UFR de Chimie

Master Molécules, Matériaux, Surfaces

université PARIS DIDEROT PARIS 7

Séminaire de Chimie Autour des Nanosciences

BENEDIKT LASSALLE

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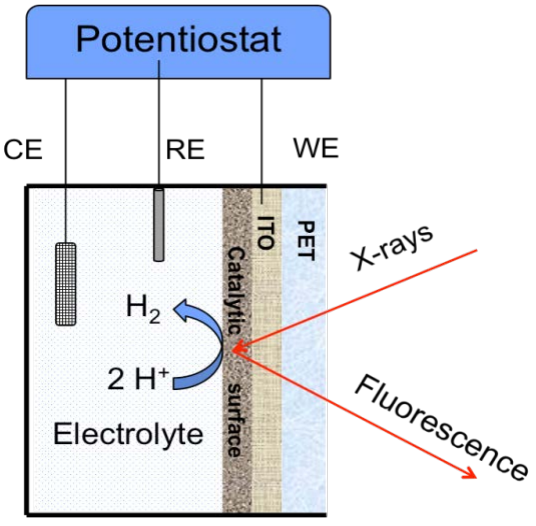
Donnera une conférence sur le thème :

X-RAY SPECTROSCOPY OF WATER-SPLITTING CATALYSTS.

The water-splitting reaction into dioxygen an hydrogen is considered a major technological bottleneck for the advent of a sustainable, hydrogen-based economy. Water-splitting consists of two complementary reactions: water oxidation and hydrogen reduction. As of today, they are both performed by catalysts based on noble metals. As a replacement to these expensive materials, a lot of research efforts are directed towards the preparation of catalytic materials based on non-noble metals. In order to compete with the current catalysts, it is essential to understand the structure and reaction mechanism of newly developped catalysts.

After an introduction on X-ray Absorption (XAS) and Emission (XES) spectroscopies, we will present recent results on water-splitting electrocatalysts studied in situ by a coupled electrochemical/X-ray spectroscopic technique. We will first describe the structure and behavior of a water-oxidizing/dioxygen-reducing bifunctional manganese oxide (MnOx) electrocatalyst based on X-ray absorption data recorded in situ. We will also describe results obtained by a similar technique on a hydrogen-evolving molybdenum sulfide (MoSx) electrocatalyst. In a last part, we will present recent advances in the study of manganese model complexes of the Oxygen Evolving Center (OEC) of Photosystem II, the enzyme responsible for natural water-oxidation. We will show how X-ray Emission Spectroscopy can be used to assess the oxidation, the spin and the protonation state of such complexes.



LE VENDREDI 23 Janvier À 11H00

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