



UNIVERSITE DE NANTES

# Internships 2013

## Study of platinum-mineral surface interaction

(4 months)

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### Description :

For the past two decades, personal vehicles are equipped with a catalytic converter, allowing the degradation of 95% of pollutant emission, such as  $\text{NO}_x$  gaz. This degradation is catalyzed par nanoparticles of platinum, palladium, rhodium, *etc.* deposited at the internal ceramic surface of the converter. These elements do not participate to the reaction per say, but can be dispersed in the environment after partial degradation of the converter ceramic, and accumulate in the urban soils in the vicinity of roads and motorways. Though these chemical elements are thought to be non-reactive chemically, they can act as strong catalyst of undesirable reactions in the environment. It appears then fundamental to understand the fate of these elements in the environment, that is, their mobility, speciation, and interaction with the minerals surface in the soil.

In this project, the focus will be made on the interaction of platinum with reference mineral of a soil (iron oxide, clay ...). The initial step will be the synthesis of oxide or purification of a reference clay, and its characterization with classical laboratory techniques: X-ray diffraction, particle seizer, *etc.* Then sorption experiments of platinum on the mineral surface will be conducted for different Pt concentrations, and followed by ICP measurements. Finally, interaction of Pt with the mineral surface will be modeled and compared with the evolution of the mineral surface followed by zetametry, and optic spectroscopy. Localization of the platinum on the mineral surface could also be imaged by electron microscopy.