



Secteur des Sciences
et Technologies

Invitation à la soutenance publique de thèse de
Lei HU

Master degree in the discipline of Pharmaceutical Chemistry

Pour l'obtention du grade de Docteur en sciences

« Design, synthesis and applications of phosphines and amines embedded triptycenes: exploring new reactivities in main-group and organometallic chemistry »

qui se déroulera
le vendredi 30 octobre 2020 à 15h
The LAVO51 auditorium
Place Louis Pasteur
1348 Louvain-la-Neuve



UCLouvain

This PhD work was focused on the development of sterically hindered Lewis bases, in particular triaryl phosphines and amines, which then were employed for the rational design of frustrated Lewis pair catalysts. In this context, we prepared new types of FLPs by combining strong boron Lewis acids with the group XV (N, P) derived 9-hetero-triptycene. Initially, several novel synthetic approaches enabling the access to the 9-azatriptycene framework were attempted. We then turned our attention to the preparation of sterically hindered 9-phosphatriptycene scaffold. Two methodologies were developed allowing to reach unprecedented *ortho*-substituted unsymmetrical 9-phosphatriptycene derivatives which include the first example of P-chirogenic 9-phosphatriptycene ever reported. By means of computational and experimental methods, the unique electronic and steric properties, and Brønsted and Lewis basicities of 9-phosphatriptycenes were quantified. The coordination of 9-phosphatriptycenes with transition metal (Rh^{III} and Au^I) was finally investigated and the resulting complexes were studied and characterized by IR, NMR, and X-ray diffraction crystallography. Lastly, the association of phosphatriptycenes with B(C₆F₅)₃ was experimentally tested and applied as FLP catalyst, enabling the transition-metal-free hydrogenation reaction of unactivated alkenes under mild reaction condition.

Jury members:

Prof. Raphaël Robiette (UCLouvain), supervisor
Prof. Guillaume Berionni (Namur Institute of Structured Matter (Unamur), Belgium), supervisor
Prof. Jean-François Gohy (UCLouvain), chairperson
Prof. Michael Singleton (UCLouvain), secretary
Prof. Olivier Riant (UCLouvain)
Prof. Stéphane Vincent (Namur Institute of Structured Matter (Unamur), Belgium)
Prof. Olivier Baudoin (Department of Chemistry University of Basel, Switzerland)