R2R Biofluidics

Large scale micro-and nanofabrication technologies for bioanalytical devices based on R2R imprinting

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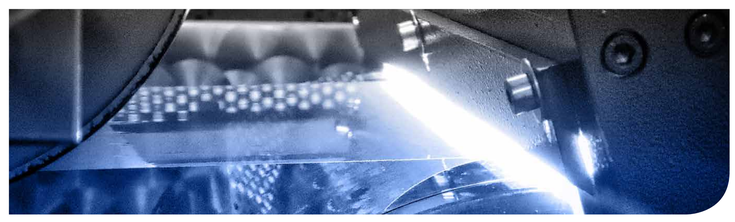

Background

The determination and evaluation of chemical and biological parameters with miniaturized sensors and analytical systems based on microfluidics is a strategic focus of the healthcare and life science community. These systems called »lab on chip (LOC)« address applications ranging from in-vitro diagnostics, patient monitoring to biotechnological and environmental aspects. Considering diagnostic applications, especially **easy handling and low production costs are of high importance.** The project R2R Biofluidics directly addresses the demand for rapid and accurate tests to increase pharmaceutical research yield and better monitor/cure patients.

Goal

R2R Biofluidics aims at the development of a complete process chain for first-time realization of production lines for two selected bioanalytical lab-on-chip devices.

The main approach of R2R Biofluidics is to use roll-to-roll pilot lines for highly cost-efficient, high throughput fabrication of micro- and nanostructured bioanalytical devices (Figure 3). Several interrelated development tasks (designs, processes, materials) feed into the central area of setting-up a production line and fabrication chain for bioanalytical devices (Figure 1).

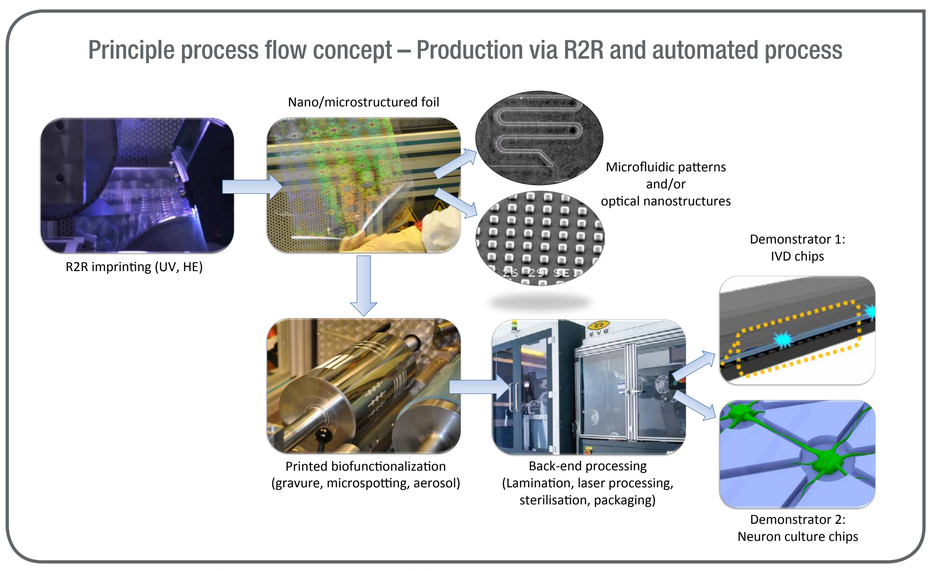

Figure 1: Overall concept for R2R production lines for bioanalytical devices

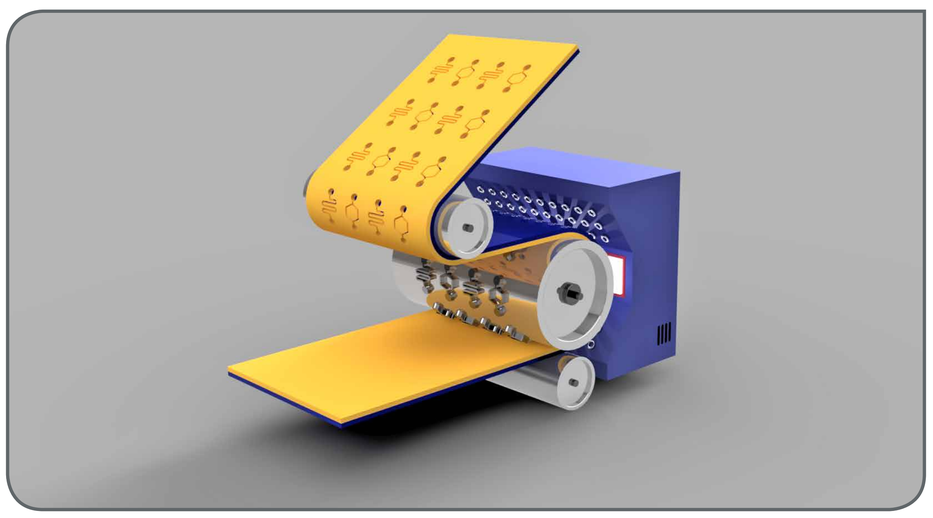

Figure 2: Schematic of roll to roll based nanoimprinting

Figure 3: EVG®570 R2R Hot-Embossing System

Concept and approach

An in-vitro diagnostic system to identify antibiotic-resistant bacteria will be developed based on microfluidics and roll-to-roll nanoimprint technologies (Figure 2). Microfluidics makes these diagnostic tests very straight forward and fast. Besides that, additional optical nanostructures will allow the detection of bacteria with higher sensitvity.

A second demonstrator is targeting an in-vitro test method for the development of active pharmaceutical substances. Neuron cells will be fixed to a structured substrate and the modified surface is used to induce a predefined and structured growth, thus allowing the precise determination of the effect of potential drugs on these immobilised cells.

Key Data

JOANNEUM RESEARCH MATERIALS is coordinating the EU project »R2R Biofluidics« (Innovation Action) under call NMP-04-2014.
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Project start: **February 1st, 2015**
Duration: **48 months**

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