
Contribution ID: **635** Type: **Oral Presentation**

# Progress towards SAXS-based PEFC catalyst layer saturation determination

*Friday, 4 June 2021 15:45 (15 minutes)*

Water management is of high importance to overcome mass transport limitations in polymer electrolyte fuel cells (PEFC) at high current densities. Although the knowledge about water management in the catalyst layer is continuously increasing, it has not been fully understood so far. Within the past decade, numerous methods for *ex-situ* and *operando* imaging of water evolving in the porous structures of the PEFC have been explored, primarily X-ray and neutron imaging methods [1,2]. However, due to the lack of time and/or spatial information of these studies, the catalyst layer saturation mechanism remains unclear.
Here, we propose small angle X-ray scattering (SAXS) as a diagnostic tool for investigating catalyst saturation processes. We confirm that intensity changes in SAXS profiles can be attributed to different pore filling mechanisms with the help of virtual SAXS experiments. A series of experimental studies of *ex-situ* and *in-situ* wetting of catalyst layer was conducted. Stochastic morphological model was used to interpret the data. Derivation of the liquid content inside the catalyst layer was also performed. We believe that the mechanistic knowledge of catalyst layer saturation obtained from this diagnostic tool is essential to move forward materials development for higher performing PEFCs.

## Time Block Preference

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

## References

[1] A. Bazylak, Int. J. Hydrog. Energy. 2009, 34, 3845-3857
[2] P. Boillat et al, Curr. Opin. Electrochem. 2017, 5, 1, 3-10

## Acceptance of Terms and Conditions

Click here to agree

## Newsletter

I do not want to receive the InterPore newsletter

## Student Poster Award

Yes, I would like to enter this submission into the student poster award

**Primary author:** ALIYAH, Kinanti Hantiyana (Paul Scherrer Institut)

**Co-authors:** Dr GUBLER, Lorenz (Electrochemistry Laboratory, Paul Scherrer Institut); ELLER, Jens (Paul Scherrer Institut)

**Presenter:** ALIYAH, Kinanti Hantiyana (Paul Scherrer Institut)

**Session Classification:** MS13

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