

Research Topic for the ParisTech/CSC PhD Program

Field : Chemistry, Physical Chemistry and Chemical Engineering

Subfield: Coordination Chemistry and catalysis

Title: Multidentate iminophosphorane based ligands: coordination chemistry and catalytic applications

ParisTech School: Ecole polytechnique

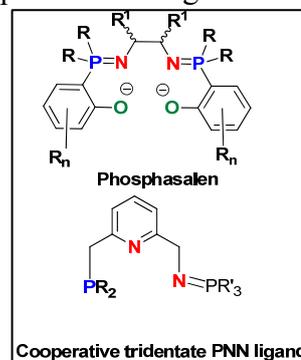
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Short description of possible research topics for a PhD: Mixed ligands are becoming increasingly important in coordination chemistry and in homogenous catalysis. Polydentate systems containing different complementary heteroatoms have been much investigated because the presence of different coordination sites exhibiting different electronic properties, allow for a fine tuning of the activity of the metal center during the catalytic process.

As we are specialized in the laboratory in iminophosphorane ligands (containing P=N linkage), that display remarkable σ and π donating properties and poor accepting ability, we are interested in developing new polydentate iminophosphorane based ligands. In particular, during the past few years we have shown that phosphasalen, the phosphorous analogue of the well-known salen, can form efficient catalysts for the production of bio-polymers, are able to stabilize metal centers in unusual oxidation state. The objective of the PhD project would be to develop new iminophosphorane based tetra- or tridentate ligands, study their coordination in particular to abundant and cheap first row metals (Fe, Mn, Co) and demonstrate their catalytic ability. Special attention will be also devoted to cooperative ligands which are able to assist the metal during the catalysis.



Required background of the student: Studies in molecular chemistry and an experience in organometallic chemistry or catalysis would be an advantage.

A list of 5(max.) representative publications of the group:

- T. Cheisson, L. Mazaud, A. Auffrant, *Dalton Trans.*, **2018**, DOI : 10.1039/C8DT03488E.
- Mustieles-Marín, T. Cheisson, R. Singh Chauhan, C. Herrero, M. Cordier, C. Clavaguera, G. Nocton, A. Auffrant, *Chem. Eur. J.*, **2017**, 23, 17940-17953.
- T. Cheisson, A. Auffrant, *Dalton Trans.* **2016**, 45, 2069-2078.
- T. P. A. Cao, G. Nocton, L. Ricard, X. F. Le Goff, A. Auffrant, *Angew. Chem. Int. Ed.* **2014**, 53, 1368-1372.
- C. Bakewell, T. P. A. Cao, N. Long, X. F. Le Goff, A. Auffrant, C. K. Williams, *J. Am. Chem. Soc.* **2012**, 134, 20577-20580.