

## Fabrication of optofluidic and microfluidic devices

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### Organisation

**Name of the organisation** Vrije Universiteit Brussel (VUB)

**Department** Faculty of Engineering

**Country** Belgium

**Geographical Area** Brussels Region

## SCOPE OF THE METHOD

<b>The Method relates to</b>	Animal health, Environment, Human health
<b>The Method is situated in</b>	Basic Research, Translational - Applied Research
<b>Type of method</b>	In silico

## DESCRIPTION

### Method keywords

hot embossing  
micro-injection moulding  
3D nanoprinting  
microscaffolds

### Scientific area keywords

lab-on-chip  
microfluidics  
optofluidics  
free-form optics

### Method description

Prototyping and replication (small series production) of microfluidic or optofluidic devices, in thermoplastic polymers or in glass. 3D nanoprinting is also available to produce microscaffolds, possibly within microfluidic channels.

### Lab equipment

Ultraprecision diamond tooling ;  
High-precision milling and grinding ;  
High-precision polishing ;  
Hot embossing ;

(micro-)injection moulding ;  
Glass press moulding ;  
Two-photon polymerization-based 3D nanoprinting ;  
Femtosecond laser glass machining.

### **Method status**

Internally validated  
Published in peer reviewed journal

## **PROS, CONS & FUTURE POTENTIAL**

### **Advantages**

Custom-designed labs-on-chips can be fabricated (prototyped, or produced in small series), potentially including photonics structures (e.g. waveguides, lenses, ...) to allow for optical read-out integration. In addition, the produced optofluidic devices can be enhanced with 3D nanoprinting to produce custom scaffolds (e.g. for cell growth). In terms of materials, thermoplastic polymers (PMMA, PC, COC) or glass can be used.

### **Challenges**

Sealing of microfluidic channels is sometimes challenging. Depending on the material used, several approaches are possible (laser welding, thermal bonding, chemical bonding,...).

### **Modifications**

Our fabrication technologies are very flexible and allow a large design freedom.

### **Future & Other applications**

The fabrication technologies are also used in other areas, such as high-end free-form optics for imaging or non-imaging applications.

## **REFERENCES, ASSOCIATED DOCUMENTS AND OTHER INFORMATION**

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