

PhD position

From homogeneous Water Oxidation Catalysts to functional building blocks for hierarchically porous electrodes

CONTEXT - SCIENTIFIC FRAMEWORK

EnSuTe aims at bringing Green Hydrogen Generation from bio-inspired research to a higher technology readiness level (TRL1 to TRL4) addressing issues as the sustainability of the materials used, the design of the devices available and the consumed energy of the electrolyser, that current existing technology presents.

Moreover, in a holistic approach, EnSuTe will gather together the technological research with a social dimension to tackle legal, economic and social topics to make GHG and use a real, sustainable energy solution for isolated and solidarity territories. These first studies in isolated communities will give a sight of the potential implementation in larger and complex territories.

Bio-inspiration will be the project's guideline. At the technical level, integrating such concepts implies to take profit of the thousand-years-old evolution report of the animal and plant kingdom with their environment, around 3 inseparable major pillars: (1) chemical composition to lead to features, (2) molecular or macromolecular structure to create elementary building blocks, and finally (3) hierarchical architecture of materials combined to the processes of the elementary building blocks self-assembly, to promote and enhance properties of the living entities "devices" allowing in a way or in other one to favour their development and then Life diversity.

MISSION - MAIN ACTIVITIES:

In this PhD project you will work on the optimization of water oxidation catalysts WOC using efficient, robust, and earth abundant atoms. You will work on the Synthesis and characterization of homogeneous catalysts, the catalyst heterogenization as building blocks for electrodes and the reactivity modelling of WOC in molecular or conjugated states.

POSITION AND ASSIGNMENTS

The position has its focus on the synthesis and optimization of water oxidation catalysts and their heterogenization on conductive materials.

The successful candidate will contribute to the following tasks:

- Synthesis of molecular Water Oxidation Catalysts (WOC)
- Catalyst heterogenization
- Reactivity modelling of WOC in molecular or conjugated states

The position includes research and teaching duties (32h/year). The position will also include international travel to conferences and meetings with partners/collaborators.

WORKING CONDITIONS

The chosen candidate will be working with an inter-disciplinary supervisory team (ICIQ (Spain)/IPREM (France)) and benefit from a world-class programme.

Hosting laboratories:

IPREM, UMR CNRS 5254, Université de Pau et des Pays de l'Adour

IPREM is a joint Research Unit CNRS/UPPA (UMR 5254) in France. IPREM has an extensive and highly competitive research program that comprises the development of fundamental knowledge in physical-chemistry, analytical chemistry and synthesis of functional/bio-inspired materials, in relation to conversion and electrochemical/chemical storage of renewable energies.

ICIQ, The Institute of Chemical Research of Catalonia, is a non-profit research organization. ICIQ's mission is to perform excellent research at the frontier of knowledge in two main areas of chemical research: catalysis and renewable energy. The main aim of ICIQ is to train the future generation of scientists by offering high-quality educational programmes to master, PhD students and postdoctoral researchers. The group of A. Llobet focuses on the development of homogeneous catalytic systems for efficient and sustainable catalytic processes from a molecular perspective, particularly in the field of artificial photosynthesis.

EnSuite research team – Thesis supervisors: The challenges presented at **EnSuite** are great, but the potential rewards are enormous. To work in this project, we will make use of advanced experimental techniques and knowledge of **Prof. Antoni Llobet** (ICIQ, Spain) and **Prof. Laurent Billon** (Bio-inspired materials group: functionality & self-assembly at Université de Pau et des Pays de l'Adour/Energy & Environment solutions UPPA/E2S, France).

Localisation addresses:

IPREM, Université de Pau et des Pays de l'Adour, Pau, Nouvelle-Aquitaine, France

ICIQ, Avda. Països Catalans, 16 43007 Tarragona, Spain

Starting period: November 2020 or as otherwise agreed.

Duration of the contract: three years with 12 to 18 months in ICIQ.

Gross salary range: 1 870 € / month (which includes extra gratification for teaching duties – 32h per year)

Funding: This position is funded by the project E2S UPPA (Energy Environment Solutions) which has a core scientific domain focused on Environment and Energy to meet challenges related to the energy transition, geo-resources, aquatic habitats and the environmental effects of natural and anthropogenic changes.

<https://e2s-uppa.eu/en/index.html>

APPLICANT'S PROFILE

Priority will be given to candidates holding a master's degree in Chemistry, organic, organo-metallic or polymer. A strong interest in material science and advanced organic and polymeric synthetic skills are suited. Interested in the catalytic and electrochemical characterization of the functional materials and their application as anodes in the water splitting process.

Extensive experience in experimental research in molecular and supramolecular chemistry, structure-properties association, catalytic and electrochemical characterization of functional materials.

The ranking will also accord weight to the candidates assessed competence in ability to interact effectively in a multi-disciplinary research environment.

The applicant must be proficient in spoken and written English. French knowledge would be desirable, but non mandatory.

ADDITIONAL QUALIFICATIONS

The chosen candidate should have self-motivation and the ability to achieve goals independently as well as to contribute effectively to the team. He/she should have a strong motivation to pursue a carrier in a cross-disciplinary cutting-edge domain with mobility between Tarragona and Pau.

Excellent communication skills and willingness to work in collaborative projects with multiple partners. Furthermore, the candidate should be familiar with environmental, health and safety (EHS) requirements.

APPLICATION – EVALUATION CRITERIA

Application file assessment: Selection committee

Candidates will first be selected based on their application file.

Those selected after this first step, will then be interviewed, by teleconference/skype by the selection committee.

Application files will be evaluated based on the following criteria:

- Grades and ranking during your Master's degree, steadiness in your academic background
- Appropriate education and work/research in related fields.
- English language proficiency
- Candidate's ability to present her/his work and results
- Candidate's motivation, knowledge, scientific maturity, and curiosity.
- Emphasis will also be placed on personal skills.
- Work experience similar to an internship in a laboratory – or likewise; previously achieved research work (reports, publications).

Selections will be made regardless of gender, nationality, religion, ethnicity, and cultural background.

Application will include: *(in a single pdf file)*

- CV
- Cover letter
- Master's degree grade transcripts and ranking
- 2 Reference letters
- Contact details of at least two people, from you work environment, who can be contacted for further reference
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APPLY FOR THIS JOB

Send your application (CV, motivation letter, 2 reference together with copy of the candidate's PhD thesis diploma) with the title "ENSUITE - WOC doctoral application" to the following address:

laurent.billon@univ-pau.fr

laia.francesch@univ-pau.fr

For more details, please visit our websites: <http://e2s-uppa.eu/en/index.html>

The closing date for receipt of applications is **October 26th 2020**, 17:00 Paris Time (CET or GMT+1)