



## PhD position on “Mechanistic investigation of photocatalytic deoxygenation of N-O and S-O bonds”

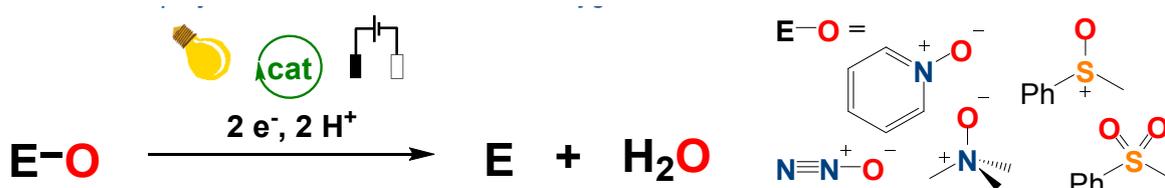
Workplace : CEA-Saclay Institutes JOLIOT and IRAMIS

Supervision : Annamaria Quaranta (Institut JOLIOT)/ Emmanuel Nicolas (IRAMIS)

Start date: October 2022

### Context and aim of the project

The deoxygenation of N-O and S-O bonds is a chemical challenge, and is key to provide interconversion pathways between various oxidation states of N and S containing compounds. These processes are necessary to close the nitrogen and sulphur cycles which are at the moment open due to human activities. Deoxygenation of N-O and S-O bonds currently rely on thermochemical methods and sacrificial reducing agents. The ANR-funded *DeNOSOx* project aims at developing transition metal based molecular catalysts for the selective and efficient photo- and electro-catalytic deoxygenation of N-O and S-O bonds, through mechanistic investigations.



In the frame of this collaborative project, the proposed PhD thesis will focus on the investigation of the (photo)-catalytic process, employing complementary spectroscopic techniques, namely electronic and vibrational spectroscopies. Time-resolved photophysical studies will also be performed to get insights on the initial steps of the photocatalysis, as well as on short-lived transient species. Whenever relevant, putative intermediates will be generated by chemical synthesis and characterized by NMR, UV-vis, IR spectroscopy.

### Job description

The work will be carried out between CEA Institutes JOLIOT (Annamaria Quaranta) and IRAMIS (Emmanuel Nicolas). The PhD student will synthesise the metal based molecular catalysts and perform mechanistic investigation of the catalytic processes using different spectroscopic techniques including time-resolved visible and FTIR spectroscopies.

### Candidate profile

We seek a motivated PhD researcher holding a master degree in physical chemistry. Some experience in organometallic synthesis will be appreciated. The candidate should be able to work within an interdisciplinary team and have excellent communication skills. Interested candidates should send a CV, cover letter and the names of two referees.

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