precision etching tools (deep reactive ion etcher, etc.), such nano-scale electromechanical resonator devices were fabricated.

3. 結果と考察(Results and Discussion)

We have successfully fabricated micro-scale

resonator devices (Fig. 1) and measured their dynamic characteristics (such as, quality factor) successfully by electrical and optical means. Electrostatic actuation is used in both cases to induce vibration in the beam.

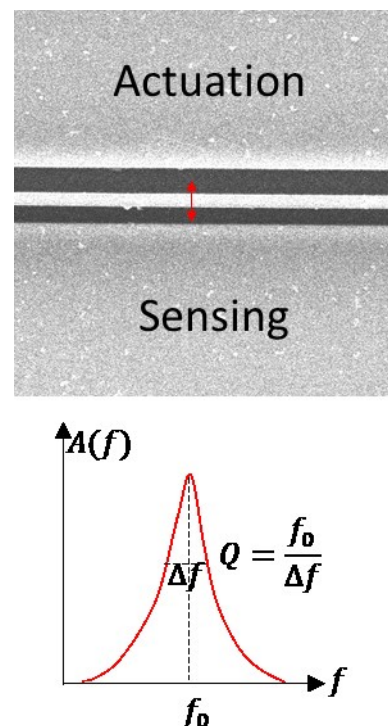


Fig. 1 Resonance vibration of a micro-resonator.

We are currently in the process of conducting similar measurements on nano-scale resonators.

4. その他・特記事項(Others)

なし。

5. 論文・学会発表(Publication/Presentation)

なし。

6. 関連特許(Patent)

なし。