

Programmable and reconfigurable microfluidic chip

Raphael Renaudot^a, Vincent Agache^{*a}, Yves Fouillet^a, Guillaume Laffite^a, Emilie Bisceglia^a, Laurent Jalabert^b, Momoko Kumemura^{b,c}, Dominique Collard^b, Hiroyuki Fujita^c

^a CEA-Leti, Minatec Campus, Grenoble, 38054, France. E-mail: raphael.renaudot@cea.fr; vincent.agache@cea.fr; yves.fouillet@cea.fr; guillaume.laffite@cea.fr; emilie.bisceglia@cea.fr.

^b LIMMS/CNRS- IIS, The University of Tokyo, 153-8505 Tokyo, Japan. E-mail: momo@iis.u-tokyo.ac.jp; jalabert@iis.u-tokyo.ac.jp; collard@iis.u-tokyo.ac.jp

^c Institute of Industrial Science, The University of Tokyo, 153-8505 Tokyo, Japan. E-mail: fujita@iis.u-tokyo.ac.jp

Supplementary materials

A. Two supplementary channels geometry fabrication examples

First example is illustrated in Fig. S1A. The chip geometry is symmetrical, and consists of two pairs of inlet/outlet reservoirs, communicating through two bypass channels, which are joining together in two areas and disrupted by a paraffin pillar. The channels geometry is build from a DMF platform, made of an array of 83 electrodes. The channel width is 800 μm while the channel height is 110 μm .

In Fig. S1B, the investigated design, firstly described in Tan et al. corresponds to a microfluidic system which aimed at trapping and releasing of microbeads or particles.⁴⁶ The DI water liquid finger shape in liquid paraffin is created in two steps: first the DI water is actuated onto the serpentine shape electrode and second the DI water is pulled onto the triangular restriction shape electrodes. The serpentine channel width is 200 μm and the channel height is 110 μm .

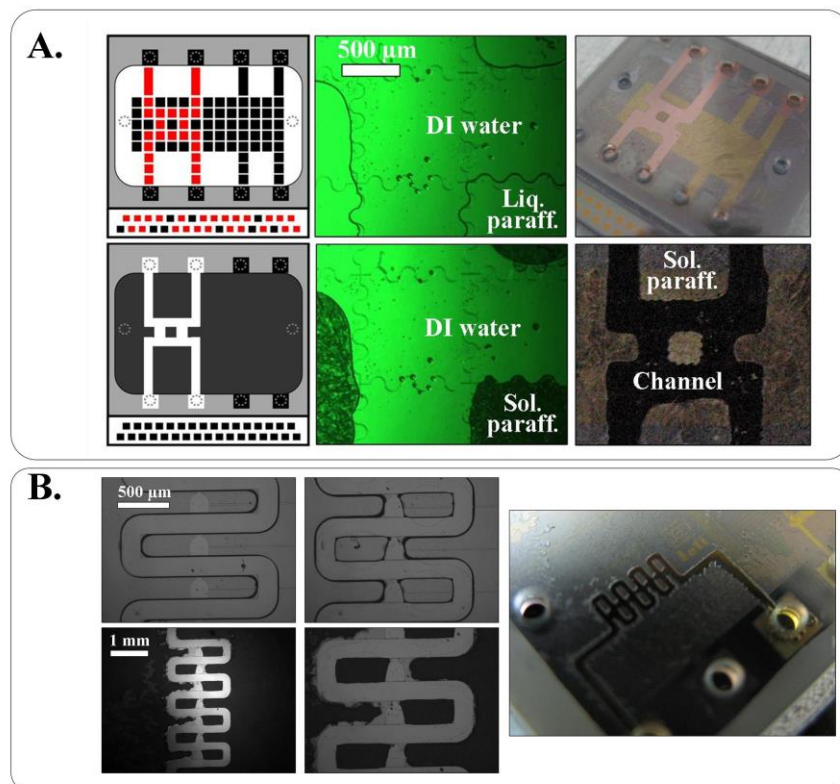


Fig S1: Photographs illustrating two supplementary CMF chips fabricated within this study. **A.** A bypass geometry. **B.** A microfluidic channel geometry used to trap particles.⁴⁶

B. Two supplementary CMF experiments examples.

In Fig. S2, the chip, shown in Fig 3B, made of an array of paraffin micropillars is used to carry out a very simple and basic biological protocol for bacteria trapping. First, DI water solution is injected in the chip, followed by a PEI (PolyEthyleneImine) polymer solute diluted in DI water. The PEI polymer (C_2H_5N)_n used in this study (supplied by Sigma Aldrich AZ234) is soluble in DI water solution at $40\text{ mg}\cdot\text{mL}^{-1}$ weight concentration. This polymer is used as a probe layer to capture BSS bacteria.⁴⁷ At that stage of the protocol, the paraffin pillars walls are coated with the PEI polymer. Then a BSS (Bacillus Subtilis) spores solution and DI water are successively inserted. Finally, optical pictures show the trapping of BSS spores onto the paraffin pillars walls.

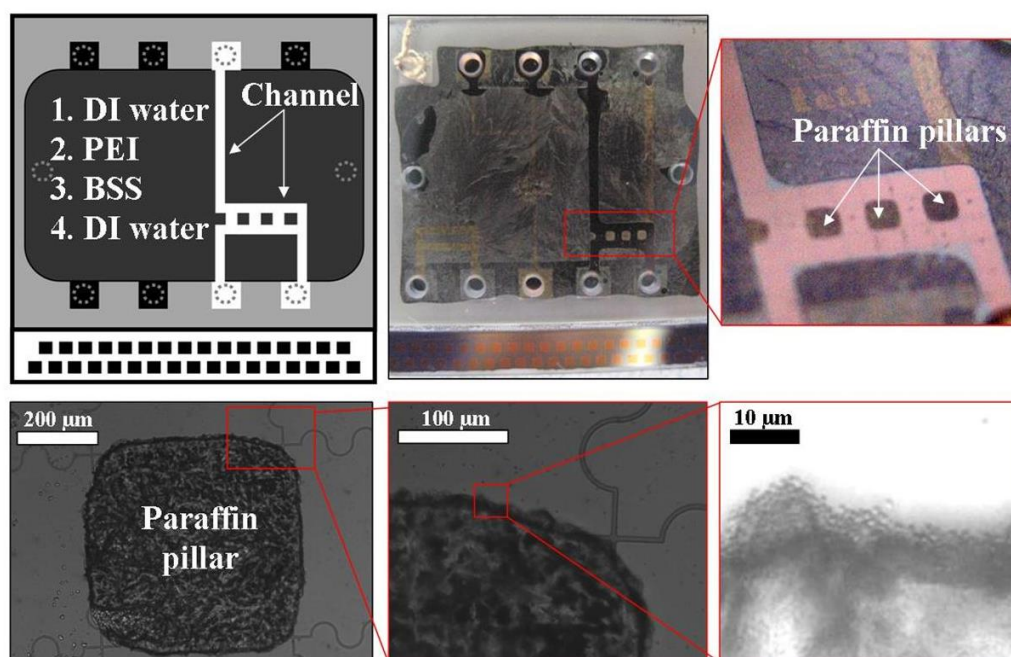


Fig S2. Bacteria trapping onto paraffin pillars walls after a biological based PEI deposition protocol.

C. References

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