TECHNISCHE UNIVERSITÄT ILMENAU

INP FROM IDEA TO PROTOTYPE

5microns microsystem professionals

"Maskless structuring of hydrophobic layers for microfluidic applications using plasma etching techniques"

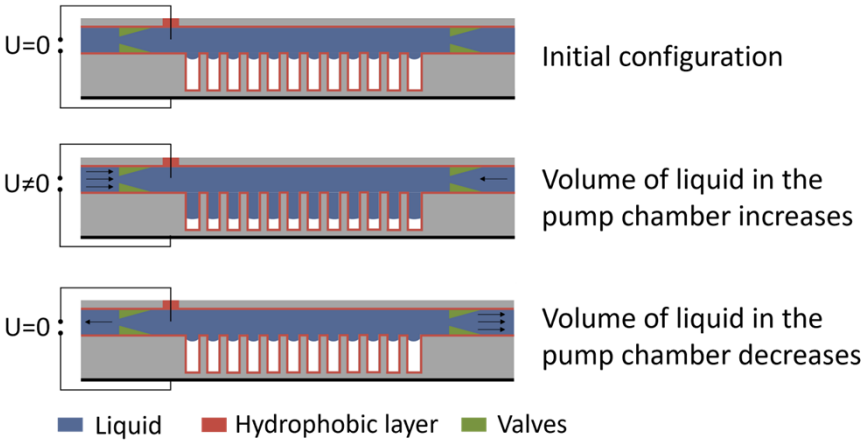

Fig. 1: Schematic view of the EWOD-driven micropump

Internship/Thesis at "Leibniz-Institut für Plasmaforschung" in Greifswald

Introduction:

Within the framework of a cooperation project between the TU Ilmenau and the 5microns GmbH, a novel micropump driven by Electrowetting-On-Dielectrics (short EWOD) is being developed. This pump is shown schematically in Fig. 1. The pump chamber made of silicon contains a few hundred thousand of deep-etched cavities. A hydrophobic layer is applied on top of an intermediate dielectric layer on the surface of the cavities to force the liquid into the Cassie-Baxter state [1]. By applying an alternating voltage between the liquid and the heavily doped silicon, the wetting properties of the liquid change, and the liquid-vapor interface is periodically and reversibly deflected inside the microcavities. The resulting volume stroke is rectified using passive Tesla valves. This results in a micropump that has the outstanding property of functioning completely without moving components.

Tasks:

The task in the internship is to develop and characterize a process to locally pattern the hydrophobic coating using maskless plasma etching techniques. In addition, the applicability of the developed process for the design of further microfluidic applications must be evaluated. The internship will take place on site at the *Leibniz-Institut für Plasmaforschung und Technologie e.V.* in Greifswald (close to the Baltic Sea – combining the useful with the pleasant) and is scheduled for a duration of at least three months. The internship can start from now on. The internship is supervised by Laura Barillas-Mora from the *Leibniz-Institut* and Sebastian Bohm from the TU Ilmenau. It is also possible to work on the topic as part of a bachelor's or master's thesis. Just get in touch with us!

[1] Cassie, A. B. D., Baxter, S., Wettability of porous surfaces, T. Faraday Soc., (40), 546-551 (1944)

Kontakt

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