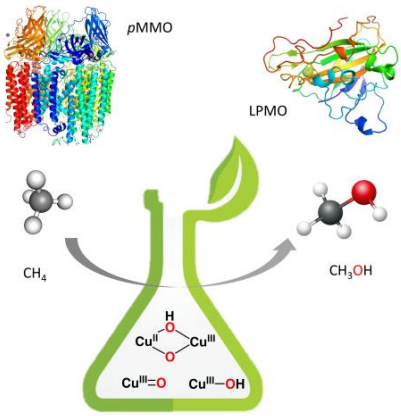
Chimie Electrochimie Moléculaires et Chimie Analytique
UMR CNRS 6521, University of Brest
France

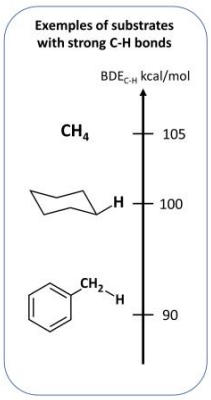
Catalytic oxidation of alkanes by reactive copper-oxygen adducts

Contract type: PhD Thesis
Contract period: 1st October 2023 – 30th September 2026
Net salary: Approx. 20 k€ /year

Host laboratory: The CEMCA laboratory is a CNRS/UBO associated unit (UMR 6521) based in Brest counting approximately 65 members. The laboratory is a major player in the field of molecular chemistry through national and international projects. The PhD student will integrate the SPECTRE team which investigates the activation of small molecules by inorganic complexes for several applications in the areas of catalysis and detection.

Mission: The objective of the PhD thesis is to develop new mononuclear and dinuclear synthetic models of Cu monooxygenases, in order to catalyze the oxidation of alkanes in the presence of dioxygen. The synthesized complexes will be characterized by various spectroscopic techniques (UV - Vis, IR, EPR, NMR…) and the electron transfer and dioxygen activation process scrutinized by electrochemistry in Brest. Special emphasis will be placed on the characterization of copper-oxygen adducts by cryo-spectroelectrochemical techniques for a full correlation with mechanisms occurring in related Cu enzymes. Immobilization of the Cu complexes onto electrodes will be also developed to perform heterogeneous catalysis.





Candidate profile: The candidate (M/W) will lead the project from the synthesis of ligands and complexes (performed in associated teams) to their spectroscopic and electrochemical analysis. A good knowledge in inorganic/bioinorganic chemistry is necessary. Additional skills in electrochemistry (molecular and/or surface modification) and electronic spectroscopy (EPR) will be appreciated. The candidate must demonstrate enthusiasm, initiative and autonomy to manage the project and enjoy teamwork.

Collaborations: UMR CNRS 7313 (Marseille), UMR CNRS 5250 (Grenoble), JHU (Baltimore)

Contact: Dr. Nicolas LE POUL (CR CNRS); nicolas.lepoul@univ-brest.fr

Application procedure (mandatory, deadline 17 July 2023):
https://emploi.cnrs.fr/Offres/Doctorant/UMR6521-NICLEP-002/Default.aspx?lang=EN

Required documents: CV, Motivation letter, Master 2 grade

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