

課題番号 : F-17-TU-0034
 利用形態 : 機器利用
 利用課題名(日本語) :
 Program Title(English) : IoT for Safety and Security
 利用者名(日本語) :
 Username(English) : L. Van Minh¹⁾, H. Kuwano^{1,2)}
 所属名(日本語) :
 Affiliation(English) : 1) New Industry Creation Hatchery Center (NICHe), Tohoku University
 2) Sendai Smart Machines, Co. Ltd.
 キーワード/Keyword : Energy harvesting, 成膜・膜堆積, film deposition, sputtering, glass etching

1. 概要(Summary)

For development of energy harvesters providing electrical power supply for wireless sensor nodes, it is crucial to establish cost-effective and batch manufacturing process. At this time, a part of our research, namely fabricating spacer structures and metal thin films for interconnection, was conducted by using facility equipment at Center for Integrated Nano Technology Support (CINTS), Tohoku University.

2. 実験(Experimental)

【利用した主な装置】

We mainly used the following facilities:

- (i) Sandblaster
- (ii) Sputtering

Sandblaster (Shinto Kogyo MB-1-ML; F-TU-043)

Metallization: Sputtering apparatus (Shibaura Mechatronics CFS-4ESII; F-TU-036)

Automatic Shibaura sputtering (Shibaura Mechatronics i-Miller CFS-4EP-LL; F-TU-075)

【実験方法-Experimental method】

We fabricated Tempax glass spacers with thickness of 500 μm . At first, clean glass substrates were prepared with a photoresist mask, MS7050, with thickness of 50 μm . Then, the samples were etched by a sand blaster with Al_2O_3 particles with 14 μm size. The conditions were scanning rate of 20 mm/s and the nozzle pressure of 0.25 MPa.

For metallization process, Au(200 nm)/Cr(10 nm) were deposited by a high vacuum sputter under the conditions of Ar ambient of 0.5 Pa, and RF power of

300 W.

3. 結果と考察(Results and Discussion)

Figure 1 shows the images of glass samples before and after sandblaster.

For metallic film deposition, we used a CCD camera microscope at our laboratory to observe the as-deposited surface. Au/Cr film surface images are shown in Fig. 2.

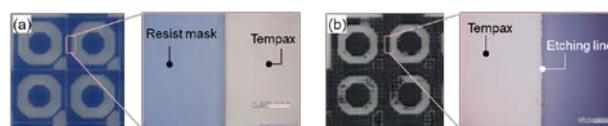


Fig. 1. Images of Tempax spacer before sand blaster with microscopic image of the resist mask (a), after sand blaster with CCD image of the etching line after cleaning (b).

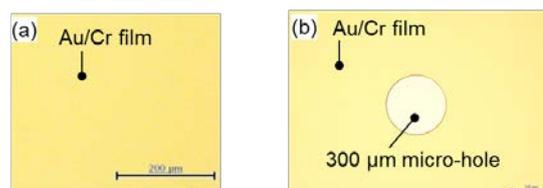


Fig. 2. CCD microscopic images of the Au/Cr as-deposited surface (a), after forming micro-hole (b).

4. その他・特記事項(Others)

なし

5. 論文・学会発表(Publication/Presentation)

- (1) L. Van Minh, S. Igarashi, and H. Kuwano, IEEE MEMS 2018, pp.624-627, 2018
- (2) H. H. Nguyen, L. Van Minh, H. Oguchi, and H. Kuwano, IEEE MEMS 2018, pp.222-225, 2018

6. 関連特許(Patent)

なし