PhD Offer: Synthesis of catalysts from waste for green hydrogen production.

(Located at Lyon 2 years + 1 year Singapore)

This PhD proposal outlines an innovative research project focused on developing advanced electrocatalytic materials for sustainable hydrogen production. The central theme turns around valorizing industrial waste streams—lithium-ion battery components and bio-derived polymers—to create novel catalysts for the oxygen evolution reaction (OER) in alkaline environments. A key aspect of this work involves implementing an environmentally conscious recycling approach, utilizing mild reagents and naturally derived compounds to recover valuable metals. The recovered materials will be integrated with modified biopolymers to form composite precursors. These composites will then be transformed into highly efficient, metal-doped carbon electrocatalysts. The project will use artificial intelligence (AI), to accelerate the discovery and optimization of these new materials. This PhD project is anticipated to contribute significantly to the development of circular economy principles by transforming industrial waste into valuable resources for clean energy applications, to pioneer an innovative, AI-driven approach to discover and optimize new electrocatalytic materials.

This PhD project requires interdisciplinary skills and expertise in material chemistry field. In-depth knowledge of electrochemistry will be of interest for such subject. The project is a collaborative work between CEA Marcoule, IRCELYON, IMN Nantes and NTU (Singapore). This work will be based mainly at Lyon with some travel to Marcoule and it is planned to stay one year in Singapore (travel and support will be provided in plus of the salary to cover all the cost). Good English spoken and written is required due to the stay to Singapore and to participate to the consortium.

Qualifications needed:

- Master's degree (or equivalent) in Chemistry, Materials Science, Chemical Engineering, or a related field.
- Background in electrochemistry, catalysis, or materials synthesis.
- Experience in laboratory work and hands-on use of characterization equipment.
- Exposure to machine learning or materials informatics is a strong asset.
- Excellent communication skills and ability to work in a collaborative, interdisciplinary environment.

We invite applications for a fully-funded PhD position in the field of materials chemistry, electrocatalysis, and sustainable energy technologies. If you are interested by such project, please to send your CV and a cover letter.

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