



PhD position(s) (M/F): investigating the spontaneous oxidant formation at the air/water interface

PhD overview

Aerosols and clouds are key players in tropospheric chemistry. These tiny particles suspended in the air, with a radius ranging from a few nanometres to tens of micrometres, impact atmospheric composition, represent one of the largest uncertainties in climatic projections and cause millions of deaths worldwide every year. Hence, they have enormous societal and economic consequences. Nonetheless, there is still a knowledge gap preventing us from describing the chemical evolution of aerosols and clouds during their atmospheric lifetime.

Water molecules in bulk liquid are stable and inert under ambient conditions. In sharp contrast, it was very recently shown that the local orientation of water molecules at an air/water interface induces an electric field that generates spontaneous radicals in micron-sized droplets. This production does not involve any catalysts such as light or heat. It is an intrinsic property of the air/water interface, and therefore potentially ubiquitous in the troposphere.

This PhD project aims to unravel the atmospheric importance of this interfacial chemistry by means of (i) laboratory-based investigations, (ii) field observations and (iii) modelling. These activities will take place in the frame of an ERC funded project.

Activities

The recruited person(s) will perform either laboratory-based experiments, field measurements or numerical modelling, depending in the applicant's profile.

The experimental activities will involve various advanced high-resolution mass spectrometers (Orbitrap, Vocus, ...), optical techniques (fluorescence, optical tweezers,...), aerosol flow tubes and an atmospheric simulation chamber.

The modelling aspects will cover the development of a new aerosol chemistry module for box models up to meso-scale modelling.

Skills

The candidate should be fluent in English and have excellent communication, organization, planning and interpersonal skills, along with a strong scientific spirit.

The successful applicant should have a strong interest in experimental atmospheric chemistry. Applicants should have good knowledge of either analytical, physical or atmospheric chemistry. Ideally, applicants should also have a talent for experimental research involving instrumentation and spectroscopy for atmospheric applications.

Work context

The researcher will work in the CARE team (Characterisation and Remediation of pollutants, <https://www.ircelyon.univ-lyon1.fr/en/team/characterization-and-remediation-of-pollutants-in-air-and-water/>), of the Institute of Researches on Catalysis and Environment of LYON (IRCELYON). This academic laboratory located in Villeurbanne (France) is one the largest one in Europe devoted to heterogeneous catalysis. The CARE group is focus on environmental topics.

Application & further information

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