

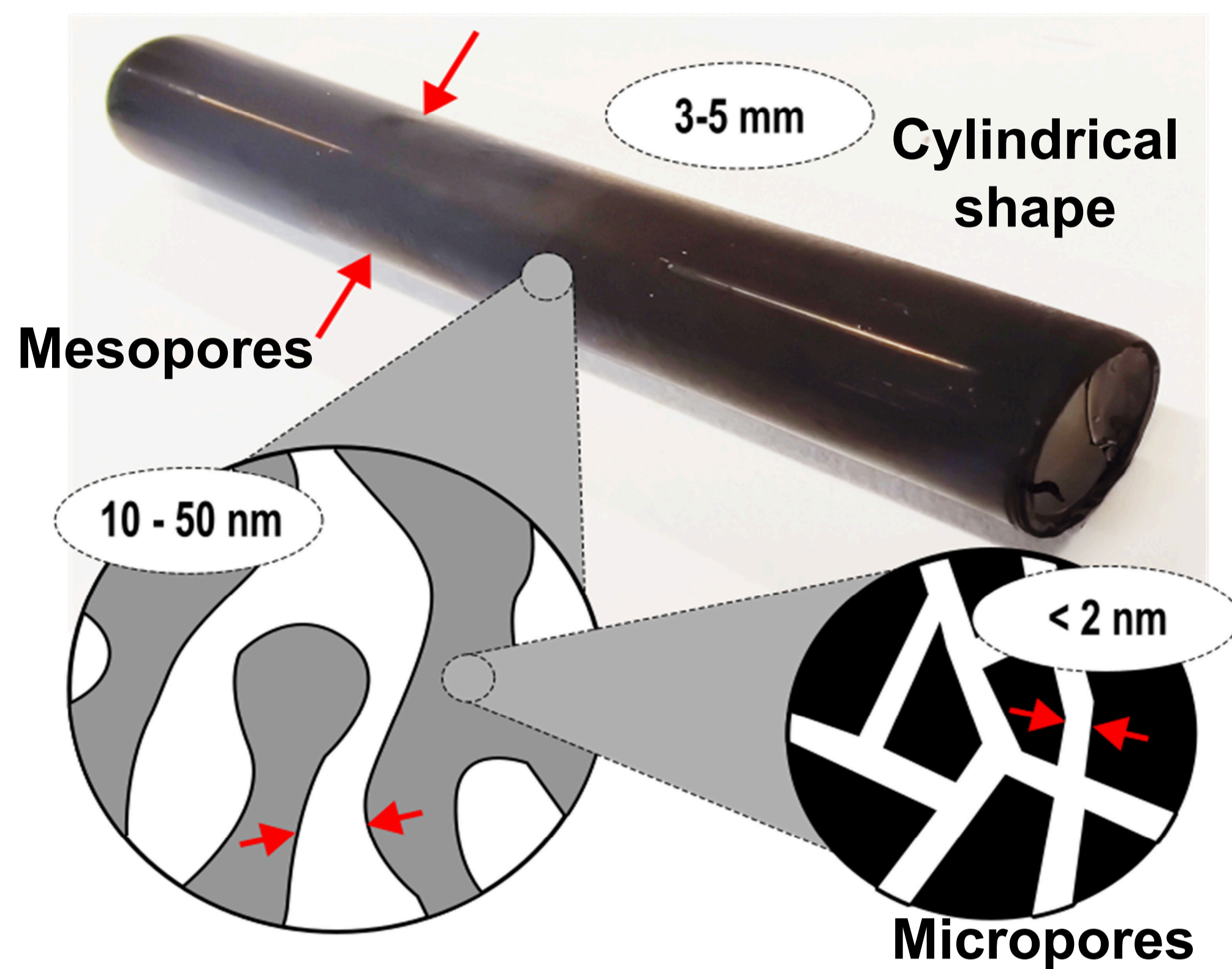
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Many applications of nanoporous solids require that their porosity be filled with liquid. However, wetting conditions of nanometer-sized pores are still not well understood, and the relevance of macroscopic concepts (such as contact angle) is also unclear. The complexity of pore geometry and connectivity is an additional.

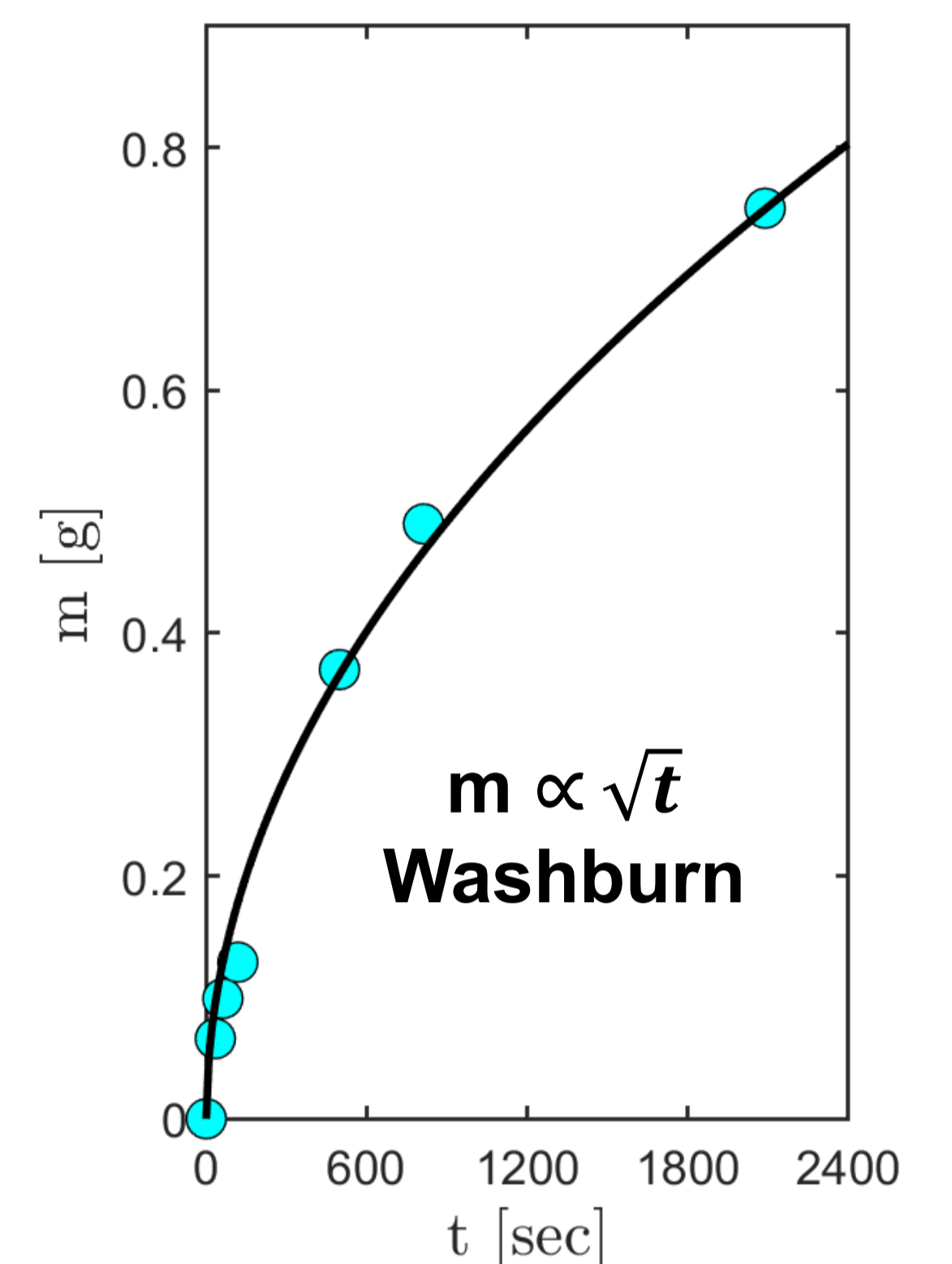
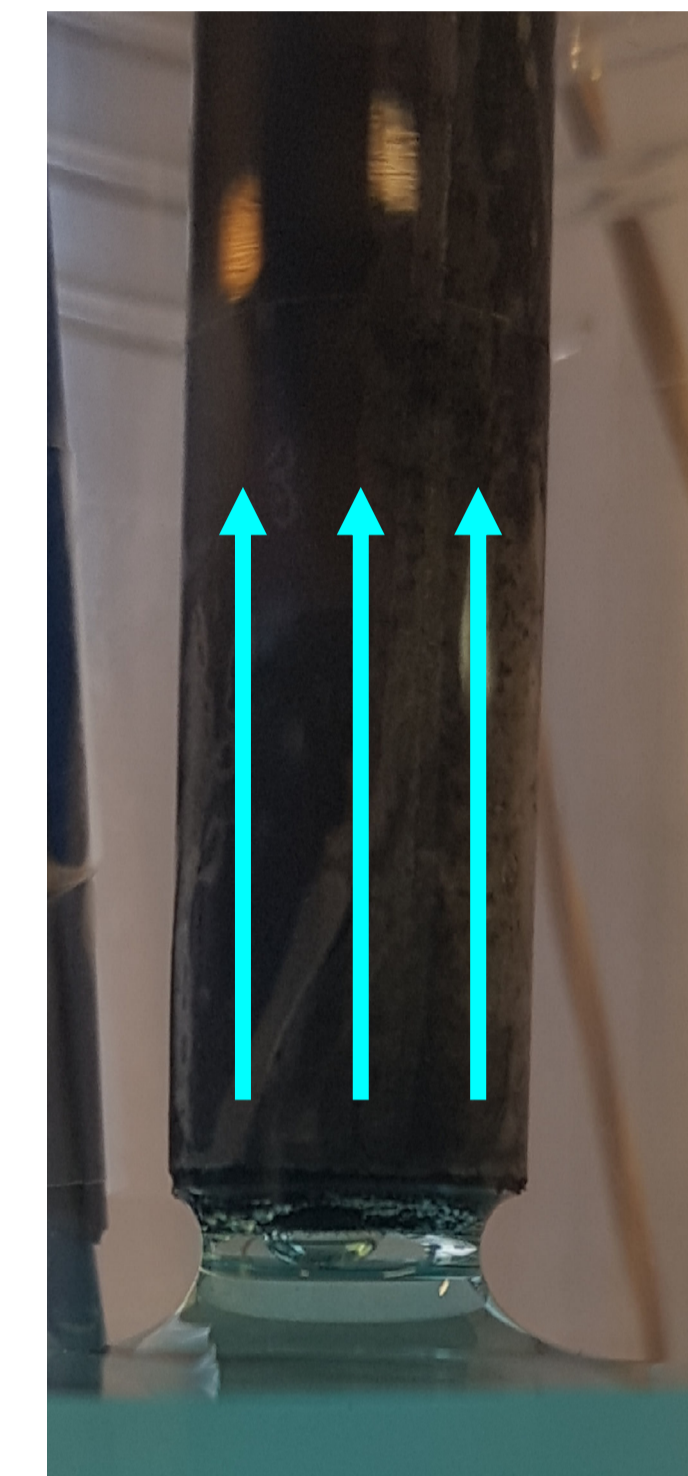
Wetting of micro- and meso-porous carbons



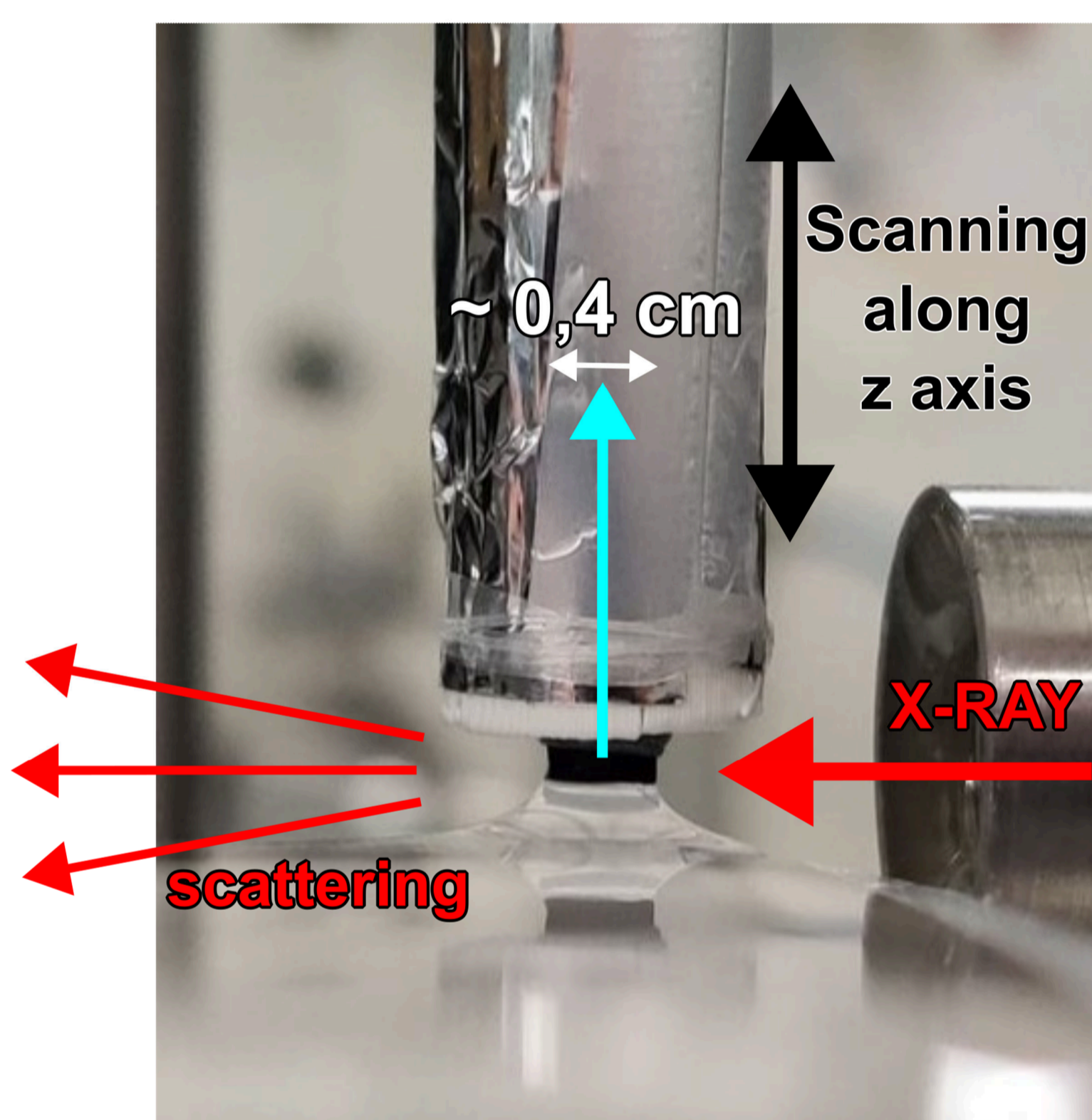
Mass measurements provide data about the volume : mostly biggest pores.

Micropores represent more than 3/4 of the surface area.

How to study the wetting of micropores?

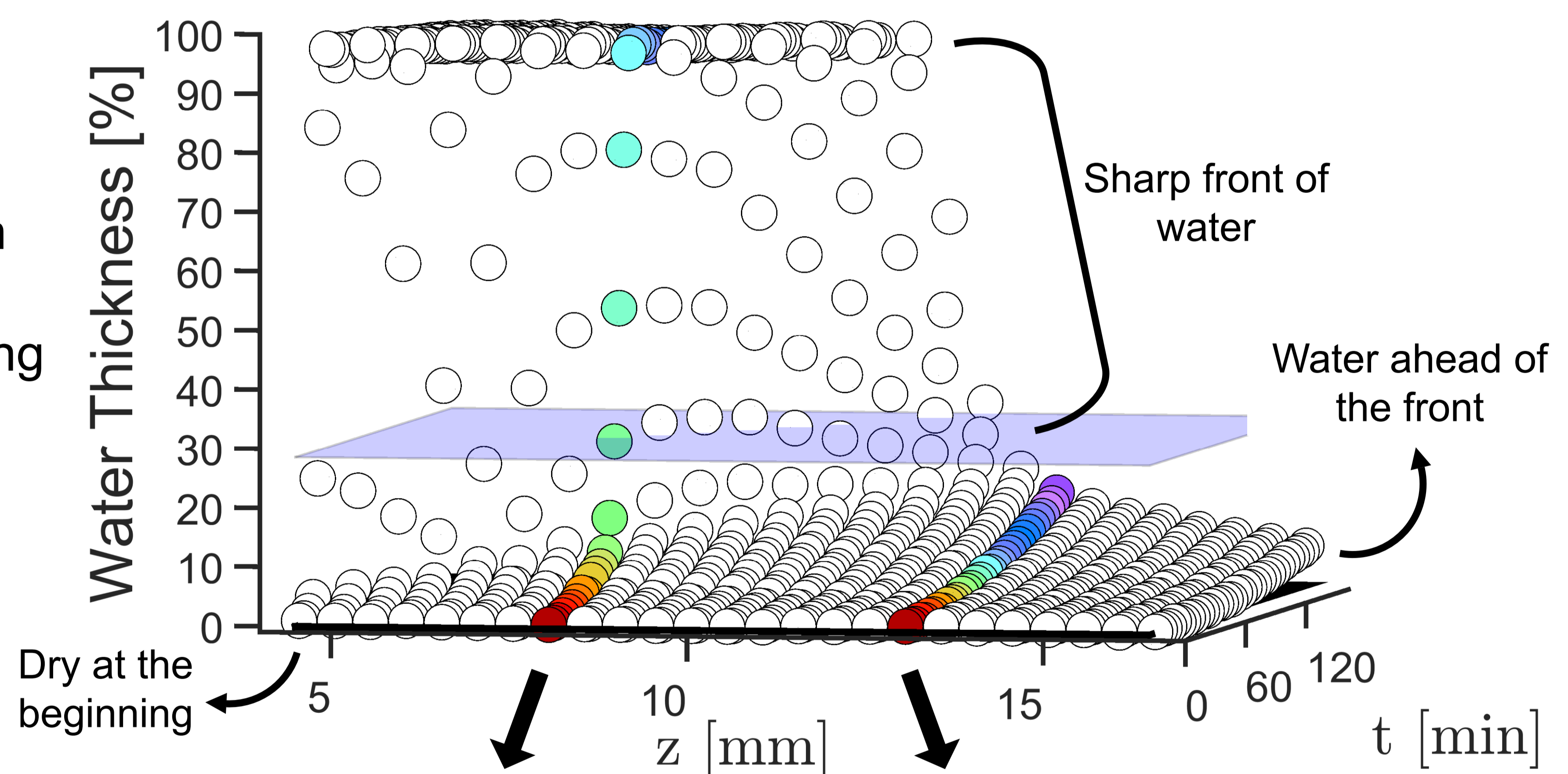


Time resolved synchrotron measurements



Time- and space-resolved SAXS experiments were done at the Belgian beamline BM26@ESRF during capillary rise.

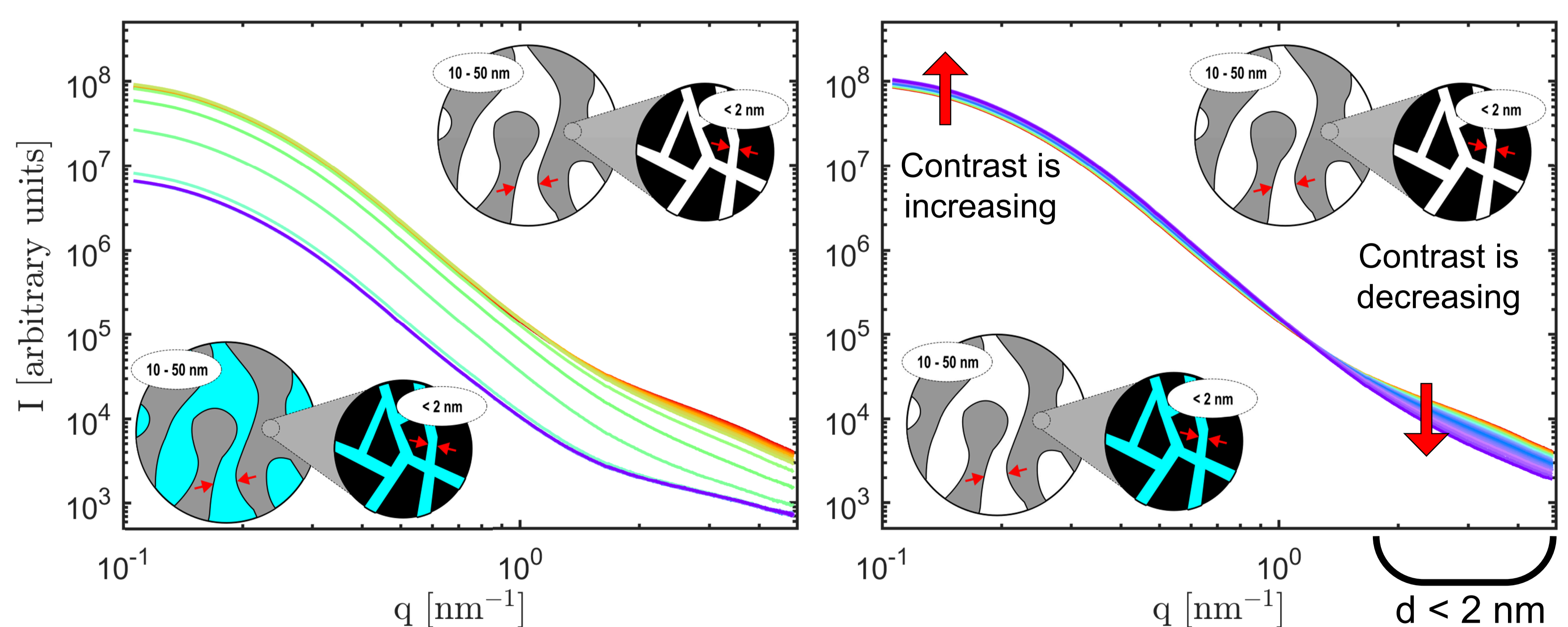
X-ray absorption reveals a 2-step wetting process.



Small-angle scattering study

The intensity scales with the electron density contrast, which decreases when pores fill with water.

- SAXS shows that water wets first the micropores (smaller than 2nm);
- This is followed by the wetting of the mesopores (about 20 nm).



Open Question

What is the structure of the wetting front?

Hopefully, data modelling will enable use to discriminate various filling processes.

