

PhD position available in ISCR (Rennes), 36 months

Title: Cationic C-C fragment coupling

Location: Chimie Organique et Interfaces (COInt Team), Institut des Sciences Chimiques de Rennes, UMR 6226 CNRS, Campus de Beaulieu, Université de Rennes 1 (France)

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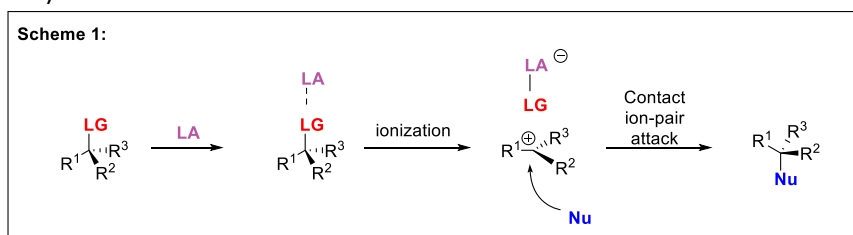
Financial support: three-year doctoral contract (100% ANR)

Gross monthly salary: 2 135,00 €

Keywords: organic synthesis, catalysis, organometallic chemistry, total synthesis

Overview of the research project:

According to organic chemistry textbooks, the bimolecular nucleophilic substitution reaction (SN2) is limited to primary and secondary electrophiles. For tertiary electrophiles, based on steric arguments, only the SN1 mechanism is applicable, resulting in a general loss of stereochemical information at the affected carbon center. However, an inspection of the literature reveals that there are several exceptions to this rule with regards to heteroatom nucleophiles (*Chem. Sci.*, **2020**, *11*, 9378–9385). Here we propose that under well-defined conditions it should be possible to perform substitution reactions of tertiary electrophiles and organometallic reagents with inversion of configuration (Scheme 1).



These transformations are not currently part of the repertoire of organic synthesis, yet holding exciting potential to solve important challenges in constructing complex organic molecules. The proposed project focuses on various fundamental investigations concerning the interplay between Lewis acid, leaving group and organometallic reagent, the stereochemistry involved in such processes and rational approaches towards the identification of new reactions. The realization of this proposal will push the use of organometallic reagents into widely unexplored areas of chemical reactivity. In consequence, new synthetic strategies will be made available in particular in the challenging field of molecules incorporating a quaternary carbon stereocenter. The ideal candidate would have a solid background in organic chemistry, especially methodology and organometallic chemistry which includes the manipulation of sensitive compounds under inter atmosphere.

Profile of the ideal candidate:

- Profound theoretical and experimental knowledge in organic synthesis.
- Experience in organometallic chemistry and methodology.
- Familiar with the common analysis of organic compounds (NMR, GC, HPLC *etc.*).
- Knows how to efficiently do literature research and how to present results.
- Fluent in (both) written and spoken English.

Application:

- Detailed CV and cover letter.
- One recommendation letter from Master 2 internship supervisor.
- Transcripts of marks for Master 1 or 2nd year of Engineer School.
- Past and current research reports (or bibliographical surveys).
- An interview will be planned for the candidates best fulfilling the criteria.