

課題番号 : F-18-KT-0115  
利用形態 : 技術代行  
利用課題名(日本語) : バクテリア培養のためのマイクロ流路デバイスの作製  
Program Title(English) : Microfluidics and microbiology  
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キーワード/Keyword : Microfluidics, bacteria, biofilm, confinement, リソグラフィ・露光・描画装置

## 1. 概要(Summary)

Kyoto Univ.'s NanoHub has fabricated chrome masks to be used to produce the masters for microfluidic devices. With these chrome masks, I am able to trap bacteria in chambers with heights of 1  $\mu\text{m}$ . These devices are being used in experiments currently.

## 2. 実験(Experimental)

### 【利用した主な装置】

Laser pattern generator (A3), Photoresist Developer (A10), Wafer spin cleaner (A11)

### 【実験方法】

The photo mask was fabricated through following process :

- CAD data preparation
- Exposure : Laser pattern generator (A3)  
Data conversion / set photo-mask parameter
- Development : Photoresist Developer (A10)  
Developer : TMAH(tetra methyl ammonium hydroxide)2.38% / Development time : 60 seconds
- Cr wet etching : Manual treatment  
Etching time : 60 seconds
- Resist removal : Piranha treatment : Wafer spin cleaner (A11)

Acetone dipping was done before piranha treatment to remove almost all of the resist.

## 3. 結果と考察(Results and Discussion)

With the Kyoto U. chrome masks, I have generated SU-8 masters using photolithography. I successfully fabricated two-layer devices capable of trapping bacteria in a thin, quasi-“2D” chamber. Bacteria in this chamber grow normally and we can accurately

monitor their growth and spatial distribution as they divide and spread as shown in Fig. 1.

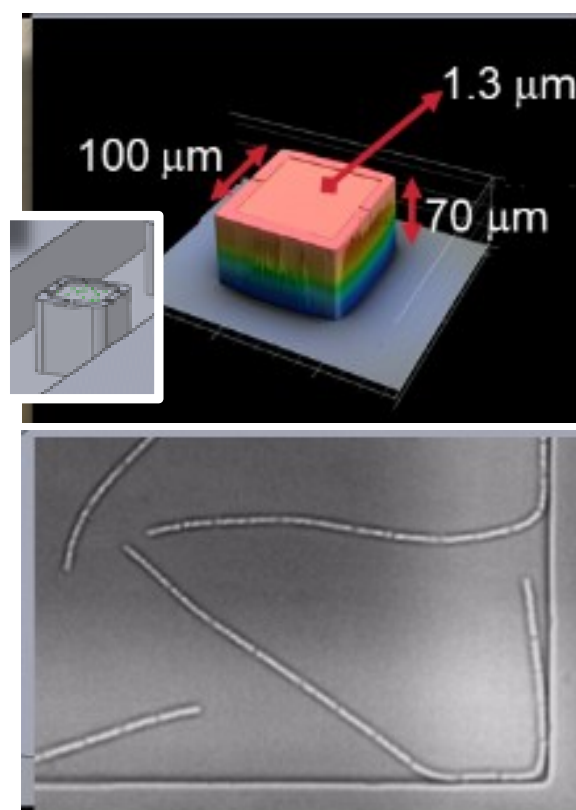


Fig 1 (upper) A 3D laser profilometer scan of the chambers fabricated via photolithography using the Chrome mask. (inset) A schematic of the device showing an idealized image of the channel containing the chambers. (lower) Bacteria growing in a PDMS device replicated from a mold fabricated at Univ. Tsukuba.

## 4. その他・特記事項(Others)

特になし。

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

なし。

## 6. 関連特許(Patent)

なし。