



## MASTER 2 Internship

### New electroactive transition metal complexes for aqueous organic redox flow batteries

The development of renewable energies is making stationary energy storage a necessity. Although widely developed for small equipment and mobility, Li-Ion or Na-ion batteries are not necessarily the most suitable for this type of application, for reasons of cost, safety and recyclability. One of the most promising avenues is the development of redox-flow batteries, in which energy storage takes place within electrolytes that are stored outside the electrochemical cell. This makes it possible to decouple the power and capacity of the electrochemical system. Classically, electroactive species are dissolved in either aqueous or non-aqueous media, the most widely developed being all-vanadium redox-flow systems (VRFB). Recently, a revival of these systems has been enabled by the use of electroactive organic molecules in aqueous electrolytes. Although many advances have been made, molecules of potential interest for electrolytes remain scarce and some improvement can be made for electrolytes.

The aim of the proposed MASTER 2 Internship is to develop prepare and characterize new transition metal complexes soluble in aqueous media and which could be used for the formation of redox-flow batteries electrolytes. The study will consist of (1) the selection and/or modification of ligands for the complexation of the transition metals (2) the study the formation of the complexes and their electrochemical properties (3) evaluate their solubility and stability in aqueous electrolytes.

**STARTING DATE:** February 2025

#### CONTEXT/QUALIFICATIONS

The work will be carried out at the LRCS in Amiens and co-supervised by Emmanuel Baudrin (LRCS) and Lionel Dubois (CEA). A PhD position on this topic will be opened to applications for the next academic year.

The master student recruited should have skills in organic synthesis and/or coordination chemistry, and in the characterization of these systems using conventional chemistry methods. Notions or skills in electrochemistry would be appreciated.

The position is located in a sector covered by the protection of scientific and technical potential (PPST), and therefore requires, in accordance with regulations, that your arrival be authorized by the competent MESR authority.

#### CONTACTS

Prof. Emmanuel BAUDRIN [emmanuel.baudrin@u-picardie.fr](mailto:emmanuel.baudrin@u-picardie.fr)

Dr. Lionel DUBOIS [lionel.dubois@cea.fr](mailto:lionel.dubois@cea.fr)

#### Selection process

The candidate should first contact anyone of the two contact persons above and provide (via e-mail):

- a detailed CV
- a motivation letter emphasizing the fit between the candidate's background and the proposed position
- the names and contact details of at least 2 reference persons