Contribution ID: **712** Type: **Oral Presentation**

Droplet absorption into thin layers of hydrogel

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Some cross-linked polymers, such as hydrogels, can absorb large quantities of solvents whilst undergoing a large change in volume. These chemically driven flows lead to a strong deformation of the polymer. In our experiments, we place a single droplet of water on a thin layer of strongly swelling polymer. Within minutes, a strongly swollen, very localised blister with a patterned surface forms. Over the next few hours, the pattern vanishes and the blister spreads radially whilst significant swelling remains.
We show that this process is driven by transport of solvent within the polymer and within the vapour contained in the surrounding gas phase. We also show how these two transport phenomena can be experimentally separated to enable the study of the transport within the polymer alone. The long-time dynamics of transport within the polymer is compared against a linear poroelastic model and a poroelastic model with porosity-dependent permeability which agrees well with the observed kinetics and blister shape.

Time Block Preference

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

References

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