

課題番号 : F-19-IT-0012  
 利用形態 : 機器利用  
 利用課題名(日本語) : 液中分散非球形粒子の分離用マイクロ流路デバイスの開発  
 Program Title(English) : Separation of non-spherical particles using a microfluidic device  
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## 1. 概要(Summary)

To fabricate a polydimethylsiloxane (PDMS) microfluidic device for separation of non-spherical particles, we fabricated an SU8 mold using the facilities in Tokyo Institute of Technology. Effect of dose on the fabrication of SU-8 mold was evaluated.

## 2. 実験(Experimental)

### 【利用した主な装置】

電子ビーム露光データ加工ソフトウェア

マスクレス露光装置

### 【実験方法】

The data of designed micropillar device was transformed for reading of maskless exposure system. The diameter of the pillar was set at 11.5  $\mu\text{m}$ . The size of gaps between the adjacent pillars was set at 3.5  $\mu\text{m}$  (Fig. 1)

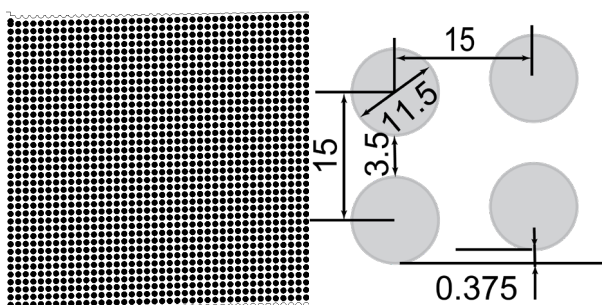


Fig. 1 Schematic illustration of a micropillar array.

Next, the negative photoresist SU8-3005 was coated on a silicon substrate and was exposed to UV light. Then, the SU8-3005 was coated on the substrate once again (thickness: 10  $\mu\text{m}$ ) and was exposed using the maskless exposure system with

different doses (400  $\text{mJ}/\text{cm}^2$ , 550  $\text{mJ}/\text{cm}^2$ , 1000  $\text{mJ}/\text{cm}^2$ ). After exposure, the substrate was baked at 95°C for 10 min and developed for 5 min.

## 3. 結果と考察(Results and Discussion)

The SU-8 mold was observed using an optical microscope equipped with a camera (Fig. 2). The gap sizes under different doses were 5.6  $\mu\text{m}$  (400  $\text{mJ}/\text{cm}^2$ ), 3.2  $\mu\text{m}$  (550  $\text{mJ}/\text{cm}^2$ ) and 2.7  $\mu\text{m}$  (1000  $\text{mJ}/\text{cm}^2$ ), respectively. As the dose increased, the gap size decreased. Therefore, to fabricate a device with gap size of 3.5  $\mu\text{m}$ , the optimal dose is expected to be slightly lower than 550  $\text{mJ}/\text{cm}^2$ . This would be examined further in the future.

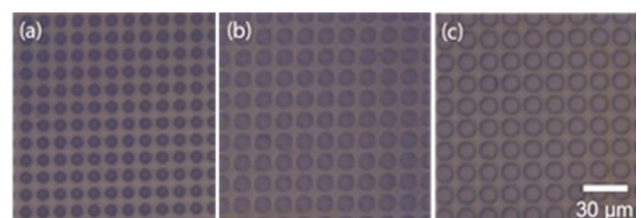


Fig. 2 Fabricated SU8 micro pattern with different doses, (a) 400  $\text{mJ}/\text{cm}^2$ , (b) 550  $\text{mJ}/\text{cm}^2$ , (c) 1000  $\text{mJ}/\text{cm}^2$ .

## 4. その他・特記事項(Others)

・技術支援者の河田様, 守田様に感謝致します。

## 5. 論文・学会発表(Publication/Presentation)

なし。

## 6. 関連特許(Patent)

なし。