

SINGLE USE DROPLET BASED MICROFLUIDICS – SCREENING TOOLS FOR BIOTECHNOLOGY AND LIFE-SCIENCES

Alexander Groß, Institute for Chemistry and Biotechnology, Technische Universität Ilmenau Germany
alexander.gross@tu-ilmenau.de

Thomas Henkel, Institute for Photonic Technologie IPHT-Jena, Germany

Mark Kielpinsky, Institute for Photonic Technologie IPHT-Jena, Germany

Martin Roth, Institute for Photonic Technologie IPHT-Jena, Germany

Alexander Mendel, Fraunhofer Institute for Chemical Technology, Germany

Jialan Cao, Institute for Chemistry and Biotechnology, Technische Universität Ilmenau Germany

Stefen Schneider, Institute for Chemistry and Biotechnology, Technische Universität Ilmenau Germany

J.M. Köhler, Institute for Chemistry and Biotechnology, Technische Universität Ilmenau Germany

In the recent years droplet-based microfluidic techniques were developed and used for various screening purposes mainly in the field of life-sciences and biotechnology. Therefore, droplet volumes in a range from pL to μ L were used and different technology platforms were necessary to produce the required fluidic devices which made of various materials. Traditionally, lithography combined with etching processes were used to produce precise glass or silicon devices. But, hot embossing and injection molding techniques are better suited for the production of single use devices. Recently, 3D-printing technologies are under development for the generation of individual costumes made microfluidic devices in low numbers for reasonable prices. Here, we present an example for a complex droplet based screening network designed for bacterial screening purposes received by CD-production technologies. General principles of droplet based processing, fluidic devise units and peripheral analytical techniques will be introduced as well as details for the screening of soil bacteria will be given. As an outlook the future microfluidic techniques for monitoring or continuous sampling form large volume bioprocesses will be given.