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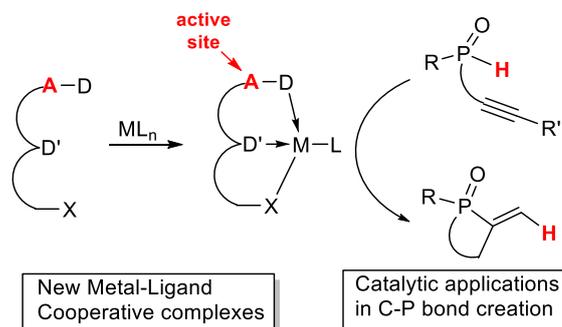
ANR PhD Fellowship (2021-2024)

## Cooperative Catalysis for C-P Bond Formation

**Context.** Over the last decade, cooperative effects in transition metal catalysis have attracted increasing attention from the scientific community.

Thanks to the synergy between two different catalytic sites, extraordinary improvements in efficiency and selectivity can be achieved. In this context, *metal/ligand cooperation (MLC)*, in which one of the ligands participates actively to the activation of the substrates, can be highlighted.<sup>1</sup> Pincer complexes of transition metals play an important role in this area.<sup>2</sup> We have contributed to this field by developing an original non-innocent ligand based on an *indene skeleton* bearing two coordinating side-arms. Remarkable results have been obtained in catalytic cyclisation processes involving C-O/C-N & C-C bonds formation with  $d^8$  complexes based on the group 10 metals.

**Objectives.** Building on these successes, the aim for this PhD. project is the diversification of MLC catalysis with group 10 pincer complexes, by developing a new family of *non-innocent* pincer ligands. The first objective will be to prepare and characterize Ni, Pd and Pt complexes bearing the original pincer ligands, and to evidence their *non-innocent* behavior. We will then take advantage of this *non-innocence* in MLC catalysis and more particularly in the preparation of *P*-containing cycles via the creation of C-P bonds.



This is a multidisciplinary project involving: (i) ligand design of new non-innocent cooperative ligands, (ii) preparation, characterization (multi-dimensional NMR, X-ray diffraction, IR...) and reactivity studies of organometallic compounds and (iii) exploration of catalytic activity.

The candidate should have a good knowledge of molecular chemistry and a particular taste for organometallic / coordination chemistry. Motivation for research, curiosity and team spirit will be additional assets. Applications to be sent to Blanca Martin-Vaca ([bmv@chimie.ups-tlse.fr](mailto:bmv@chimie.ups-tlse.fr)).

1. Khusnutdinova, J. R.; Milstein, D. *Angew. Chem. Int. Ed.* **2015**, *54*, 12236.
2. (a) Espinosa-Jalapa, N. Á.; Ke, D.; Nebra, N.; Le Goanvic, L.; Mallet-Ladeira, S.; Monot, J.; Martin-Vaca, B.; Bourissou, D. *ACS Catal.* **2014**, *4*, 3605. (b) Monot, J.; Brunel, P.; Kefalidis, C. E.; Espinosa-Jalapa, N. Á.; Maron, L.; Martin-Vaca, B.; Bourissou, D. *Chem. Sci.* **2016**, *3*, 2179. (c) Clerc, A.; Marelli, E.; Adet, N.; Monot, J.; Martin-Vaca, B.; Bourissou, D. *Chem. Sci.* **2021**, *12*, 435.

Sous la co-tutelle de

