

Two-year postdoctoral position in bioinorganic chemistry in Marseille

Offer description

A postdoctoral position (expected starting date: autumn 2023) is available at the "Institut des Sciences Moléculaires de Marseille" (iSm2, UMR 7313) within the frame of an ANR-funded project. The laboratory is located in Saint-Jérôme campus of Aix-Marseille University.

Project

The selective functionalization of alkanes by energy-efficient, environmentally-benign and cost-effective catalytic devices is a formidable challenge for the near-future of our society. In particular, the activation and selective hydroxylation of strong C-H bonds (Bond Dissociation Energy > 90 kcal/mol) remains a challenge. Lytic Polysaccharide Mono- Oxygenase (LPMO) able to perform hydroxylation of the strong C-H bonds of recalcitrant polysaccharides (*e.g.* cellulose or chitin). LPMO were shown to contain a mononuclear copper active site and high-valent copper oxygen species have been proposed as key oxidizing intermediates formed during the reaction mechanism.

To date, very few mononuclear high-valent copper-oxygen intermediates have been isolated and characterized. In this project, we aim at (i) designing mononuclear bioinspired copper complexes to stabilize high-valent copper species, (ii) determining spectroscopic, thermodynamic and kinetic properties of the trapped reactive intermediates using both experimental and theoretical approaches, and (iii) evaluating their catalytic properties for C-H bond activation. The project will thus cover different fields including the synthesis and characterization of new ligands and complexes, the generation and identification of the reactive intermediate species and the catalytic studies for substrate oxidation.

Through the consortium of the project (COSACH, ANR-22-CE07-0032), one important aspect will rely on the use of original techniques such as cryo-spectroelectrochemistry and sequential-collisions mass spectrometry.

The candidate will join the Biosciences group of iSm2 (<https://ism2.univ-amu.fr/fr/biosciences/biosciences>) which has a strong expertise in the study of metalloenzymes and in the development of bioinspired metal complexes. The candidate will evolve in a multidisciplinary environment at the interface between chemistry, biology and biophysics. In particular, the group is involved in structure-function relationships studies of LPMO. Knowledge on the enzymatic system will therefore be available to strengthen the development of bioinspired complexes.

Candidate profile and skills

Expected competences

- Strong experience in synthesis and coordination chemistry
- Solid background in electrochemistry and in spectroscopic tools for the characterization of coordination complexes
- Knowledge in quantum chemistry will be a plus

Application:

Applications have to be exclusively submitted online *via* the CNRS job portal (<https://emploi.cnrs.fr/Offres/CDD/UMR7313-ARISIM-002/Default.aspx?lang=EN>)

- A CV including a brief summary of the thesis work and of other research experiences
- A motivation letter
- Names of two references

Contact details

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