

!!! ATTENTION jour, heure et lieu inhabituels !!!

Séminaire SOLEIL

Probing Environmental Nanoparticles and Chemical Reactions at Solid- Water-Microbial Biofilm Interfaces with Synchrotron Light

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Invité par Jean-Pierre SAMAMA

Mardi 15 mai à 11h00
Amphi Bât. Accueil SOLEIL

Synchrotron light sources are now utilized in most areas of science and engineering to probe structure-function relationships of matter and to understand chemical, biological, and physical processes responsible for many phenomena such as the release of arsenic into groundwater in SE Asia, phase transitions, melting of solids, superconductivity, heterogeneous catalysis, and photosynthesis over a range of conditions. My usage of synchrotron light sources began in the late 1970's when I first used EXAFS spectroscopy at SSRL to determine the local cation environments in aluminosilicate glasses and later aluminosilicate liquids at high temperature. I also used LURE and ACO in the early 1980's for similar studies. Over the intervening years, my interests have evolved to the chemistry occurring at solid-aqueous solution interfaces, to microbe-solid interactions, and to the structure and reactivity of natural and engineered nanoparticles, and my group is now using SSRL, ALS, and APS to probe these interfaces and nanoparticles. Today, my talk will focus on the application of synchrotron light sources in four areas of relevance to environmental chemistry. The first involves ambient-pressure x-ray photoelectron spectroscopy studies at the ALS of the interaction of water with metal oxide surfaces, which is one of the most fundamental reactions in the environment. The second involves EXAFS studies of the interaction of arsenic with the surfaces of iron oxide nanoparticles and its release due to microbial activity, which are responsible for the largest mass poisoning in human history in SE Asia. The third involves long-period x-ray standing wave-fluorescent yield spectroscopy and grazing-incidence EXAFS studies of the effect of microbial biofilms on metal oxide surfaces on the reactivity of these surfaces with respect to common contaminant/nutrient ions such as Pb(II) and Zn(II). The fourth involves EXAFS and high-energy x-ray total scattering studies, coupled with pair distribution function analysis, of the structure of natural ferrihydrite and engineered silver nanoparticles and the effects of impurity ions and environmental transformations on their reactivities, and in the case of Ag nanoparticles, their toxicity to organisms.

Formalités d'entrée : accès libre dans l'amphi du Pavillon d'Accueil. Si la manifestation a lieu dans le Grand Amphi SOLEIL du Bâtiment Central, merci de vous munir d'une pièce d'identité (à échanger à l'accueil contre un badge d'accès).

SYNCHROTRON SOLEIL

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