

## DESIGN OF NOVEL N-HETEROCYCLIC CARBENE LIGANDS FOR MN-CATALYZED TRANSFORMATIONS

<b>Period</b>	6 months beginning not later than: <input type="checkbox"/> January <input type="checkbox"/> February <input type="checkbox"/> March <input type="checkbox"/> April <input type="checkbox"/> May <input type="checkbox"/> June <input type="checkbox"/> July <input checked="" type="checkbox"/> September 2021
<b>Internship supervisor(s)</b>	name: Dr. Dmitry Valyaev e-mail: <a href="mailto:dmitry.valyaev@lcc-toulouse.fr">dmitry.valyaev@lcc-toulouse.fr</a> group: Molecular design of transition-metal pre-catalysts
<b>Location</b>	Laboratory of Coordination Chemistry (LCC) CNRS – University Paul Sabatier 205 route de Narbonne - BP44099 31077 Toulouse Cedex 4 - FRANCE
This research master's degree research project could be followed by a PhD <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	

The design of new ligands belongs to the key tools for the development of efficient homogeneous catalysts, being especially important in chemistry of first row transition metals. In particular, N-heterocyclic carbenes (NHC) have already met the great success in this area due to their remarkable  $\sigma$ -donor properties and efficient steric protection of the metal center. Based on a prominent expertise of the host group in the preparation of original pincer-type<sup>[1,2]</sup> and backbone-functionalized<sup>[3]</sup> NHC scaffolds as well as in Mn-based reduction catalysis,<sup>[4,5]</sup> the aim of this internship will be the synthesis of new NHC ligands, their complexation with manganese and the evaluation of resulting Mn NHC complexes in catalytic hydrogenation and hydroelementation of unsaturated organic substrates.



### References:

- 1) D. A. Valyaev, O. A. Filippov, N. Lugan, G. Lavigne, N. A. Ustynyuk, *Angew. Chem. Int. Ed.* **2015**, *54*, 6315–6319.
- 2) R. Taakili, C. Barthes, A. Goëffon, C. Lepetit, C. Duhayon, D. A. Valyaev, Y. Canac, *Inorg. Chem.* **2020**, *59*, 7082–7096.
- 3) A. A. Grineva, D. A. Valyaev, V. César, O. A. Filippov, V. N. Khrustalev, S. E. Nefedov, N. Lugan, *Angew. Chem. Int. Ed.* **2018**, *57*, 7986–7991.
- 4) D. A. Valyaev, D. Wei, S. Elangovan, M. Cavailles, V. Dorcet, J.-B. Sortais, C. Darcel, N. Lugan, *Organometallics* **2016**, *35*, 4090.
- 5) R. Buhaibeh, O. A. Filippov, A. Bruneau-Voisine, J. Willot, C. Duhayon, D. A. Valyaev, N. Lugan, Y. Canac, J.-B. Sortais, *Angew. Chem. Int. Ed.* **2019**, *58*, 6727–6731.

<b>Keywords, areas of expertise</b>	Organometallic chemistry, Homogeneous catalysis, N-heterocyclic carbenes, Manganese
<b>Required skills for the internship</b>	organic chemistry, coordination chemistry