May, 2013

ANR MEPHISTO project (2010-2014)

MEcanism of **Ph**otochemistry at **I**nterfaces **:**
Study of **T**ransient reactive **O**xygen species

Post-doctoral position: Fluorescence spectroscopy and microscopy for the study of oxidation mechanisms at the solid-gas interface.

Profile: Physicist with skills in optics, microscopy, spectroscopy, data processing including basic programming.

Location: Pau (IPREM-ECP UMR CNRS 5254, Université de Pau et Pays de l'Adour)

Duration: 12 months, starting earliest from October 2013

Salary: 2 600 €/month (gross), 2 000 € (net)

Characterization of the photoinduced Reactive Oxygen Species at the gas-solid interface by fluorescence microscopy/spectroscopy for a better understanding of photocatalysis/photooxidation mechanism

Photocatalysis with titanium dioxide has found widespread use in environmental improvement, photovoltaic cells, sensors, super-hydrophilic photoactivated surfaces and so on. However there is a need for materials active under visible light. Besides modified TiO_2, other efficient materials for partial oxidation and disinfection using visible light may be prepared doping or grafting photo-sensitizers of reactive oxygen species (ROS's) in porous inorganic hosts. The aim of the MEPHISTO project is a better understanding of the oxidation mechanisms with these different kinds of materials (prepared by other team members), by using steady-state and time-resolved spectroscopy and microscopy.

The main task of the post-doc is to identify reactive oxygen species produced by various materials, using fluorescence microscopy of dyes spin-coated on thin film samples.

This project will involve:

- Classical absorption and fluorescence spectroscopy of solutions and solids.
- Preparing and spin-coating high quality solutions of dyes on thin film materials of interest.
- Development of the UV-illumination optical path in a confocal microscope in order to illuminate simultaneously or consecutively the photocatalytic or the photooxidative film and the fluorescent probe molecules sensitive to specific ROS's.
- Quantitative fluorescence microscopy, with the attendant data processing, to evaluate the ROS's produced under different ambient conditions (oxygen level, humidity,...).

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