

Surface protonics in nanoporous oxides

Truls Norby¹

¹*University of Oslo, Department of Chemistry, Centre for Materials Science and Nanotechnology*

truls.norby@kjemi.uio.no

Porous nanocrystalline materials have large surface-to-bulk ratio, and the protonic conduction in adsorbed water may contribute significantly to or even dominate over that of bulk conduction. This affects insulating and conducting properties, diffusion, kinetics, and catalysis, and may be detrimental or useful. Water adsorbs in one chemisorbed and two types of physisorbed layers (ice-like and liquid-like), from one to a handful of molecular layers and essentially 1-2 nm in thickness. Yet, the protonic conduction can increase many orders of magnitude by just the first physisorbed layer. In the talk, we will describe the adsorption, the structure of the layers, the thermodynamics and mobilities, and the potential consequences and uses as well as remaining mysteries of surface protonics in nanoporous oxides.