



Microfluidic Prototyping –



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Innovation at Work

Danish Technological Institute

DANISH
TECHNOLOGICAL
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BACKGROUND and BASICS

The presentation illustrates fast prototyping methods of microfluidic devices. It comprises the simulation of the microfluidic conditions, the laser assisted fabrication of the structures, surface modification of the structures and the integration into the infrastructural devices. Three examples are chosen in order to give an overview about the span of the methods:

- In vitro toxicity screening
- Micromagnetic separation
- Improved detection of illegal substances with help of a portable integrated detection unit

Future applications will be positioned in the field of medical and analytical devices targeting pharmaceutical or biotechnological companies, point of care (POC) products or processing of complex biological samples

The Centre of Microtechnology and Surface Analysis has strong competences and experience in the field of

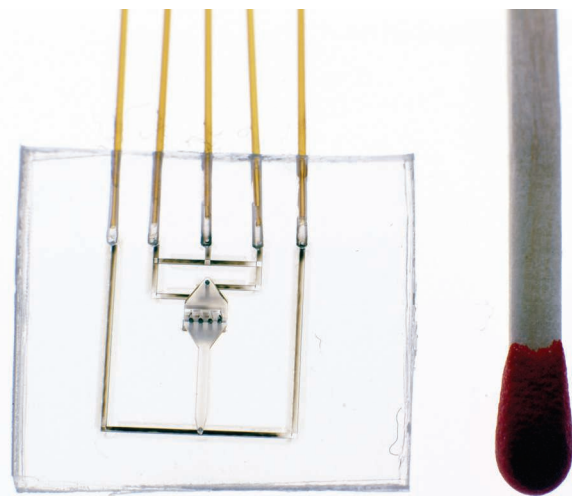
- Structural and chemical surface characterization
- Physical and chemical surface modification
- Microfluidic prototyping
- Wireless sensor technology

CONCEPT and SOLUTION

Laser assisted prototyping of microfluidic systems is based on the ablation of material with help of different laser systems (CO₂, excimer, femtosecond) and the subsequent laser bonding of the open structures. In this way it is possible to fabricate systems with the following characteristics:

- broad range of materials (polymers, ceramics, glass, metal)
- fast fabrication (dependent on the complexity of the structure a system can be processed in the range of a few minutes)
- due to the low costs the systems can be already on the prototype level disposable
- a resolution of the structures can be achieved dependent on the lasers and the material down to 2-5µm in width or even in nanometer scale for surface structuring

The technical realization is basically the printout of CAD sketches with a laser instead of a printer



STATUS and OUTLOOK

The Danish Technological Institute is committed to many national and international research collaborations and the commercial development or fabrication of products and processes. We are involved at different stages of engagement (basic research, pilot tests in field and laboratories, 0. Series production as well as full scale production >1 mio. Parts per year).

We have identified micro- and nanotechnology as future key technologies and are therefore interested in:

- R&D partners for future acquisition of public funding
- Partners who want to penetrate into markets where microfluidic principles are used and lack the experience and technology

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