

Project / partners search for calls

FP7- KBBE-Environment



University of Reims Champagne-Ardenne, Institute of Reims Molecular Chemistry, UMR CNRS 6229 is seeking to join a research proposal in the course of elaboration as partner on the following themes:

- KBBE.2010.1.2-05**: Integrated pest management in farming systems of major importance for Europe
- **KBBE.2010.3.5-01**: Biotechnology for the environment - Soil and water treatment and bioremediation
- **ENV.2010.1.2.2.2** : Human health effects of exposure to pharmaceuticals released into the environment
- **ENV.2010.3.1.1.2** : Municipal sludge treatment and management
- **ENV.2010.3.1.3.2** : Innovative technologies and systems solutions for municipal solid waste management in densely populated cities

Theme: Soil properties and processes, assessing organic and inorganic pollutants life cycles

Objective: We can have a significant role in projects aiming to study and understand the impact of organic and inorganic pollutants in soils. The soil system should be considered within a multi-scale approach, from molecular scale to basin bank scale.

Our competency: Chemistry applied to environmental topics: geochemical approach of the soils pollution by organic (pesticides, PAH ...) and inorganic (metallic cations) pollutants. Study of the understanding of pollutants transfer phenomena toward surface- and ground-waters. Search for remediation means of water pollution, application to the improvement of water quality.

Context: Chemical risk management and the choice of a rehabilitation process of a contaminated site by pollutants depend less on their concentration in soils, sediments or waters than their mobility and bioavailability toward plants, animals, and population. Now the migration capacity and the fate of a pollutant in the environment are closely related to its chemical form and to the atomic scale environment. The research activities of our team are notably oriented towards the identification of the majority forms of the pollutants in soils using various spectroscopic or physico-chemical techniques.

Within the framework of pollutants fate in environment, the safety assessment requires a complete knowledge of the mechanisms involved at the aqueous solution/mineral interface. Since pollutants migration through the geosphere is mainly governed by sorption and/or precipitation phenomena, it appears to be fundamental to investigate the retention processes at a molecular level. In such a way, the major experimental limitation arises from the difficulty to extract a local phenomenon contribution from the macroscopic system. Therefore, the use of atomic scale modelling makes possible to evaluate the contribution of each component of the global system. Multi-component reactive transport models are used to simulate the fate of chemical species in subsurface environments. These models account for the coupling of surface and homogeneous chemical reactions and physical transport processes. Efforts are also underway to obtain in-situ, on-line chemical front data, instead of the classical " break through curves ", and to couple transport in the aqueous phase to eventual redox reactions.

In a more prospective view, it could also be considered to develop integrated soil system models that can be transferred across a wide range of temporal and spatial scales, addressing the entire life cycle of soil systems and thus underpinning their restoration and sustainable management.

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