
PhD offers - Development of long-life catalysts for PEM fuel cells

Context and goal

Within the framework of a project funded by the National Funds for Scientific Research (FNRS), the University of Liège and the UCLouvain University recruit **two PhD candidates** to develop electrocatalysts for low temperature fuel cell applications. The research will deal with (i) the synthesis of corrosion-resistant supports and (ii) the use of protective barriers to avoid the coarsening/leaching of metallic nanoparticles upon use in fuel cell, while keeping excellent catalytic activity. To that aim, several strategies will be compared, including surface functionalization and layer depositions using wet chemistry techniques. The research will include both material design/synthesis, and characterization in real fuel cell environment – which requires electrode design.

Role of the PhD students

The two PhD students will work together in a joint project to reach the same objective: developing PEM fuel cell electrocatalysts with increased lifetime. Carbon-type supports will be optimized by both graphitization and functionalization techniques already in use in both laboratories. Metal deposition methods will be adapted to the new supports, and the protection of the active phase by porous barriers will be studied. All those tasks will rely on the expertise and infrastructure of the two research groups. Support functionalization and active phase protection will mostly be studied at the MOST laboratory (UCLouvain). Graphitization and electrochemical characterization in fuel cell will be performed at ULiège. Both laboratories will strongly contribute to physico-chemical characterization of the catalysts and structure/activity correlations. The first PhD student will mainly unravel the variables responsible for materials optimization, while the second will correlate materials features to their fuel cell performance. Both students will be enrolled in a joint PhD program between ULiège and UCLouvain with the aim of completing a thesis within 4 years.

Information

- *General:* One researcher will be hired by ULiège, and the second one will be hired by UCLouvain. The work will take place at the Department of Chemical Engineering – NCE (Nanomaterials, Catalysis, Electrochemistry) laboratory of ULiège, and at the MOST (Molecular Chemistry, Materials and Catalysis) laboratory in UCLouvain. Both researchers are expected to meet frequently either in ULiège or UCLouvain.
- *Profiles:* Master in Sciences (Chemistry or physics) or Master in Engineering (preferably specialized in Chemistry and Materials Sciences).
- *Language:* a good level of English is requested
- *Duration:* 4 years
- *Start:* summer 2024
- **Monthly salary: ~2400 € (net - PhD grant)**
- *Application:* please send a detailed CV and a motivation letter highlighting your skills and interests related to this specific proposal to Nathalie.Job@uliege.be and sophie.hermans@uclouvain.be
- *Application deadline:* May 31st 2024
- *Supervisors:*
 - Prof. Nathalie Job – ULiège, Department of Chemical Engineering (NCE)
 - Prof. Sophie Hermans – UCLouvain, MOST Division, IMCN Institute.