Ph.D. defense

Institut de Chimie Séparative de Marcoule / CEA Marcoule
(UMR 5257, CEA, CNRS, Université Montpellier, ENSCM)

VIOLAINE GOUDY

will present her Ph.D. dissertation

Synthesis, characterization and reactivity of polymetallic compounds for photochemistry and charge-transfer

The defense will take place on **Tuesday, November 24, 2015** at **2.00 pm**

in the ICSM Auditorium

This work falls within the global project of the light energy conversion and storage. These systems require the association of several molecular constituents as a photosensitizer coupled to a catalyst. In order to improve the fundamental understanding on photo-induced charge transfer, the photo-physical behavior of molecular species was compared to their coordination polymers analogs. The first step of this work was to develop a synthetic pathway leading to bimetallic molecular species through an organic bridging ligand and to their coordination polymers analogs. The electro-chemical and photochemical studies of molecular species incorporating one or two photosensitizing units highlight the essential parameters for a photo-induced charge transfer. The effect of the nature and structure of the complexes and the ligands (ancillary ligands and bridging ligands) on physico-chemical properties was studied. Complexation of cobalt induces a significant drop of the excited state lifetime assigned to an electronic communication between the two metallic centers. Incorporation of electro-donating substituents on the ancillary ligands linked to the photosensitizer unit leads to a better electron transfer to the second metal center. Then the study was focused on the coordination polymer (PC) analogs. Two kinds of PC were synthesized, a first one incorporating only photosensitizing units as nodes, the catalyst being coordinated to the organic ligand, a second one with photosensitizing and catalytic units as nodes. These amorphous materials were synthesized and their photo-physical properties were studied. Finally the first attempts for the photo reduction of CO_2 and protons were realized on molecular species and coordination polymers.

Keywords: Synthesis; Characterization; Photochemistry; Electrochemistry; Coordination polymers; Molecular materials