	Experiment title: Kinetics of water imbibition at a silicon direct bonding interface	**Experiment number**: 32-02 782
Beamline: BM32	**Date of experiment**: from: 10/12/2015 to: 16/12/2015	**Date of report**:
Shifts:	**Local contact(s)**: TARDIF Samuel	*Received at ESRF:*

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Report:

The goal was to determine the impact of the size of the confinement on the ions distribution profiles at the planar parallel SiO_2 surfaces spaced of 5 nm (nanochannels) in electrolyte solutions containing ions having more or less kosmotrope character using hard X-ray reflectivity. The electron density profiles obtained in such model systems was compared to the one obtained by the atomistic modelling of these silica-based nanoconfinements filled with solutions in order to obtain the ions distribution and the charge surface

We determined the electron density profiles inside silica nanoconfinements (Ph.D of M. Baum between ICSM and CEA-MEM). A summary of the results are presented in Figure 1. We used a silica-based model system consisting in two parallel and plane surfaces spaced of 5 nm (nanochannels) filled with electrolyte solution XCl_2 (with X = Ca^{2+}, Mg^{2+}, Ba^{2+})). From Hard X-ray reflectivity curves (ESRF – BM32) electron density profiles were extracted directly using an inverse Fourier transformation assuming the symmetry of the profile. The same systems were modelled by atomistic modelling and the X-ray reflectivity curves were fitted using the electron density profiles obtained from modelling (Ph.D S. Hocine-Metahri supervised by J.-F. Dufreche and B. Siboulet). The obtained results provided quantitative values of the ions distribution. These preliminary results are, as far as we know, the first ones using an experimental and modelling approach to describe ions and water molecules distribution at the interface of a silica nanoconfinement made of two parallel and plane surfaces.

These results were publised in *Baum et al, 2017.*

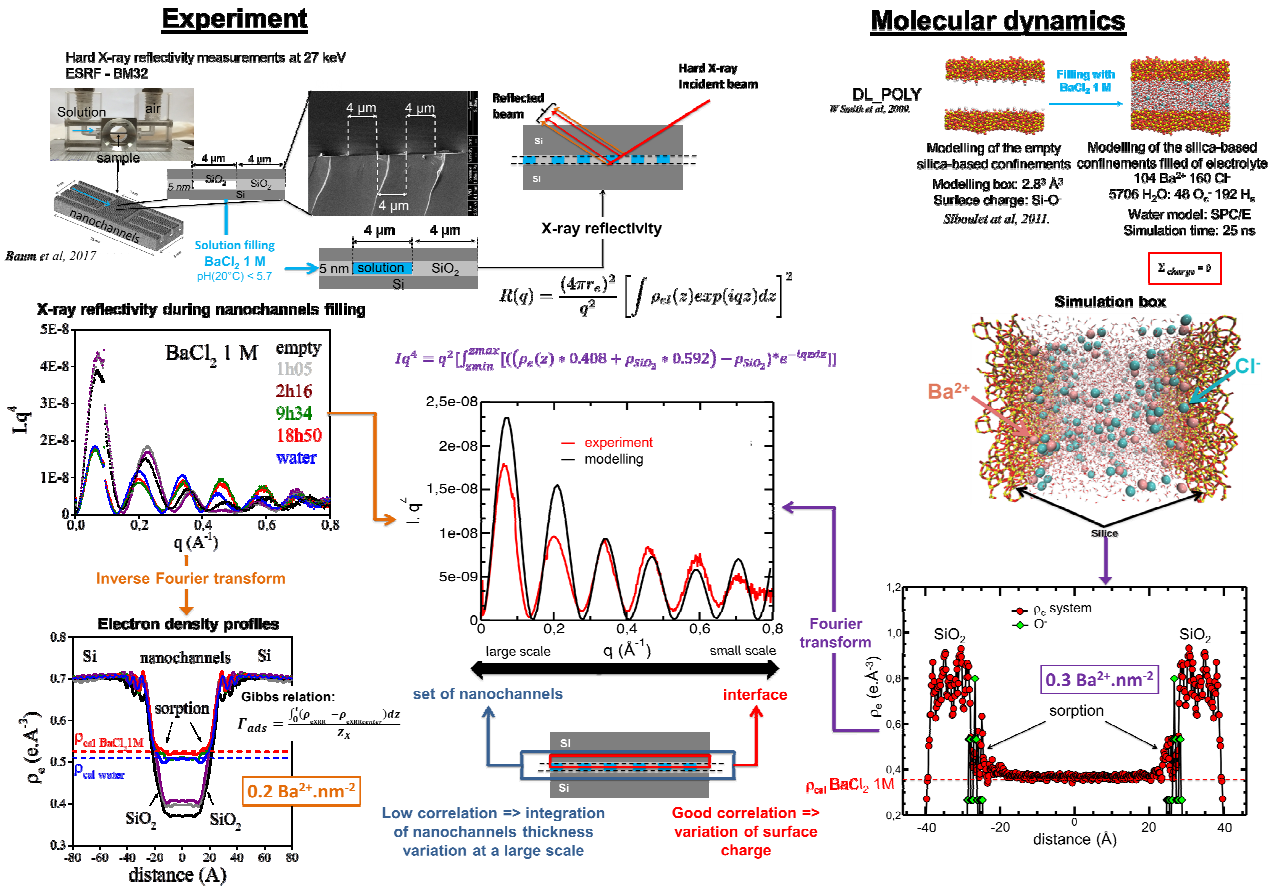

Figure 1: Description of our recent results from our previous experiment at BM32 (Poster at Goldschmidt Conference 2017).

Publication(s):

- Baum, M. et al. Procedia Earth and Planetary Science (2017) 2017,Volume 17, 2017, Pages 682-685

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