

Synthesis and evaluation of ultradispersed metal-based catalysts in hydrogenation reactions

Summary:

This internship is part of a research project, UltraCat, funded by the ANR (French Research Agency) and involving four laboratories. Our aim is the synthesis and evaluation of ultradispersed metal-based catalysts for energy applications involving hydrogen. Catalysts often consist of metal nanoparticles anchored on a support (generally an oxide powder). When the metals are atomically dispersed on a high-surface-area support ("single-atoms catalysts"), their catalytic properties may be changed. Moreover, noble metals (platinum and gold groups) are the most active materials for many reactions, but also the rarest and most expensive ones. Consequently, moving forward to sustainable chemistry requires a drastic decrease of the amounts of noble metals in the catalysts ("atom economy"). In this perspective, single-atoms catalysts are currently the focus of increasing attention.

The student's work will start with the chemical synthesis of catalysts, using skills of the laboratory. Secondly, the intern will be involved in the catalyst characterisation process, which relies on leading-edge techniques such as ultrahigh-resolution transmission electron microscopy and *operando* infrared spectroscopy. Catalytic performances (activity, selectivity and stability) will be investigated by using model hydrogenation reactions with also high industrial interests, namely butadiene and acetylene partial hydrogenation.

The internship will be carried out in close interaction with the thesis work of Thomas Len within a collaboration between ECI2D (Energy, fuels and intermediates for sustainable development) and ING (Engineering, from material to reactor) teams at IRCELYON. The candidate must have good scholar results and demonstrate motivation, scientific curiosity, good technical skills, and ability to work in a team and write up reports.

Internship location:

IRCELYON (UMR5256 CNRS-Université Lyon1), 2 av. A. Einstein, 69626 Villeurbanne Cedex, France. Website : <http://www.ircelyon.univ-lyon1.fr>

Time period:

first semester of 2019

Internship "gratification":

around 570 €/month

Supervisors:

Dr. Franck Morfin, Dr. Laurent Piccolo, Dr. Jean-Luc Rousset

Contact:

send résumé and cover letter to Thomas Len, thomas.len@ircelyon.univ-lyon1.fr