

DOCTORAL POSITION

POLYPHOSPHONATE-BASED SAFE ELECTROLYTES FOR ZINC-ION BATTERIES - POLYSAFE-ZIB

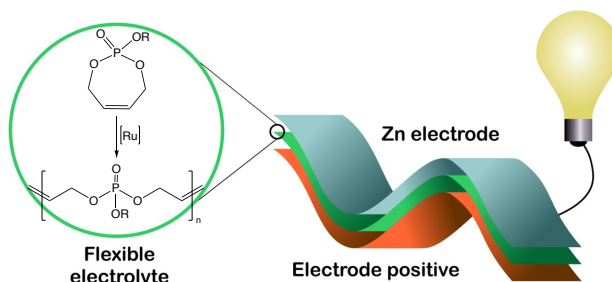
CONTEXT :

In the frame of the CaeSAR project coordinated by the University of Caen Normandy (France), we are seeking highly motivated candidate to work on the multidisciplinary thesis project **POLYSAFE-ZIB** which aims to use polyphosphonates based solid electrolyte for Zn batteries.

SCIENTIFIC PROJECT :

Zinc-ion batteries have attracted a significant attention as competitive candidates for flexible devices owing to the high volumetric capacity of the zinc (Zn) metal and its facile fabrication process. In this context, the excellent thermal stability, fire resistance, and attractive mechanical properties of polyphosphonates, make them ideal candidates for their use as polymer electrolytes. However, their use in Zn batteries has been poorly explored. **POLYSAFE-ZIB** project aims to synthesize and characterize polyphosphonates networks with a well-defined topology and architecture using Ru-metathesis polymerization, in order to develop flexible solid-state electrochemical cells with high ionic conductivity at ambient temperature, good mechanical properties and enhanced safety for Zn batteries.

This multidisciplinary project will require the complementary expertise of two teams, one specializing in polymer synthesis and characterization (CARMeN-Caen) and the other in the preparation and study of batteries (CRISMAT).



LABORATORY :

This multidisciplinary project will be carried out in two research laboratories in Caen: the **CARMeN** Institute, specialising in molecular and macromolecular chemistry, and the **CRISMAT** laboratory, specialising in materials science. **CARMeN** is involved in the two LabEX projects 'Energy Materials and Clean Combustion Center' (**EMC3**) and 'Des molécules pour le vivants' (**SynOrg**), as well as the Carnot institute 'Innovation Chimie Carnot' **I2C**. The laboratory is a part of the 'Institut Normand de Chimie Moléculaire, Médicinale et Macromoléculaire' (**INC3M**) which meets the requirements for a high quality level of research in the fields of organic synthesis, macromolecules, and medicinal chemistry (FR CNRS 3038). **CRISMAT** is also involved in the LabEX **EMC3** project, as well as the Carnot institute 'Énergie et Systèmes de Propulsion' **ESP**. The laboratory also runs the Advanced Materials Research Institute (**IRMA**), a CNRS federation (FR CNRS 3095), in which its regional partners GPM (UMR 6634 Rouen) and CIMAP (UMR 6252, Caen) are represented.

CANDIDATE PROFILE:

The candidate, specialized in organic chemistry, with a master degree (or equivalent) in organic chemistry. Knowledge or interest in polymer chemistry is required. He/She



will be rigorous, motivated, hard-worker, autonomous and he/she will have a very good ability to work within team and a very good ability to communicate. Strong oral and written communication skills in English, and French (for French speaking candidates) are requested. The candidate has to be motivated by the challenge of the project.

HOW TO APPLY :

Applications should include transcripts and rankings for the last two years, cover letter including a short statement on your motivation, career objectives, the contact details of two referees and a CV by **May 15, 2025**.

Contact: Pr. Isabelle Dez (isabelle.dez@unicaen.fr) and Dr. Vadim Kovrugin (vadim.kovrugin@ensicaen.fr)

Please mention "Application PhD POLYSAFE" in the subject line.

Internship gratification: University of Caen funding 3 years position; salary range at starting: 2300 €/month.

Location: Laboratoire CARMen-Caen , UNICAEN/CNRS/ENSICAEN, Campus 2, 6 Bd Maréchal Juin, 14000 Caen, France

Dates/duration: Starting in October 2025 for three years

Framework: Caesar Excellence project Supported by University of Caen Normandy (<https://anr.fr/ProjetIA-23-EXES-0001>)

Supervisors : Isabelle Dez (LCMT), Valérie Pralong (CRISMAT) and Vadim Kovrugin (CRISMAT)