

ITP派遣報告

オランダ トゥエンテ大学

1月10日～3月17日

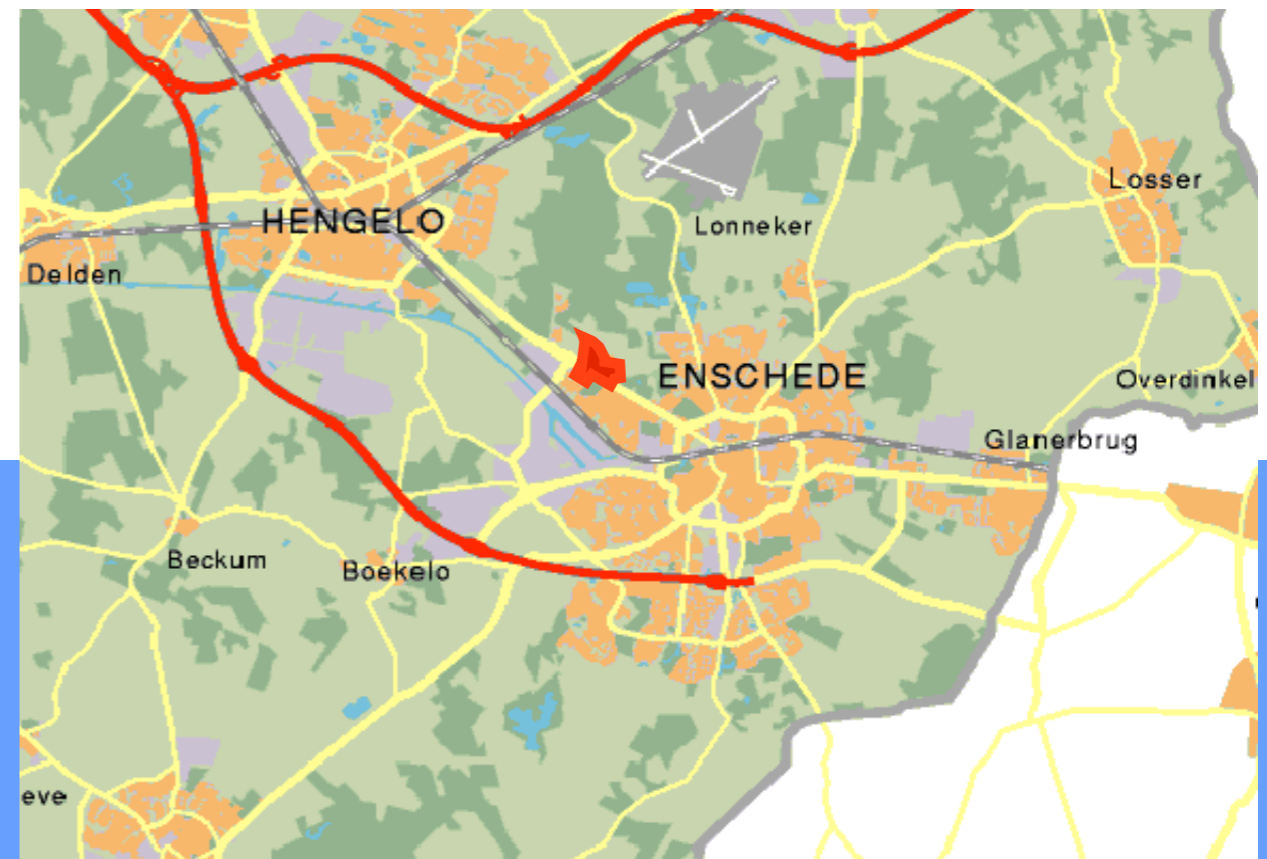


工学研究科化学・生物工学専攻
博士後期1年 内藤豊裕

University of Twente

創立：1961年

学生数：2680人(2008年)







University of Twente
Enschede - The Netherlands

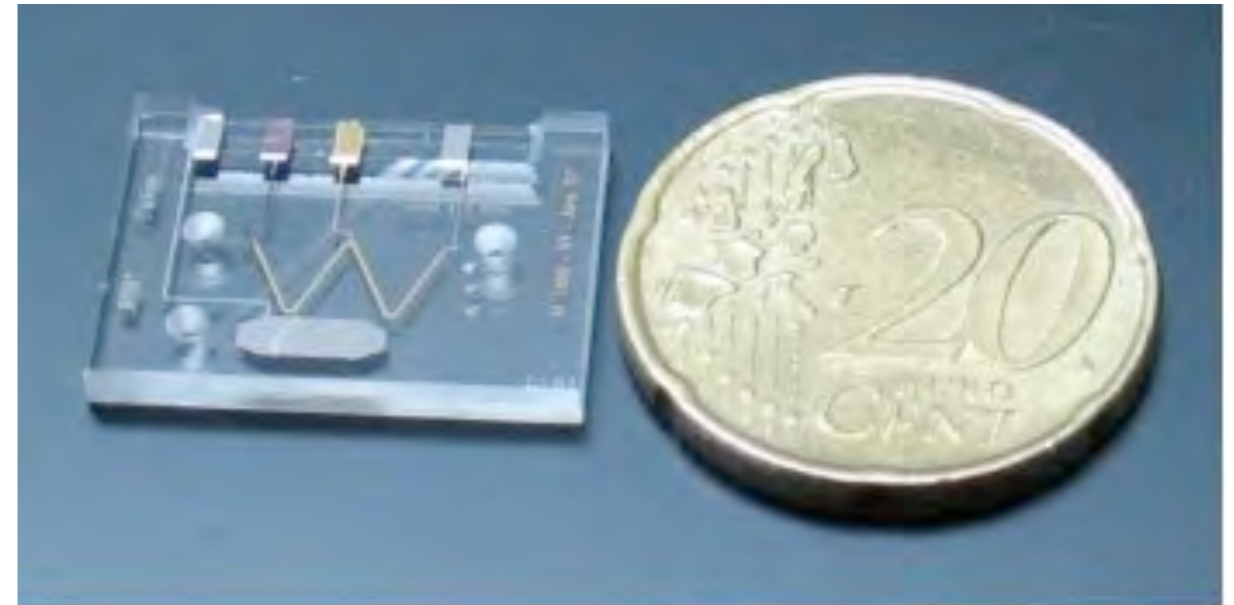
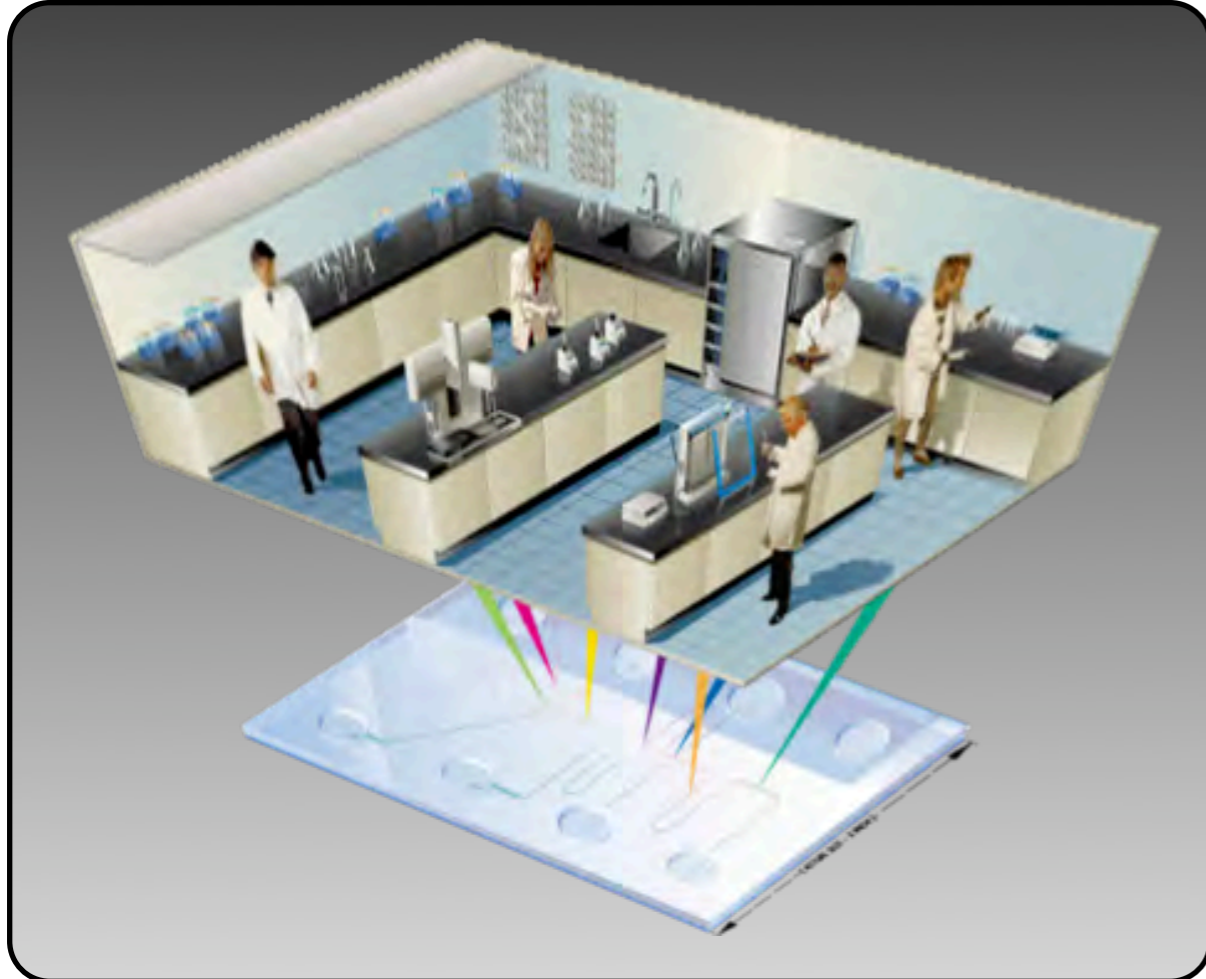
BIOS-The lab on a chip group

MESA+ Institute for Nanotechnology



Prof. Albert van den Berg

ナノ空間における流体特性の解析
異分野研究の融合
新規マイクロ・ナノ技術の開発
新規LOCデバイスの開発・評価



MESA+
Institute for Nanotechnology

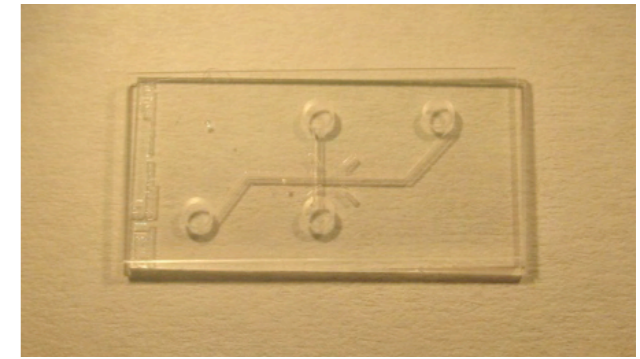
BIOS
lab on chip group



Dr. Séverine Le Gac

Assistant Professor

オンチップ細胞解析

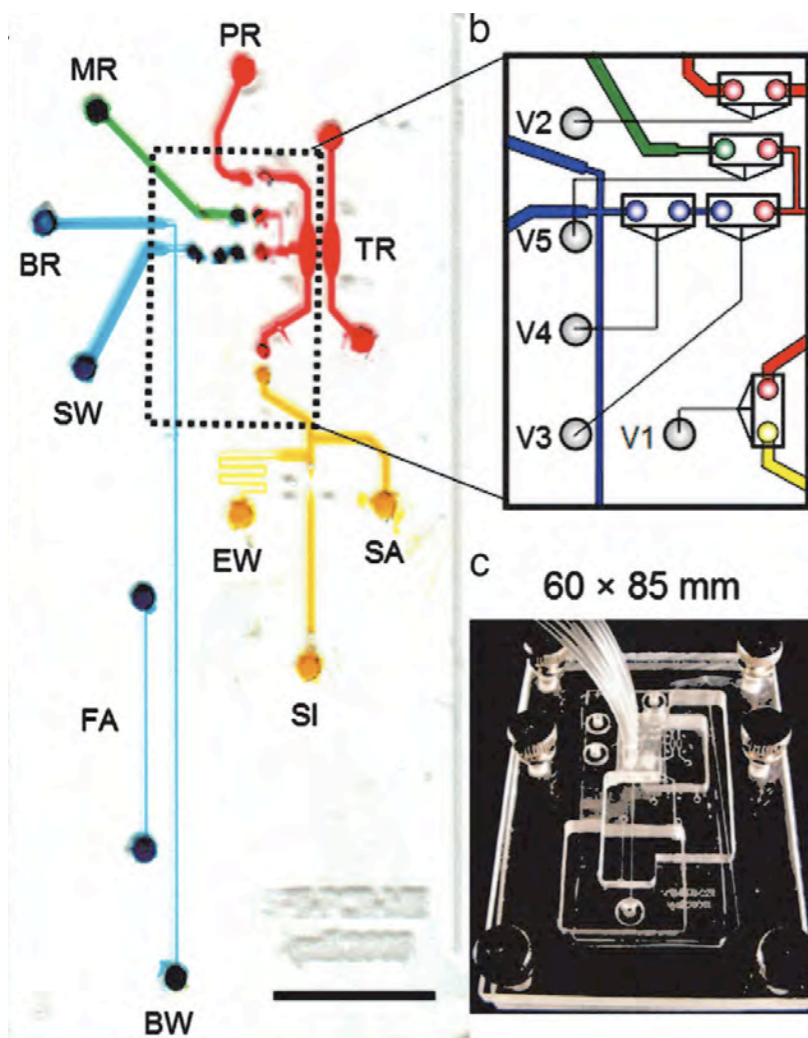


Rerngchai Arayanarakool

PhD. student

チップ上での神経科学研究

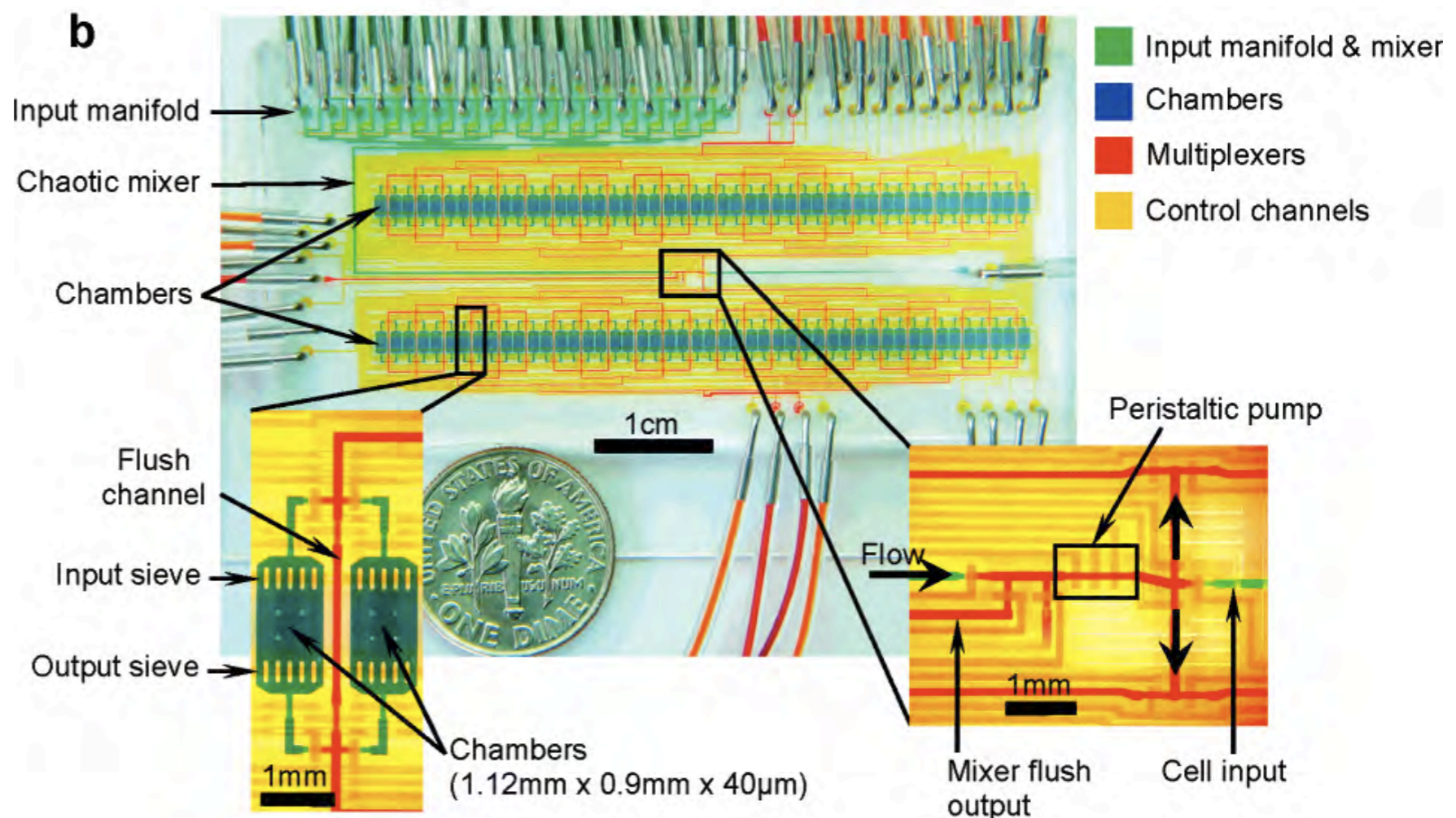
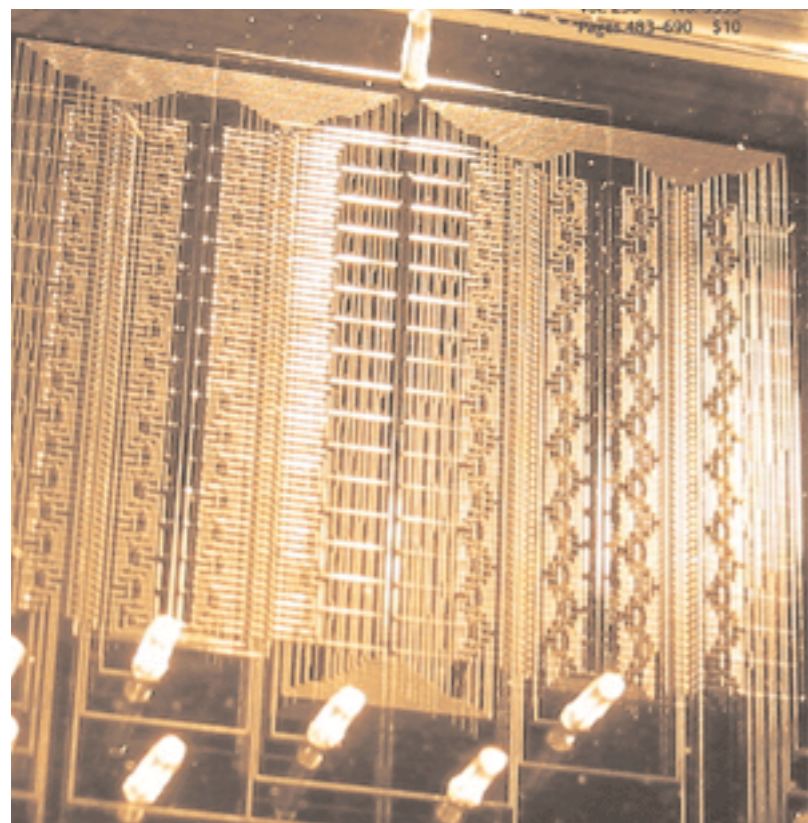




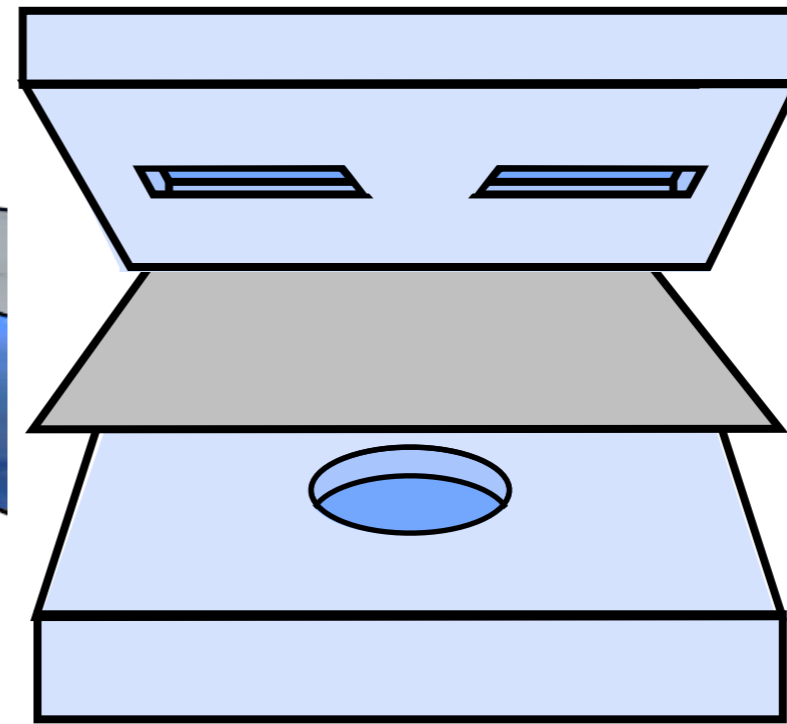
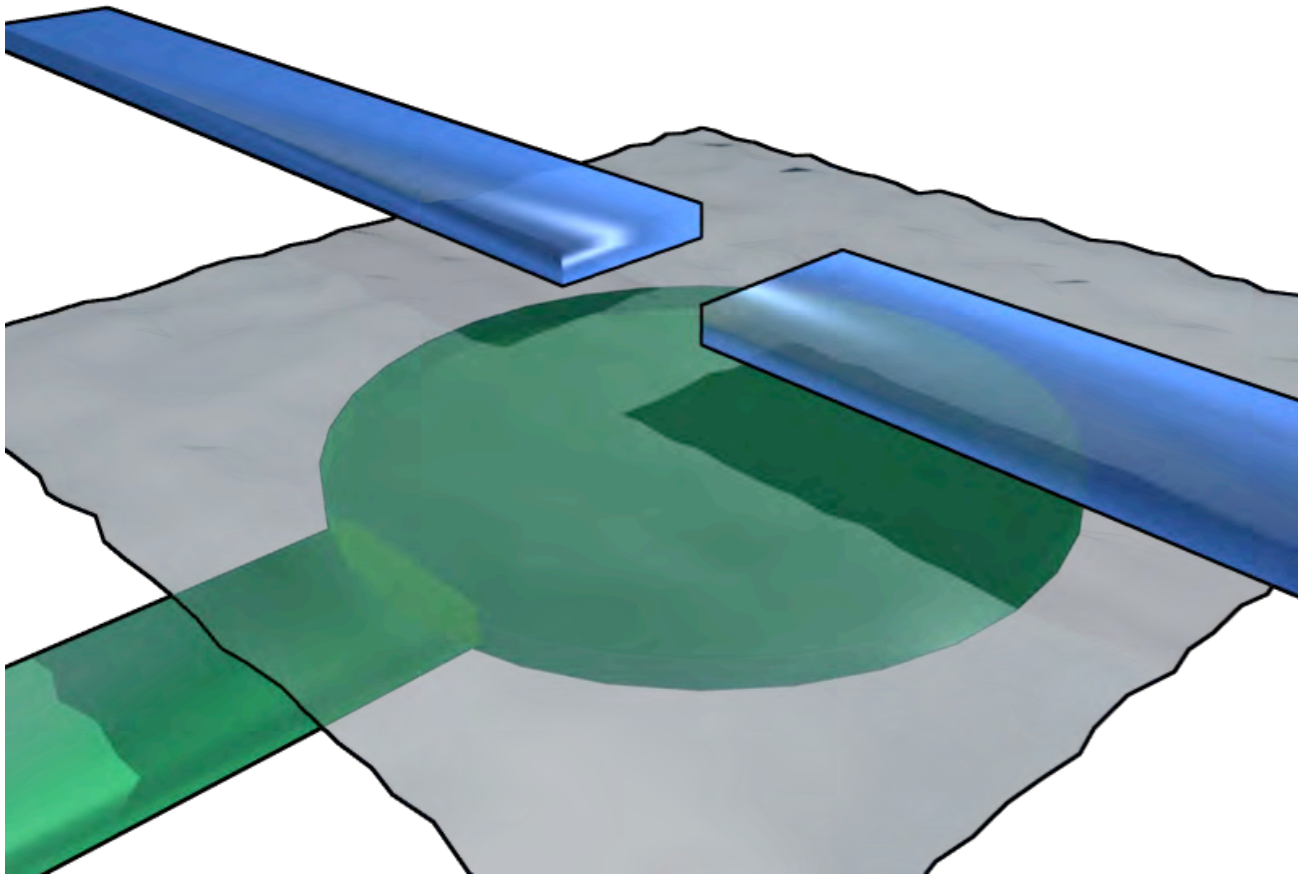
マイクロバルブ

複数の溶液を操作

各操作の統合



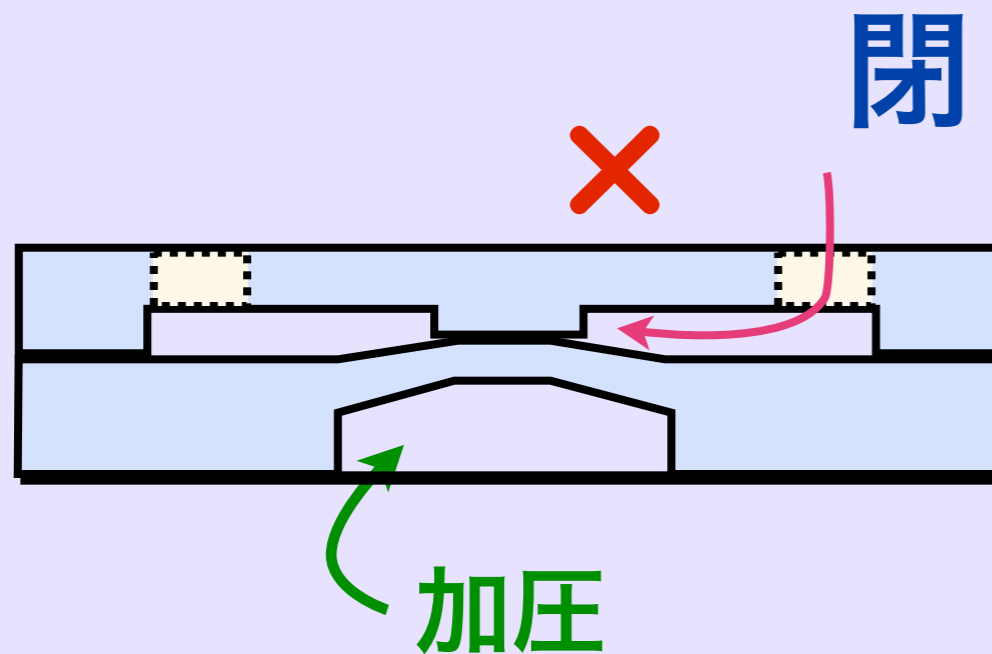
ダイヤフラム型ニューマティックバルブ



溶液導入用

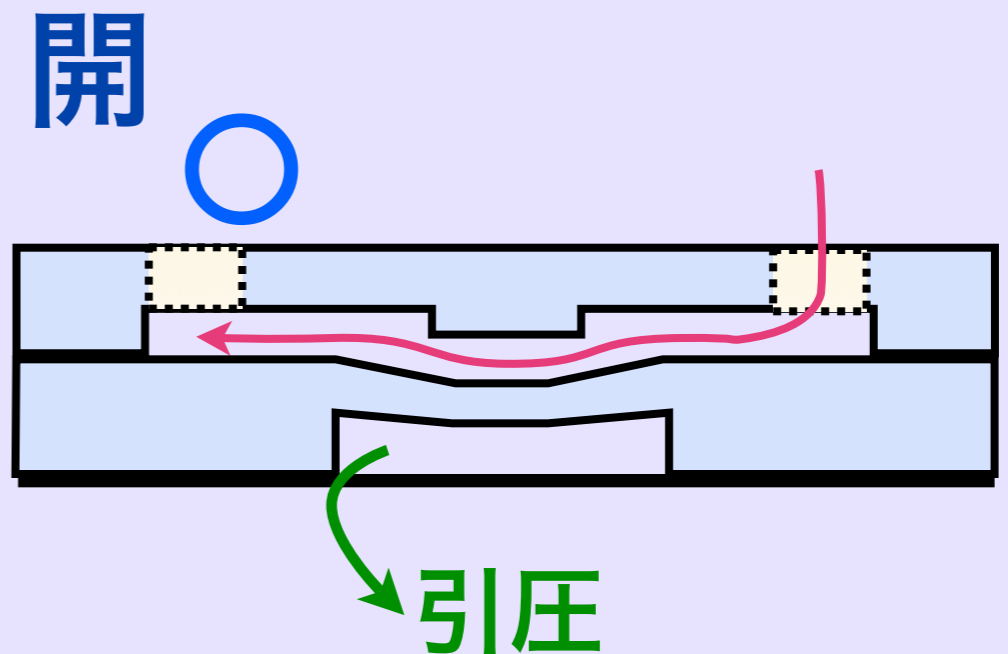
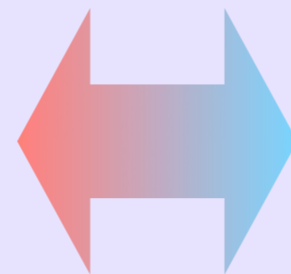
弁

圧力印加用



閉

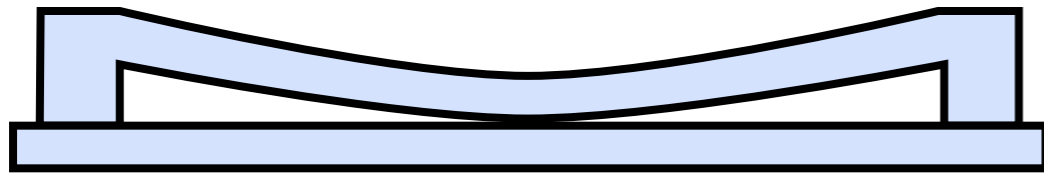
加圧



開

引圧

問題点

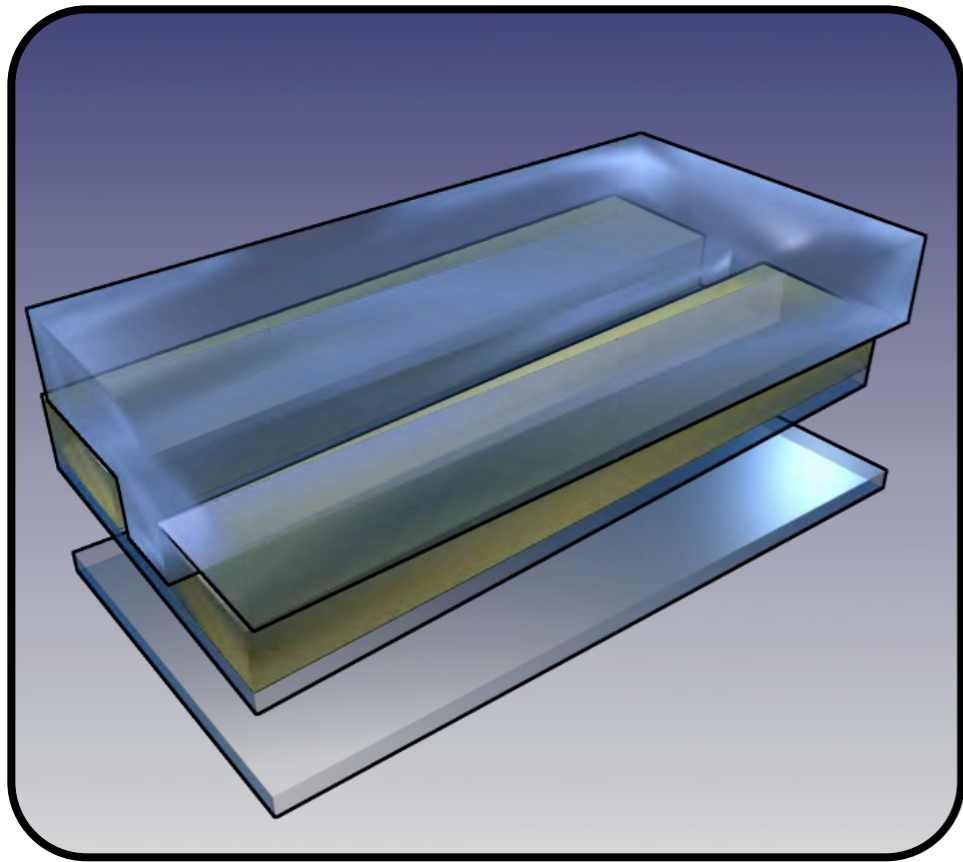


幅の広い流路作製が困難

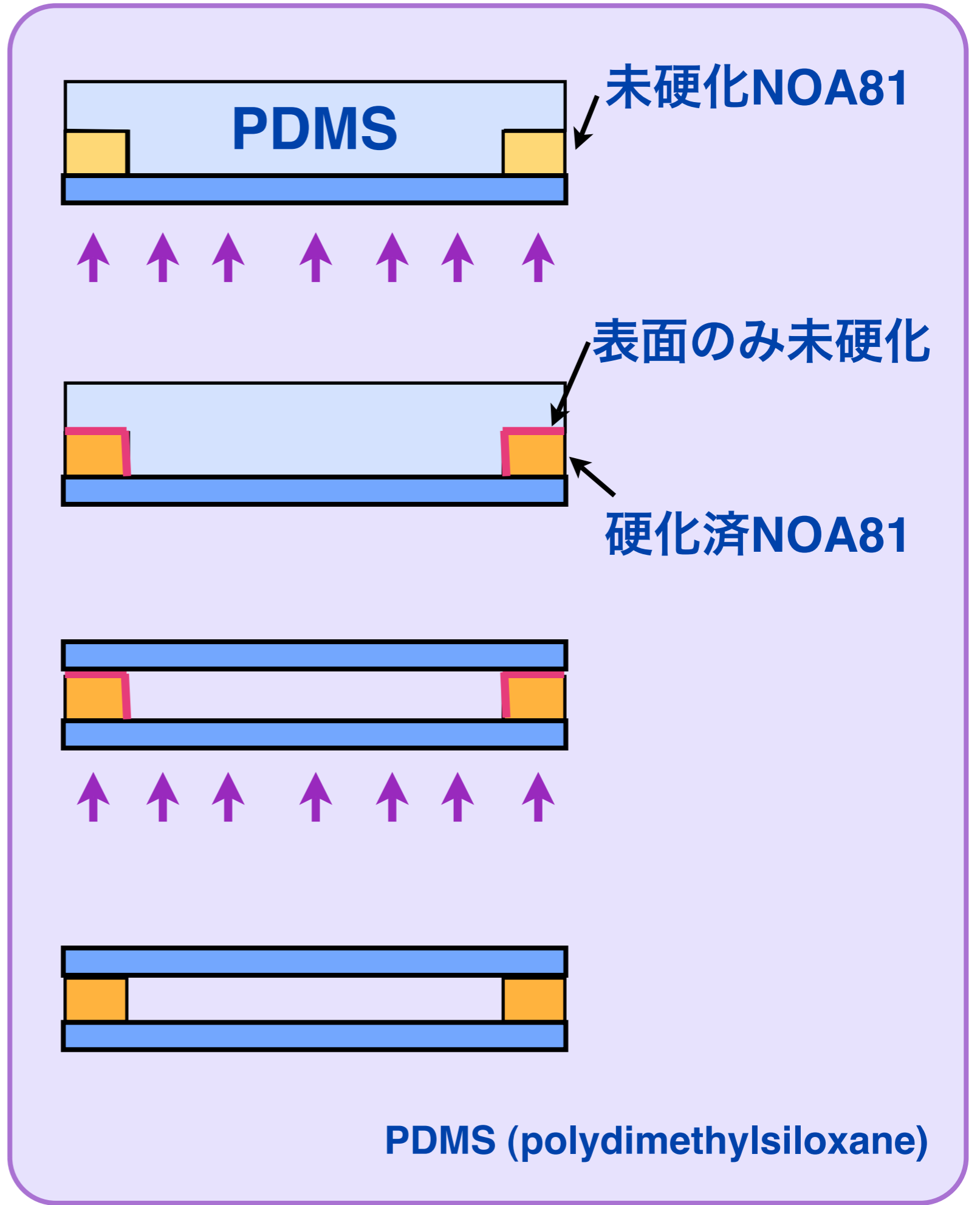
異種材料間の接着性

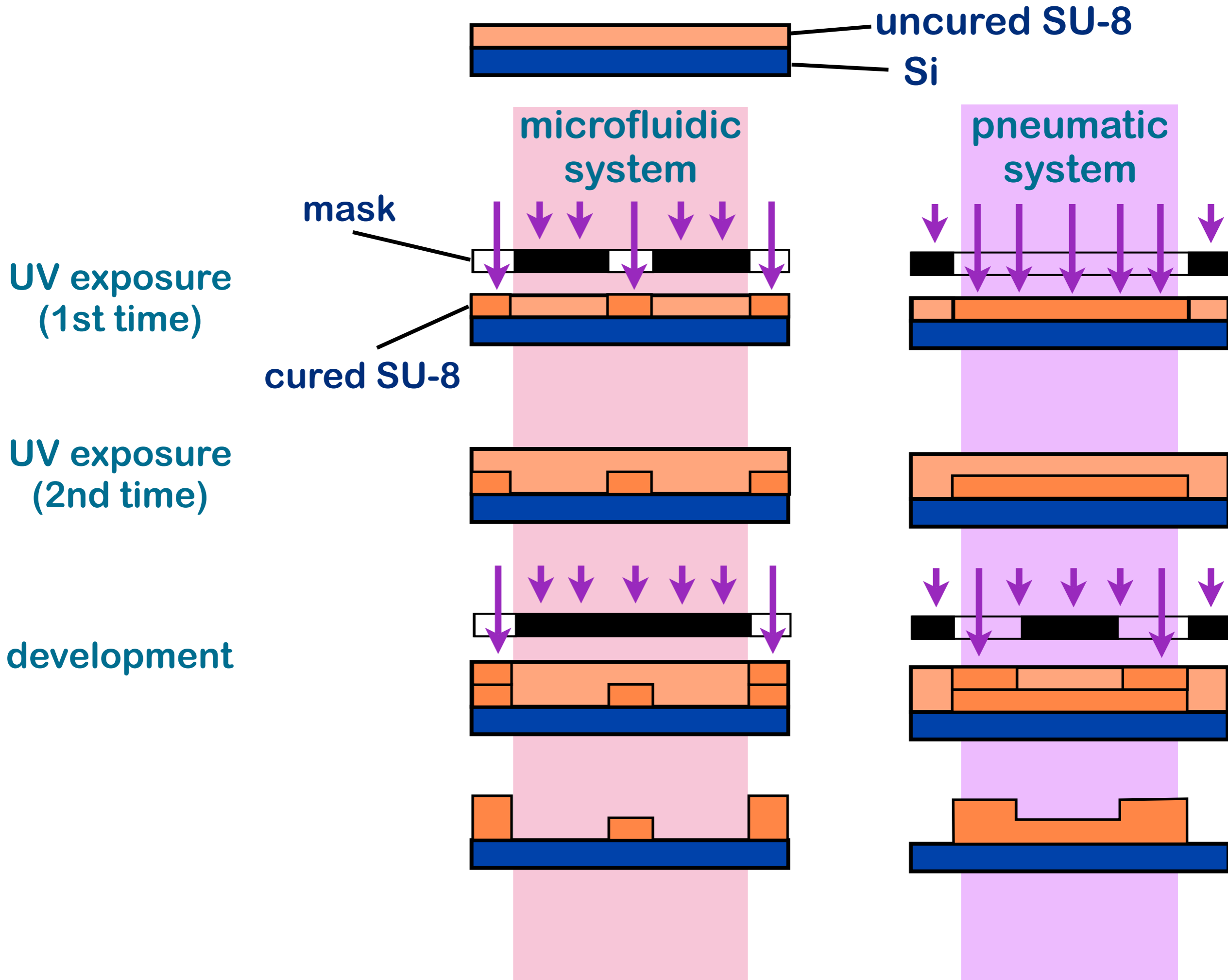
外部機器が必要



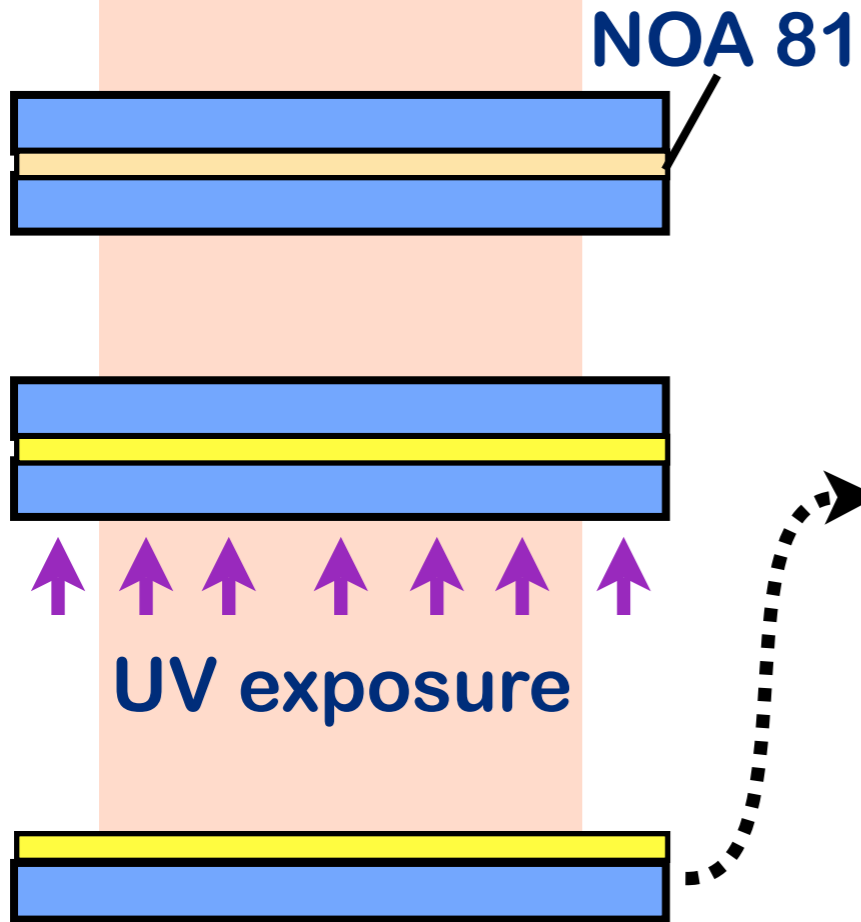


光硬化性樹脂
NOA81

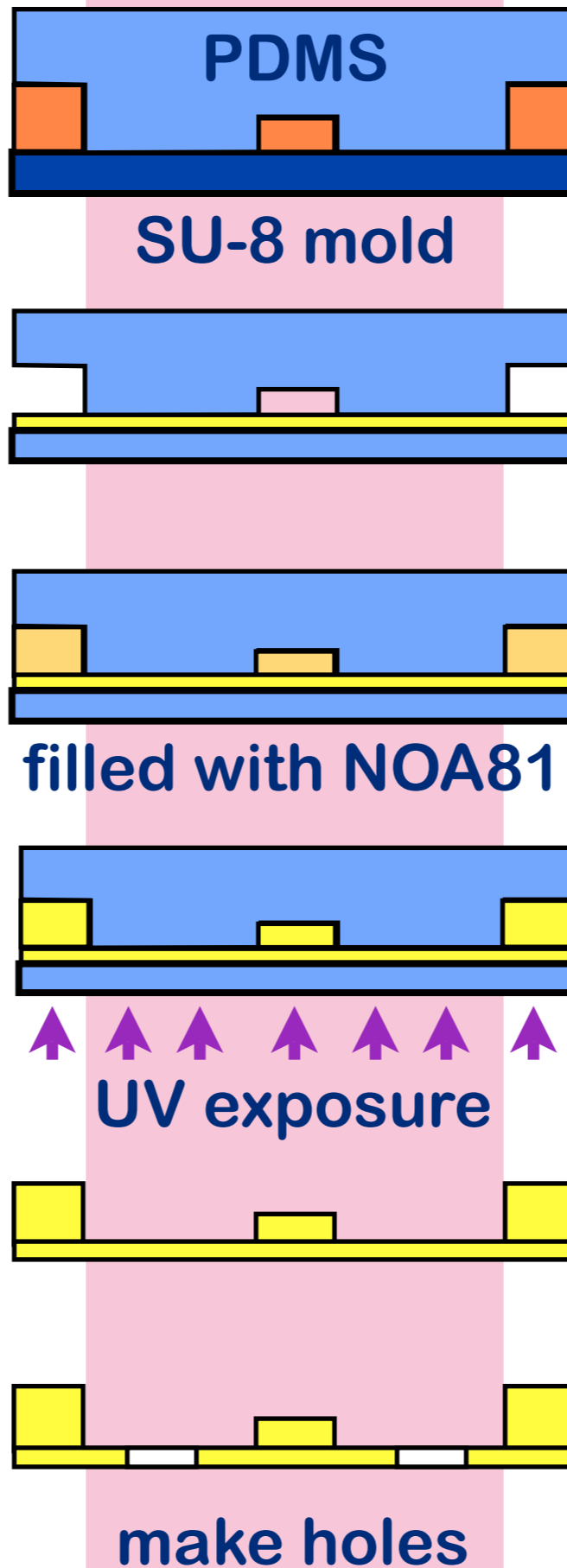




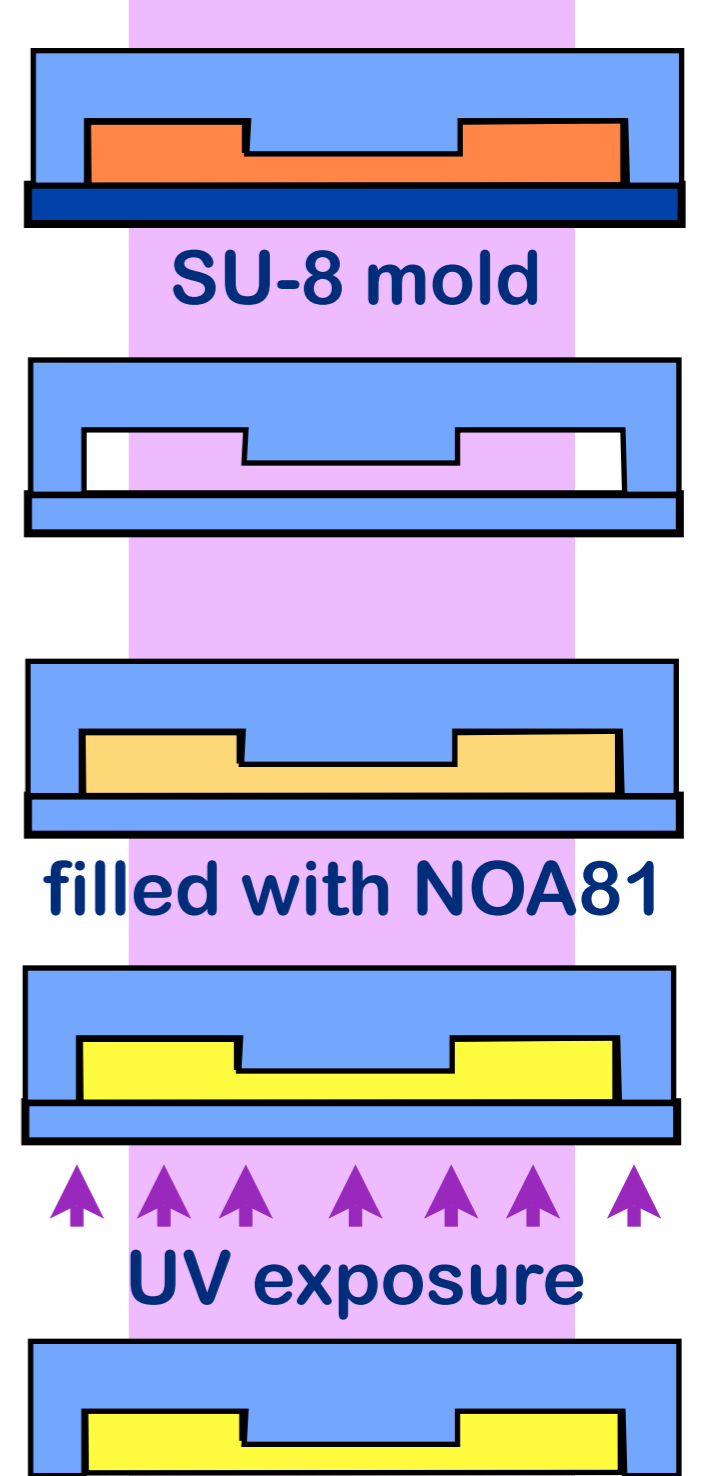
planar NOA sheet

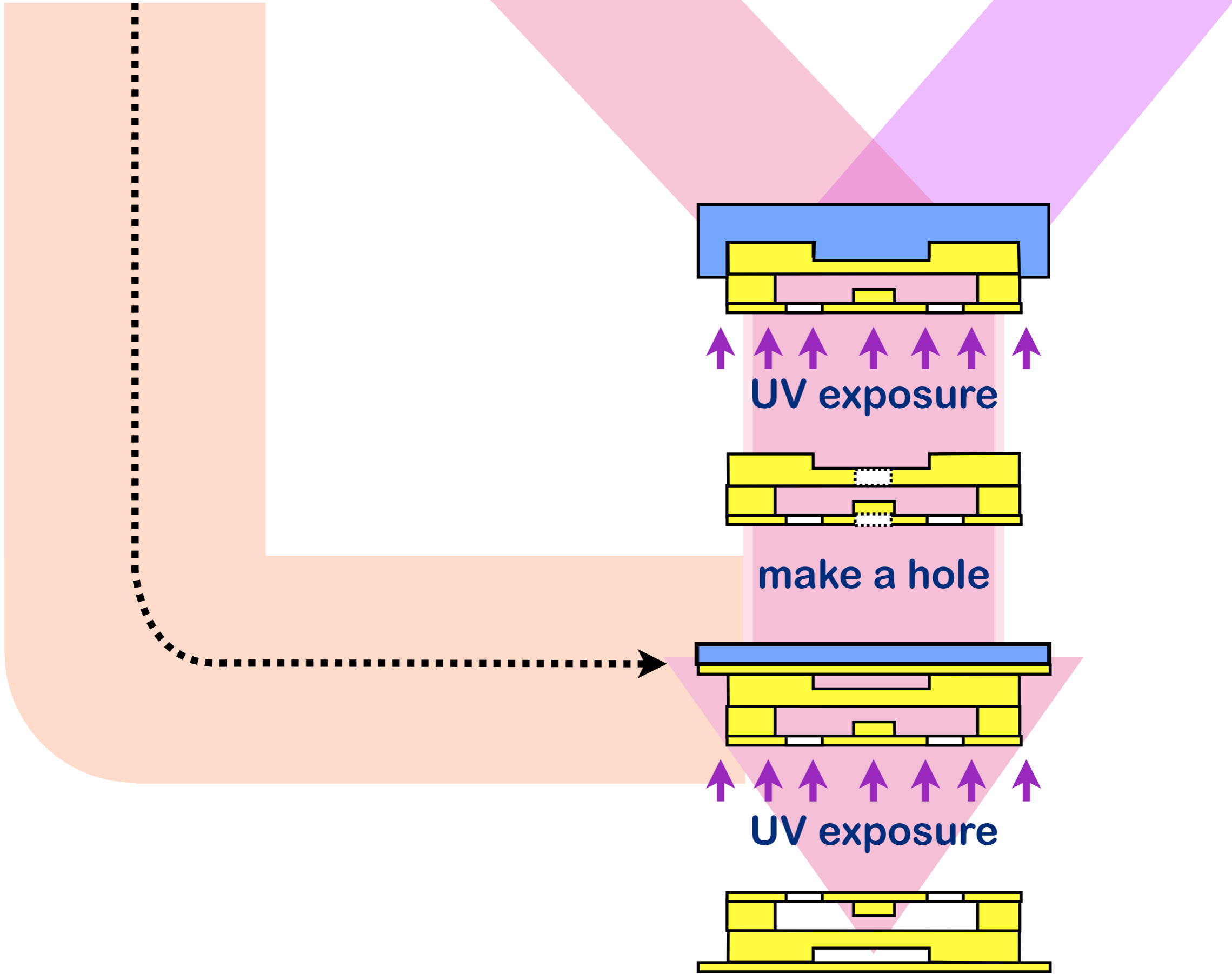


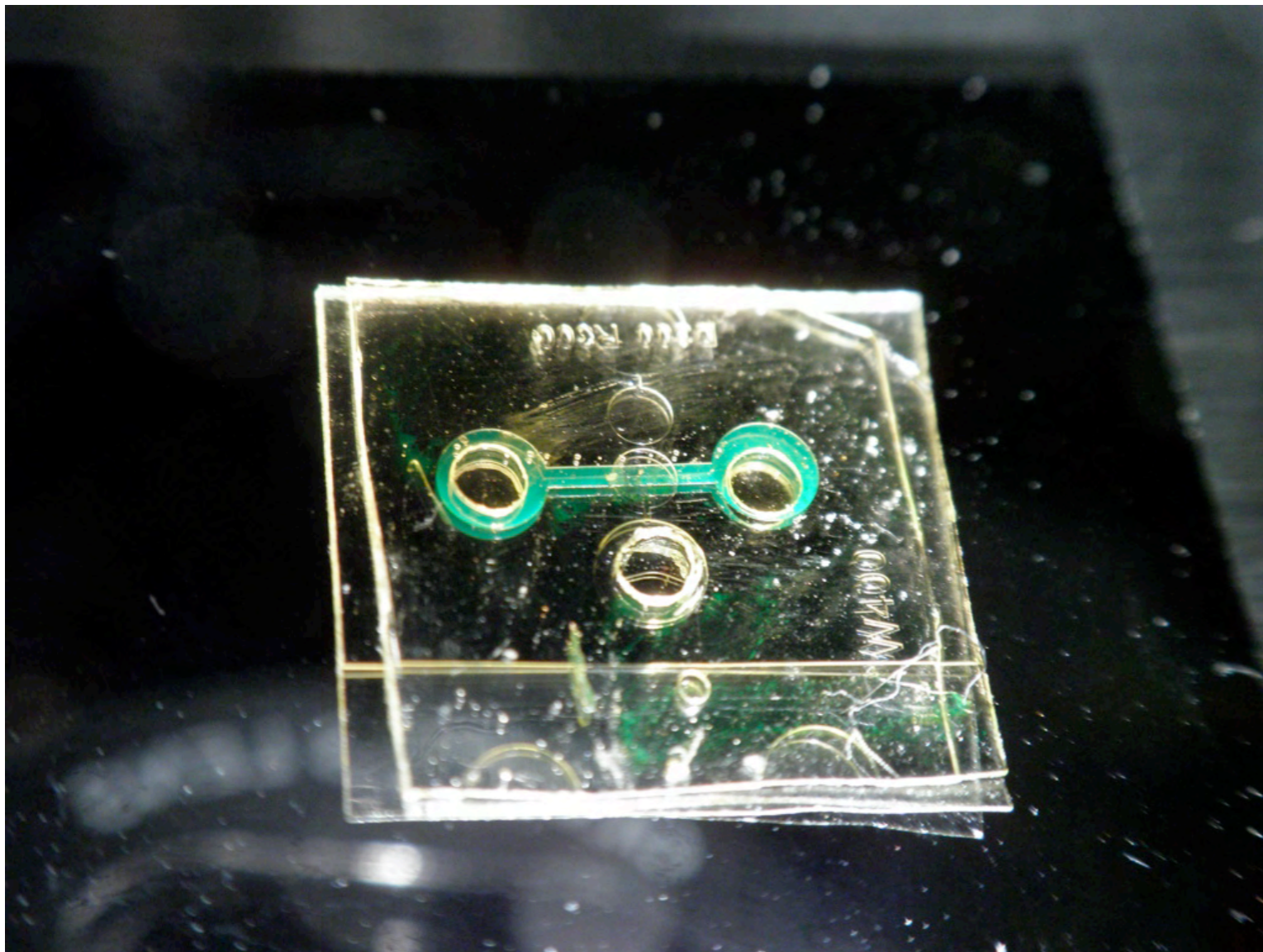
microfluidic system



pneumatic system







チップサイズ

10 mm x 10 mm

流路長さ

5 mm

(バルブ部 300 μm)

流路幅

400 μm

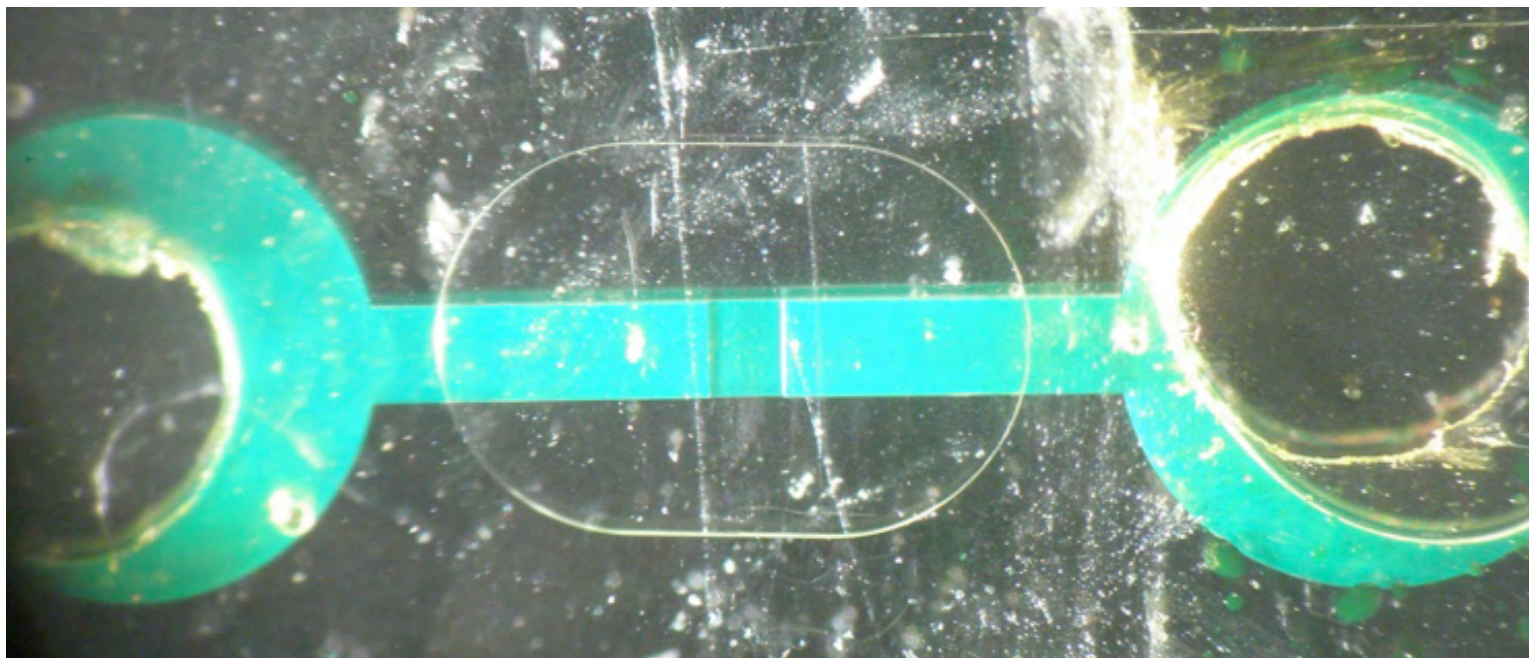
流路深さ

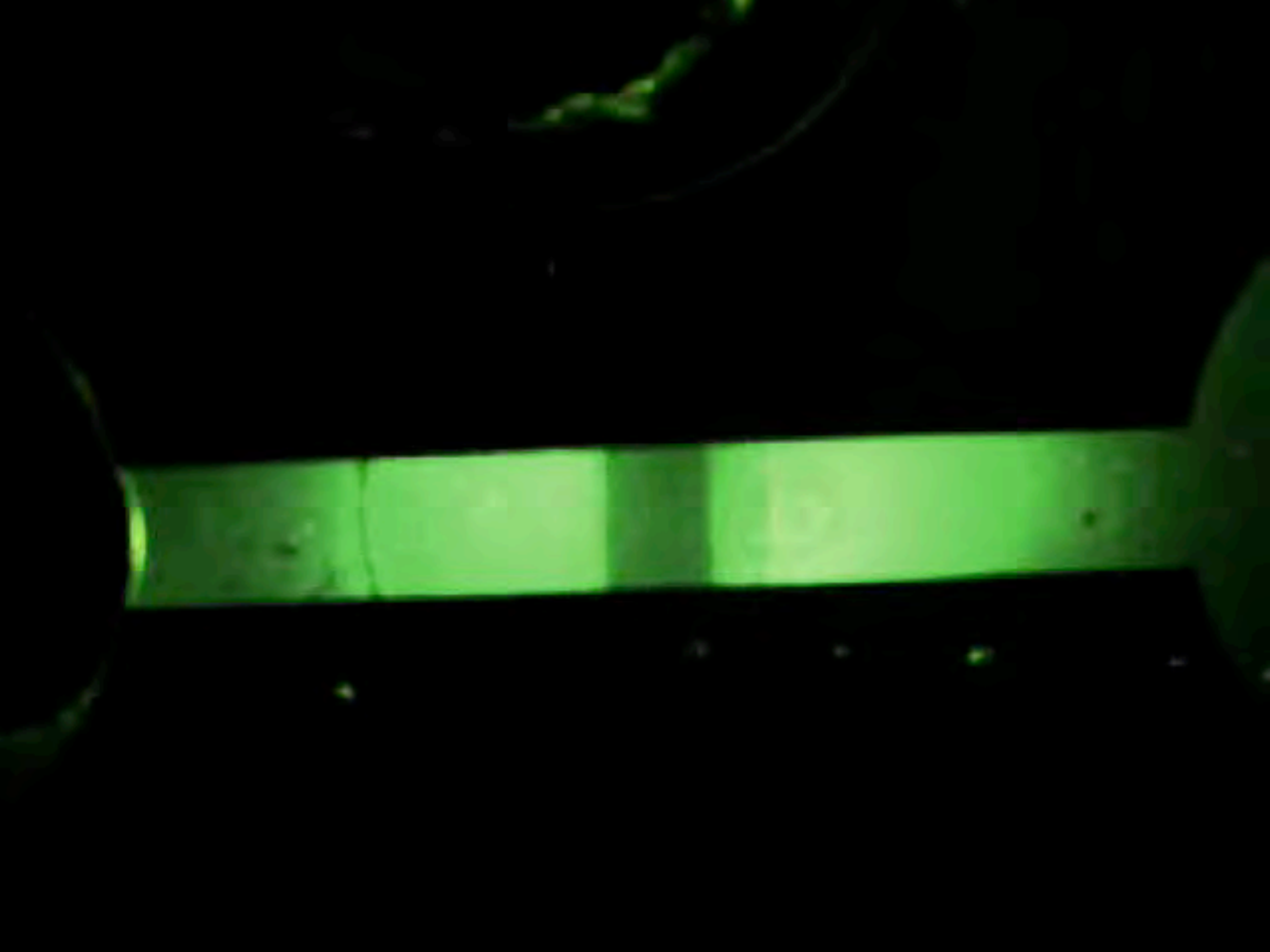
90 μm

(バルブ部 45 μm)

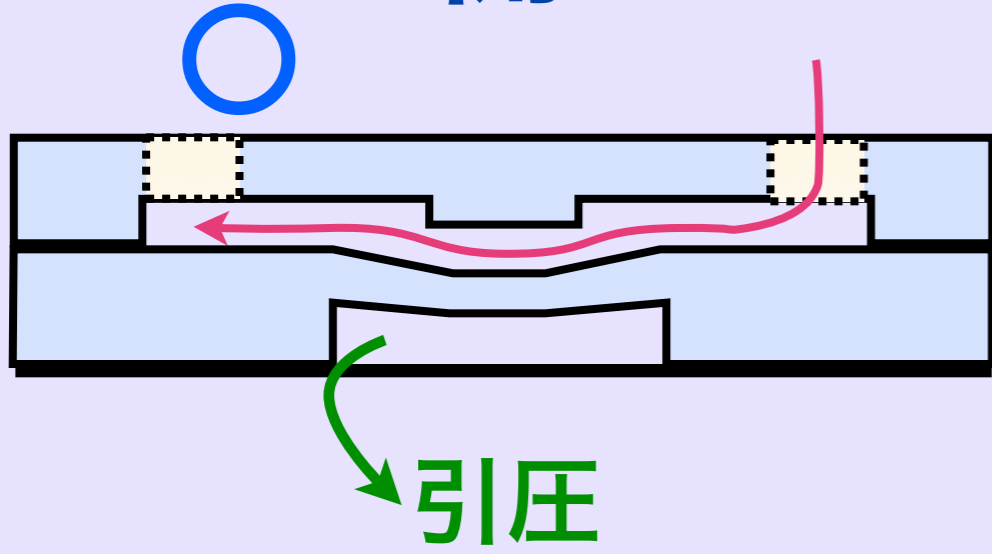
印加チャンバーサイズ

2.0 mm x 3.0 mm

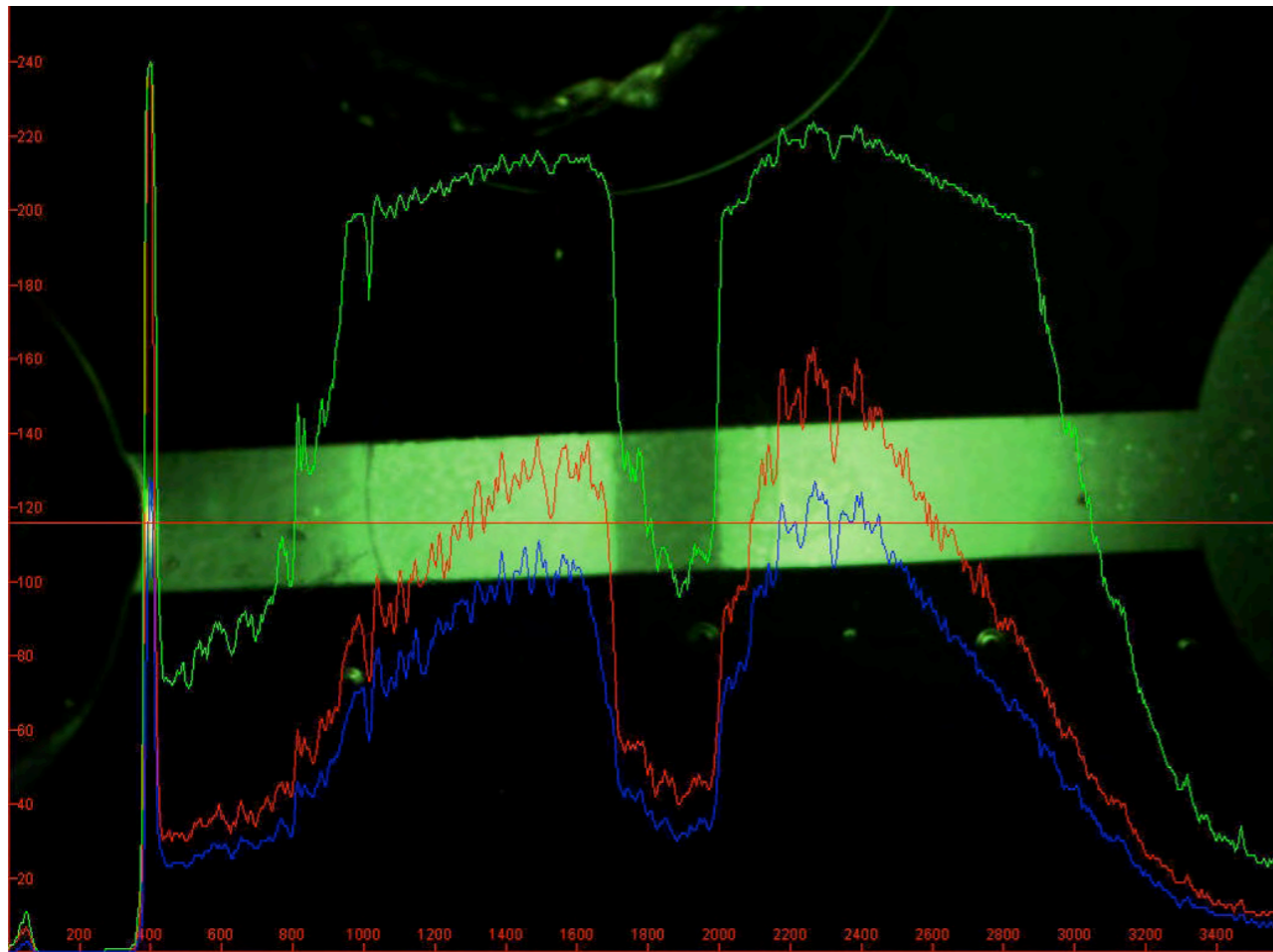
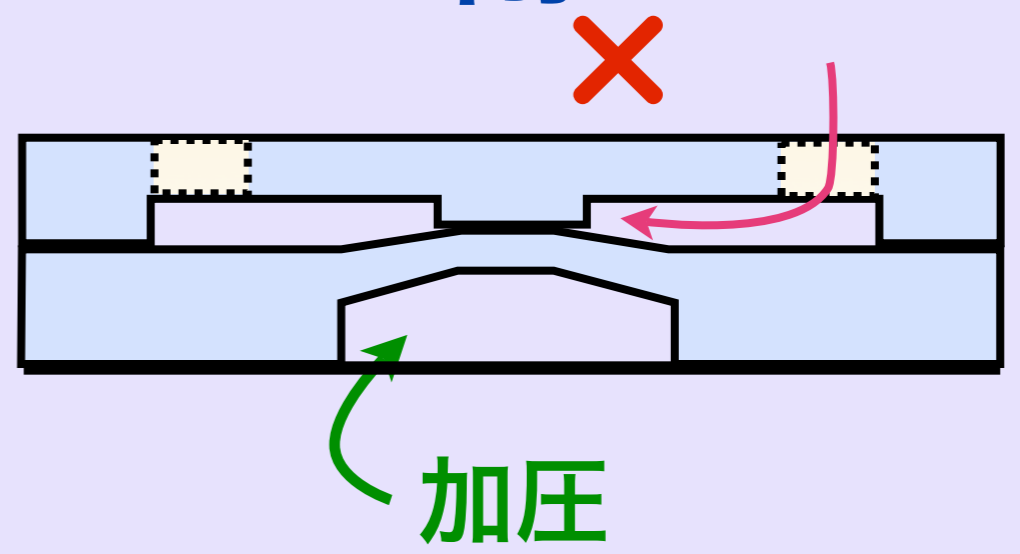




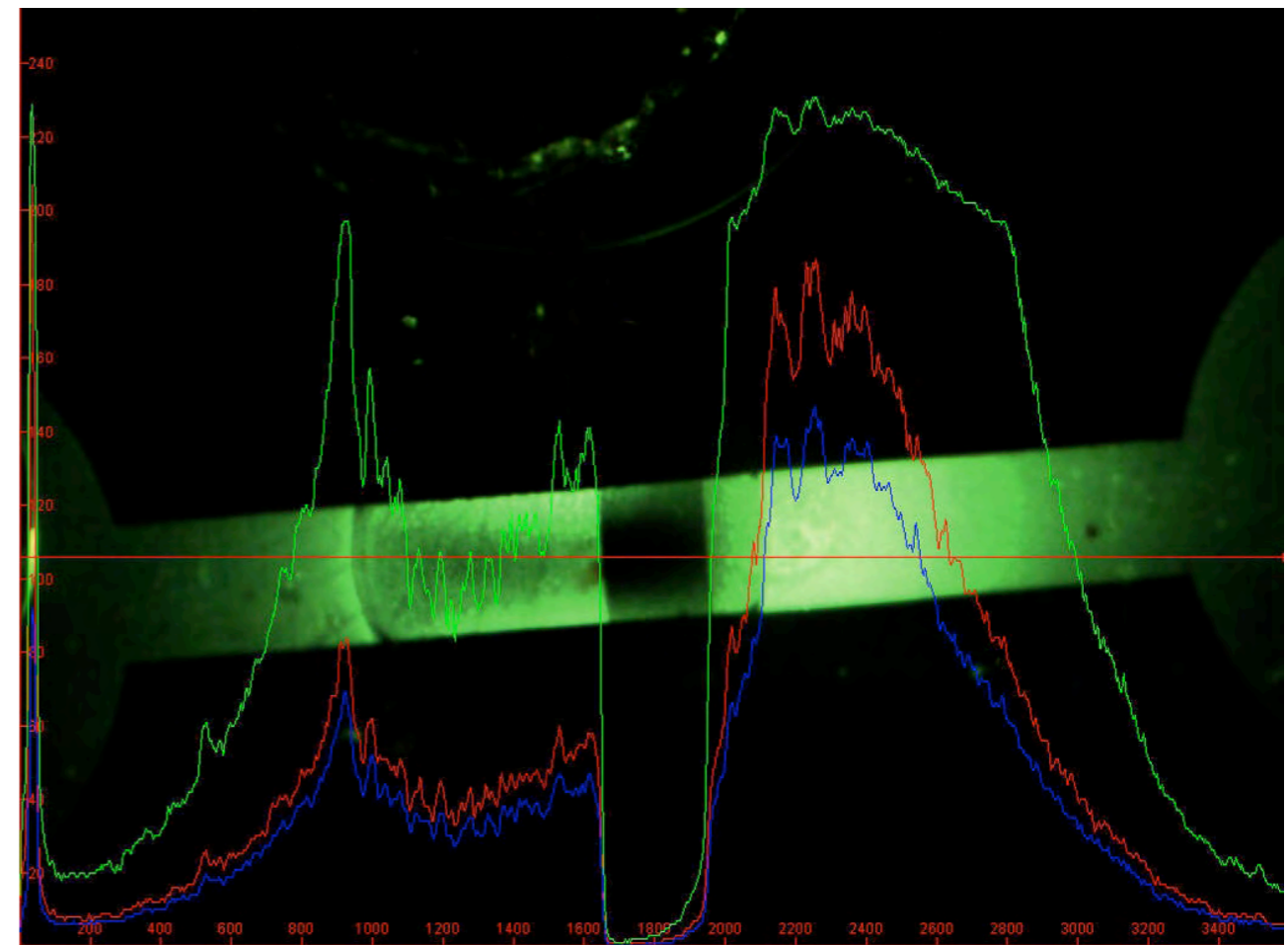
開



閉



压力印加前



压力印加後

結論

幅広の浅い流路の作製に成功

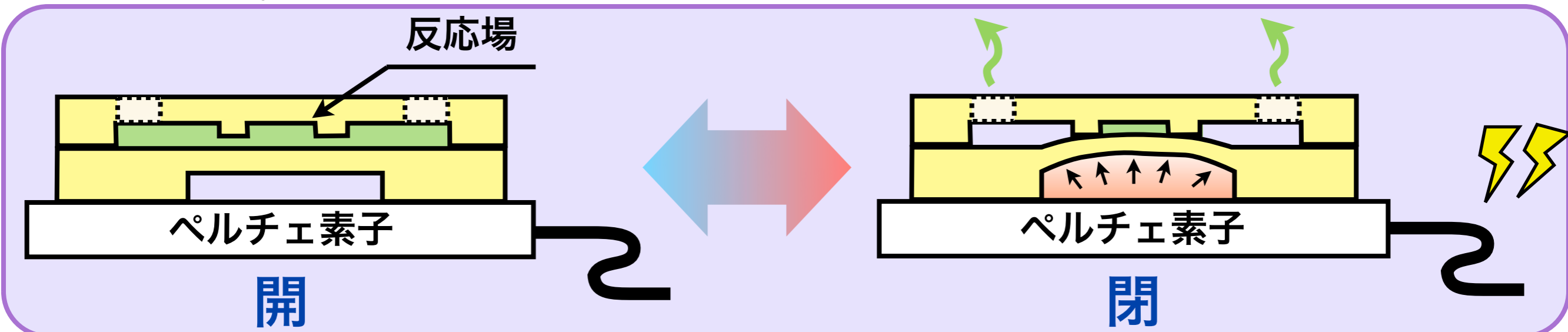
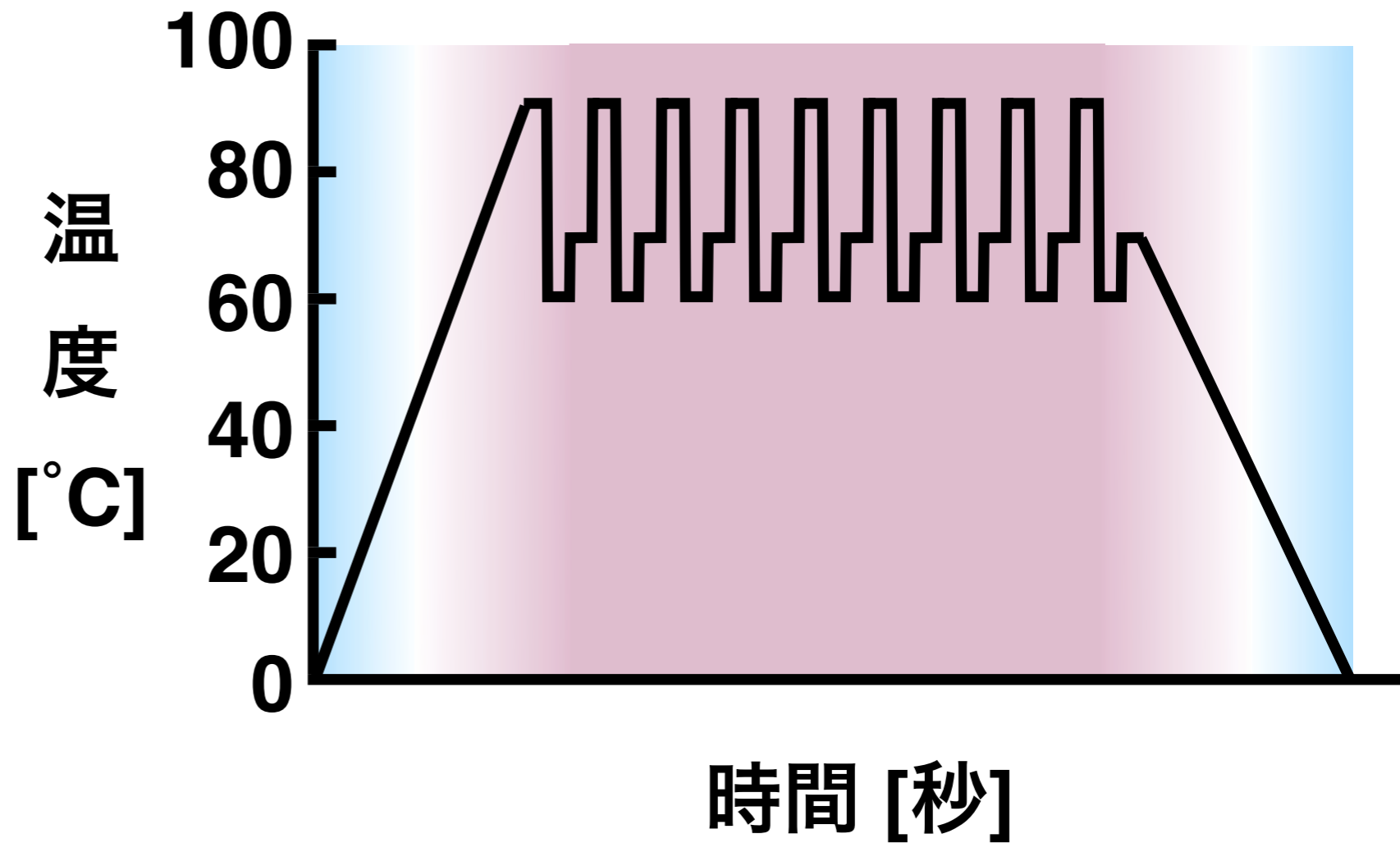
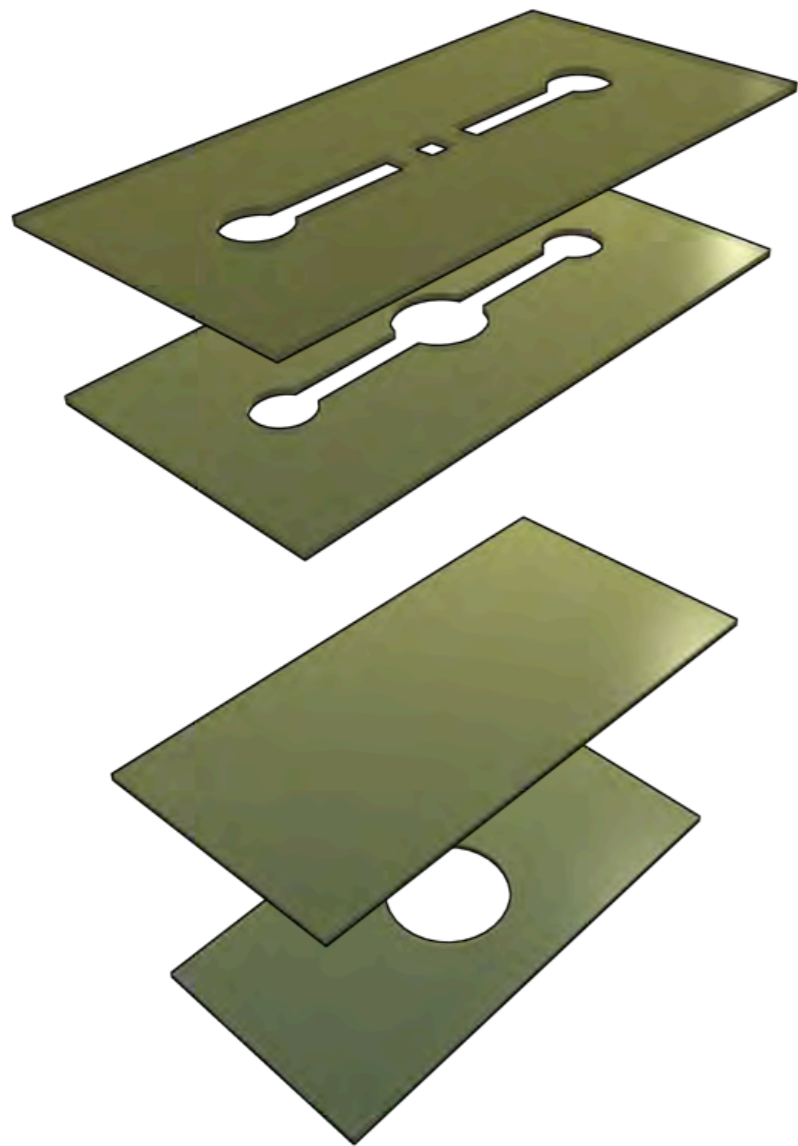
NOA81製マイクロバルブを作製

今後の展望

自動閉鎖バルブの開発

実際のチップへの応用

自動閉鎖バルブ



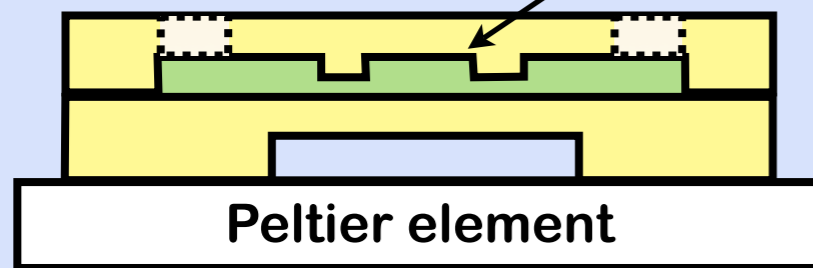
自動閉鎖バルブ (in Japan)

30°C

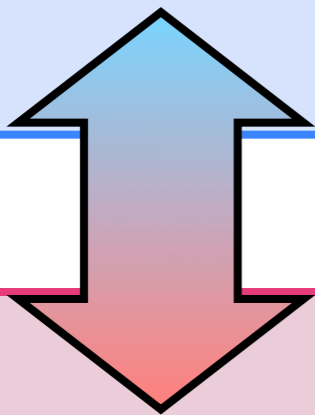
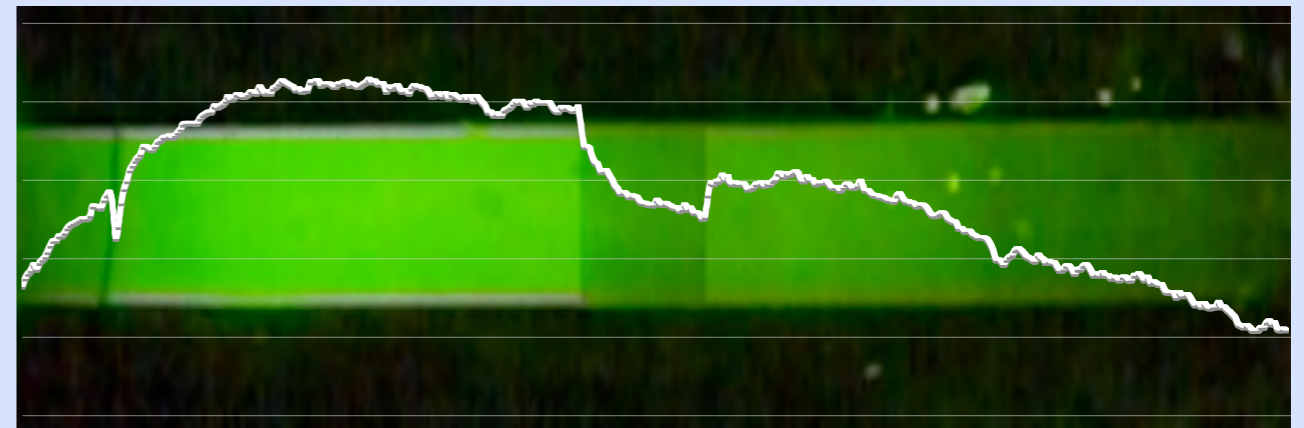
open

PCR chamber

250



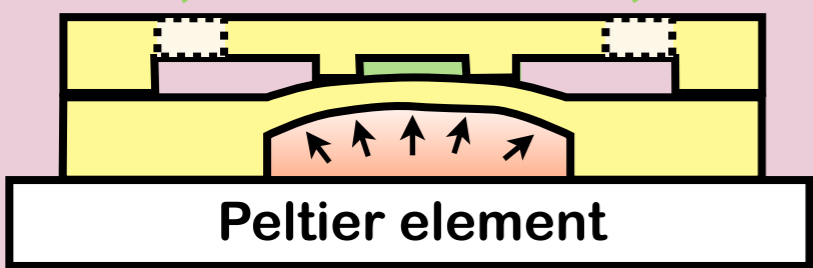
0



95°C

close

250



0

