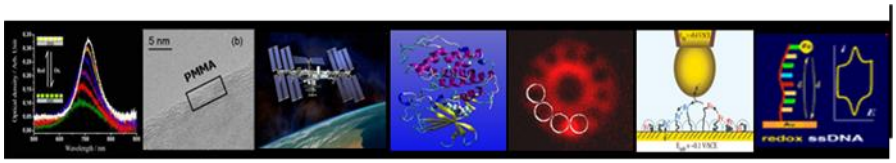

Séminaire de Chimie Autour des Nanosciences

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CHARGE STORAGE IN NANOPOROUS CARBONS: THE MOLECULAR ORIGIN OF SUPERCAPACITANCE

Supercapacitors are electric devices able to deliver a large power, enabling their use e.g. for the recovery of breaking energy in cars and tramways or the emergency door opening in the A380 airliner. This is achieved by using porous carbon electrodes and an electrolyte solution or a pure ionic liquid (Room Temperature Ionic Liquid) [1]. Energy is stored by the adsorption of ions at the surface of the electrodes, but the microscopic mechanism underlying the exceptional performance of Carbide Derived Carbon (CDC) electrodes remained unknown until recently [2]. I will present how molecular simulations allow to uncover the effects of confinement and solvation on the microscopic charging mechanism [3,4]. I will also discuss the dynamics of charging [5] and recent fundamental developments exploiting the charge fluctuations of the electrodes to investigate interfacial properties on the molecular scale [6,7,8].

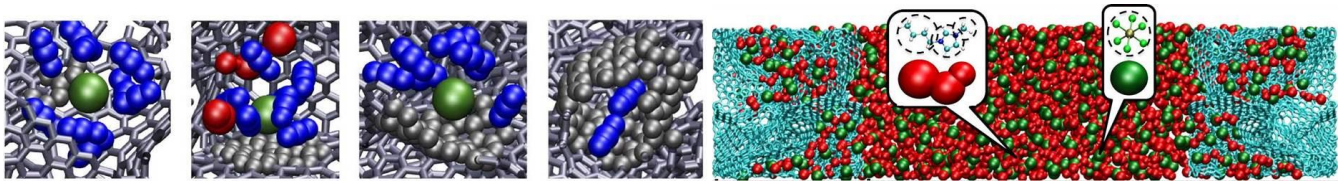

Figure 1. Adsorption of molecular species in a nanoporous electrode.

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[2] Chmiola et al., Science 313, 1760–1763 (2006)
[3] Merlet et al., Nature Materials 11, 306 (2012)
[4] Merlet et al., Nature Communications 4, 2701 (2013)
[5] Péan et al., ACS Nano 8, 1576 (2014)
[6] Limmer et al., Phys. Rev. Lett. 111, 106102 (2013)
[7] Merlet et al., J. Phys. Chem. C 118, 18291 (2014)
[8] Rotenberg and Salanne, J. Phys. Chem. Lett., 6, 4978 (2015)

LE VENDREDI 16 décembre À 11H00

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