



Contribution ID: 451

Type: Oral Presentation

## Imbibition-Induced Deformation in Nanoporous Vycor Glass

*Friday, 4 June 2021 14:30 (15 minutes)*

We present time-dependent macroscopic dilatometry experiments on the deformation of nanoporous monoliths (Vycor glass) upon spontaneous, capillarity-driven infiltration of water. We find two distinct dynamical regimes. One of them can be quantitatively traced to deformation originating in changes in the surface stress at the inner pore walls (dynamic Bingham's regime) upon water invasion, whereas the second results from Laplace pressure effects [1,2,3]. Our study demonstrates that it is possible to monitor imbibition dynamics by simply dilatometry measurements.

### Time Block Preference

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

### References

- [1] Gennady Gor, Luca Bertinetti, Noam Bernstein, Peter Fratzl, and Patrick Huber. Elastic response of mesoporous silicon to capillary pressures in the pores. *Appl. Phys. Lett.* (2015)
- [2] Gennady Gor, Patrick Huber, and Noam Bernstein. Adsorption-induced deformation of nanoporous material - A review. *Appl. Phys. Lett.* (2017)
- [3] Gennady Gor, Patrick Huber, and Jörg Weissmüller. elastocapillarity in nanopores: Sorption strain from the actions of surface tension and surface stress. *Phys. Rev. Matter.* (2018)

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**Session Classification:** MS13

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