Distribution of ions in SiO_2 nanochannels : an experimental and modelling approach

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Chemical reactions occurring at the material–aqueous solution interface are controlled by a diffuse layer, often described with models, which are not validated, in nanoconfined media.

We propose a new approach (Figure 1) using a model system of nanochannels consisting of two parallel SiO_2 surfaces spaced by 5 nm and filled with $BaCl_2$ solution (1M). The nanochannels are modelled by atomistic modelling and characterized by Hard X-ray reflectivity (ESRF, BM32) in order to obtain the electron density profiles. The modelled surface densities of adsorbed ions for various surface charges were used to fit the X-ray reflectivity data.

This method opens new perspectives to a better understanding of water and ion distribution inside nanoconfined media.

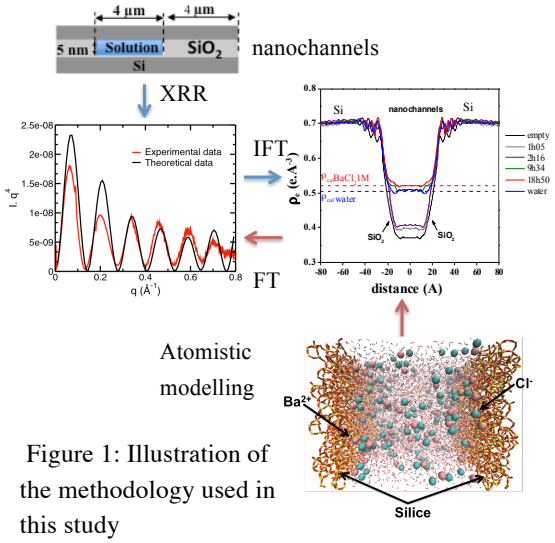

Figure 1: Illustration of the methodology used in this study