



Contribution ID: 264

Type: **Poster (+) Presentation**

## Wetting, Imbibition and Switchable Elastocapillarity in Nanoporous Media

*Friday, 4 June 2021 09:40 (1 hour)*

Liquid-infused nanopores play a pivotal role in many natural and technological processes ranging from transport across biomembranes and plant movements to templating processes for nanomaterials and modern concepts of water desalination. Here I will present three experimental studies aimed at the fundamental exploration of wetting and imbibition dynamics in and at nanoporous surfaces (1) as well as studies aimed at employing the coupling of the elasticity of solids with the nano-capillarity of liquids, most prominently water, for the design of adaptive and electrically switchable actuator materials (2,3). To that end opto-fluidic techniques employing photonic crystals will be combined with cyclic voltammetry and high-resolution synchrotron-based X-ray analytics.

(1) L.G. Cench, G. Dittrich, P. Huber, C.L.A. Berli, and R. Urteaga, Precursor Film Spreading during Liquid Imbibition in Nanoporous Photonic Crystals, *Phys. Rev. Lett.* 125, 234502 (2020).

(2) M. Brinker, G. Dittrich, C. Richert, P. Lakner, T. Krekeler, T.F. Keller, N. Huber, and P. Huber, Giant Electrochemical Actuation in a Nanoporous Silicon-Polypyrrole Hybrid Material, *Science Advances* 6, aba1483 (2020).

(3) M. Brinker and P. Huber, Switchable Elastocapillarity in Silicon Nanopores, manuscript.

### Time Block Preference

Time Block A (09:00-12:00 CET)

### References

(1) L.G. Cench, G. Dittrich, P. Huber, C.L.A. Berlin, and R. Urteaga, Precursor Film Spreading during Liquid Imbibition in Nanoporous Photonic Crystals, *Phys. Rev. Lett.* 125, 234502 (2020).

(2) M. Brinker, G. Dittrich, C. Richert, P. Lakner, T. Krekeler, T.F. Keller, N. Huber, and P. Huber, Giant Electrochemical Actuation in a Nanoporous Silicon-Polypyrrole Hybrid Material, *Science Advances* 6, aba1483 (2020).

(3) M. Brinker and P. Huber, Switchable Elastocapillarity in Silicon Nanopores, manuscript.

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**Primary author:** HUBER, Patrick (Hamburg University of Technology)

**Presenter:** HUBER, Patrick (Hamburg University of Technology)

**Session Classification:** Poster +

**Track Classification:** (MS13) Fluids in Nanoporous Media