課題番号 :F-21-TU-0066
利用形態 :機器利用
利用課題名（日本語） :
Program Title (English) :MEMS device technology development
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キーワード／Keyword :Si etching, force sensor, 膜加工・エッチング

1. 概要(Summary)

A new type of force sensor, based on stress impedance effect was prototyped. One important task in the fabrication is Si etching from the back side, almost trough the wafer (about 100 µm remain), without breaking the wafer. This etching process has been done successfully.

2. 実験(Experimental)

【Main equipment used】

Si-RIE (DeepRIE 装置#1)

【Experiment】

0.5 mm thin, 100 mm diameter wafer were etched until remaining thickness of about 0.1 mm, by using a standard Bosch process of MUC-21 equipment.

3. 結果と考察(Results and Discussion)

The etching succeeded without breaking the wafer, even though many patterns were etched. The force sensor could be prototyped successfully and tested.

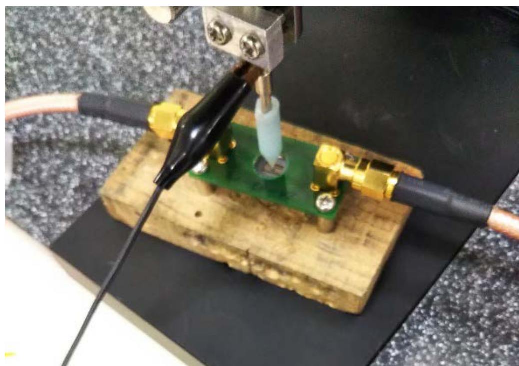
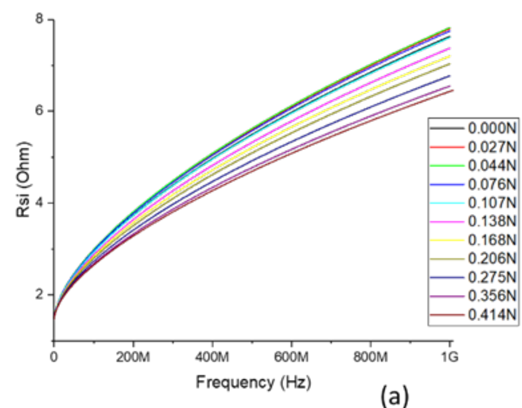


Fig. 1. Fabricated sensor prototype under testing



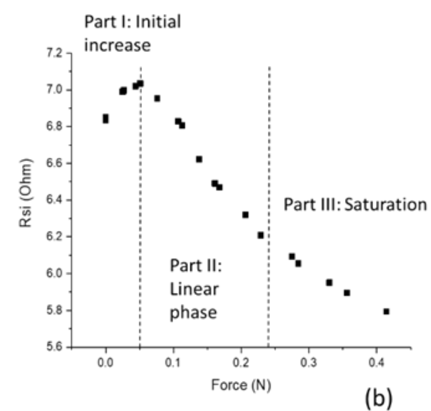


Fig. 2. (a) Extracted impedance of the force sensor vs. frequency at different force loads. (b) Impedance vs. applied force at 800 MHz measurement frequency.

4. その他・特記事項(Others)

なし。

5. 論文・学会発表(Publication/Presentation)

Froemel, J.; Diguet, G.; Muroyama, M., Micromechanical Force Sensor Using the Stress–Impedance Effect of Soft Magnetic FeCuNbSiB, Sensors 2021, 21, 7578.
https://doi.org/10.3390/s21227578

6. 関連特許(Patent)

なし。