

Research Grants for PhD students from the China Scholarship Council

Information Form (please read the guidelines carefully on the website www-csc.utt.fr)

Supervisor's name : JACOLOT Given names : Maiwenn

Status (prof., assistant prof., ...): Assistant professor at INSA LYON

Laboratory : ICBMS, Laboratory of Organic and Bioorganic Chemistry - CNRS UMR 5246 Website address : <http://www.icbms.fr>, <http://www.icbms.fr/cob>

Institution : INSA LYON, Av. Albert Einstein, 69621 Villeurbanne, France Website address : <http://www.insa-lyon.fr>

Scientific competence of the supervisor:

Dr. Maiwenn Jacolot (32 years old), appointed assistant professor at INSA-Lyon (ICBMS-COB team) in September 2017 will be the coordinator of this project. Her actual research focuses on the conversion of bio-based polyols to chiral amines via borrowing hydrogen methodology. In 2018, she has obtained a "Bonus Qualité Recherche INSA" for the synthesis and valorization of chiral amino-alcohols to accede new biobased and biodegradable oligomers. She is the author of 10 publications in international scientific journals. The PhD candidate will be also supervised by Prof. Florence Popowycz

Two major publications in the field proposed for the PhD :

1. Bahé, F.; Grand, L.; Cartier, E.; Jacolot, M.*; Moebs-Sanchez, S.; Portinha, D.; Fleury, E.; Popowycz, F.* Eur. J. Org. Chem. 2020, 599-608.
2. Jacolot, M.*; Moebs-Sanchez, S.; Popowycz, F*. "Diastereoselective iridium-catalyzed amination of biosourced isohexides through borrowing hydrogen methodology" J. Org. Chem. 2018, 83, 9456-9463

Website address of the personal page : www.insa-lyon.fr

Supervisor's email : maiwenn.jacolot@insa-lyon.fr

Description of the research work proposed for a PhD Topic # (see list) : II-13

Title : Functionalization of biosourced isohexides and polyols through borrowing hydrogen methodology

Subject :

Isosorbide, a major product of the starch industry, is a renewable platform chemical of considerable importance for the future replacement of fossil resource-based products. Over the last decade, functionalization of this chiral dianhydrohexitol as well as its diastereomers (isomannide and isoidide) into corresponding amines has also attracted considerable interest for polymer applications and for asymmetric induction in organic synthesis (chiral auxiliaries, ligands and organocatalysts). Recently, our laboratory reported a direct and diastereoselective amination of isosorbide and isomannide through a borrowing hydrogen methodology using a cooperative catalysis combining iridium metal and phosphoric acid. The present research project will consist in developing the direct functionalization of isohexides via C-N and C-C bond formations using the borrowing hydrogen methodology as an alternative of the classic strategy of nucleophilic substitution after introduction of an appropriate leaving group. The valorisation of these chiral amines and amino-alcohols as novel original monomers will then be considered in collaboration with the Polymer and Materials Engineering laboratory (IMP).

Keywords :

Isohexides, Isosorbide, Biosourced chemistry, Synthetic methodology, Organometallic catalysis, Borrowing hydrogen, Direct Amination, Diastereoselectivity

Expected collaborations :

The research will be conducted mainly in an organic synthesis team (COB) and due to potential application of isohexide derivatives in the fields of polymer, collaboration with IMP will be considered. Results generated in the project will be published in renowned international scientific journals and displayed in scientific meetings

Background required from the applicant :

We are looking for a highly motivated person with a strong background in organic chemistry (Master degree). Appropriate education profile should include experience in multi-step organic synthesis and associated analytical skills (NMR, MS, IR). Experience in organometallic chemistry and/or in asymmetric synthesis will be appreciated but are not mandatory. A good motivation to learn, communication skills, curiosity, and good team spirit are also among important qualities. Good knowledge of English is also important.

Existence of a PDF file detailing the proposal ("yes" or "no") : Yes

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