

Technical Introduction Seminarのご案内 - Micro/Nano Device Fabrication Service -

理化学研究所 生命機能科学研究センター
(BDR) 集積バイオデバイス研究チームが
提供しております微細加工デバイス受託
サービスについてご紹介いたします。是非
多数のご参加をお待ちいたしております。



説明者：田中陽チームリーダー
理化学研究所 生命機能科学研究センター
集積デバイス研究チーム

The seminar will be held in Japanese, but will use presentation slides in English. Questions in English are welcome.

- 日時： 2021年3月5日 (金) 11:00-12:30
- 形式： Zoomによるオンライン形式 (定員300名)
※URLは参加登録者にご案内いたします。
- 言語： 日本語 (スライドは英語表記)
- 対象者： 理研内外の研究者、学生、他
- 参加費： 無料
- 参加登録フォーム： <https://krs1.riken.jp/m?f=1625>
- 締め切り： 2021年3月3日 (水)



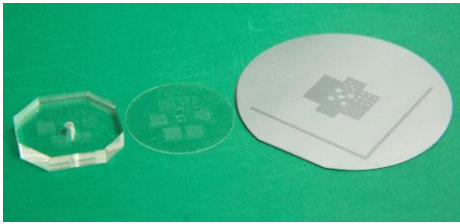
※BDR所属者は登録不要、前日にZoomのURLをお送りします。

- Date: Friday, March 5, 2021
- Time: 11:00-12:30
- Place: Online seminar by Zoom
* URL will be informed to registered participants.
- Language: Japanese.
* Presentation slides will be in English. Questions in English are welcome.
- Participation Fee: FREE
- Registration Form: <https://krs1.riken.jp/m?f=1625>
- Deadline: Wednesday, March 3, 2021

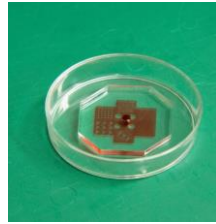


* BDR members DO NOT need to register.
You will be notified of the Zoom URL the day before the event.

SU-8 · PDMS microdevices

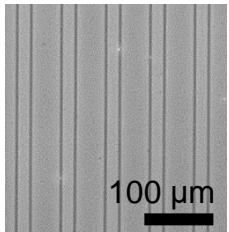


Device example
(PDMS, Gel, Silicon mold)

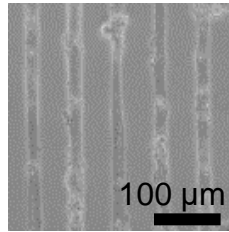


Gel, cell patterning
device

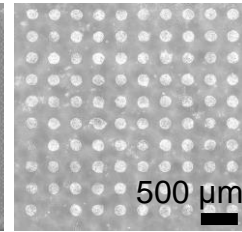
- Customized small channels and chambers are available, made by photolithography
- These small structures can be made on various materials; glass, plastics, elastomers, etc.
- Possible applications:
 - Micro patterning & analysis of biomolecules
 - Long-term cell patterning
 - Single cell/colony analysis



Gel micropattern



Cell micropattern



Ref)

N. Tanaka et al., *BioTechniques*, 69, 171-177 (2020)

Y. Shen et al., *PLoS ONE*, 15, e0232518 (2020)

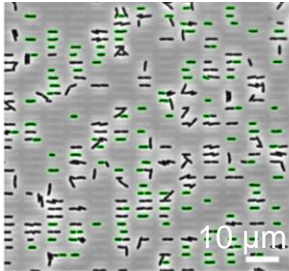
S. Funano et al., *Anal. Sci.* 33, 723 (2017)

N. Tanaka et al., *RSC Adv.* 6, 54754 (2016)

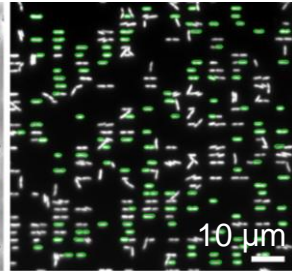
S. Funano et al., *RSC Adv.* 6, 96306 (2016)

etc.

Ultra-small fabrication (under 10 μm)



Phase contrast



Venus YFP fluorescence

E. coli analysis device

- Sub-micron features are available, made by electron-beam lithography
- Applications:
 - Ultra-rapid analysis of single molecules in nanochannels
 - Multi-microorganism analysis

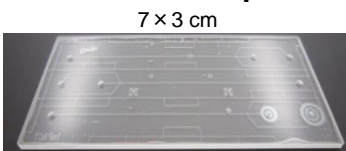
Ref)

K. Yamamoto et al., *Anal. Chem.* 93, 332-349 (2021)

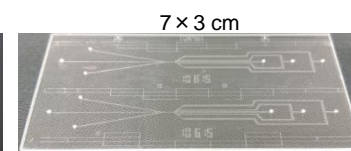
D. Priest et al., *Sci. Rep.* 7, 17750 (2017)

etc.

Glass chip devices



7 × 3 cm



7 × 3 cm

Ultra-thin flexible glass chip



7 × 3 cm

Glass chip example

- Durable for extremely-high pressure both external & internal (~ 50 MPa) and high temperature (~ 500° C)
- Compatible with optical measurement (e.g. laser), acoustic operation, and organic chemicals
- Adaptable jigs are available.
- Applications:
 - Ultra-high flow rate fluid operation
 - High throughput analysis & sorting

Ref)

Y. Yuan et al., *Sens. Actuators A-Phys* 321, 112604 (2021)

Y. Yalikul et al., *Cytometry Part A*. 97, 909-920 (2020)

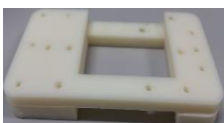
N. Ota et al., *Anal. Chem.* 91, 9631-9639 (2019)

B. Guo et al., *Cytometry: Part A*. 91, 494-502 (2017)

Y. Yalikul et al., *Lab Chip*. 16, 2427 (2016)

Y. Tanaka et al., *RSC Adv.* 3, 10213 (2013)

etc.



Jig example