Post-doctoral researcher position, 1 year, starting around September 2025

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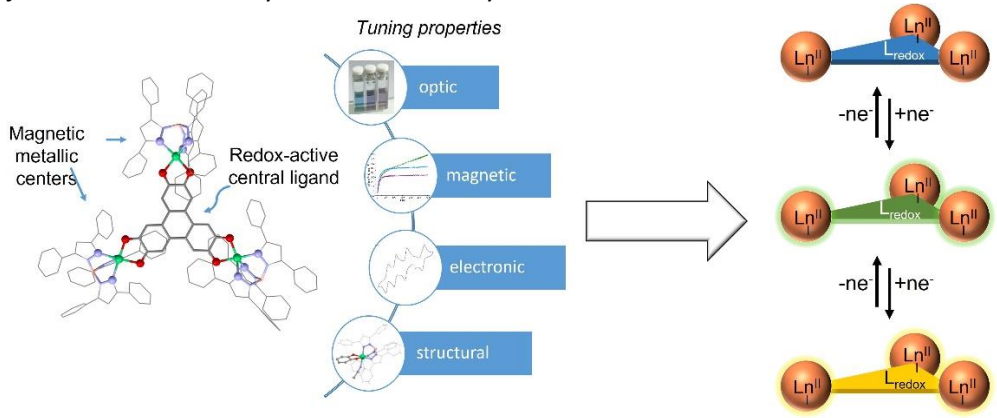
Redox-active lanthanide magnetic systems

Key words: coordination chemistry, lanthanide, redox, (spectro-)electrochemistry

Lanthanide chemistry is rich and bears an interest is various fields, such as magnetism (single-molecule magnets, quantum bits) and luminescence. But the precise control of the magnetic properties is still highly challenging and relies on a critical design of molecular materials suitable for potential applications. To switch the magnetic properties of lanthanide compounds, a wide variety of external stimuli can be employed such as electro-activity, solvents, protonation, magnetic and electric fields, and light. In this project, we propose to build redox-active lanthanide complexes, that can be of interest for the development of applications such as sensors, information storage, or electronic devices.

In the recent years, we have developed transition metal-based complexes with the purpose of controlling the interaction between three metallic ions by using a redox active central ligand. We use a central ligand that bears three positions available for complexation, all of which can switch between different redox states, leading to optical, structural and magnetic changes in the compounds.[1] The aim of this project is to extend our systems to the study of lanthanide ions.



Profile of the candidate sought: Competences in synthetic and coordination chemistries are required, as well as some knowledge in magnetic materials. The study of the obtained complexes will focus on the magnetic and electrochemical properties, and UV-vis spectroscopy (spectro-electrochemistry). All these characterizations will be performed in the lab. Fluency in English and skills in oral and written reporting of results will also be appreciated. Techniques used: NMR, IR, UV-visible, electrochemistry, SQUID magnetometry, data simulations.

[1] a) A. Colin, Y. Wang, F. Lambert, N. Bridonneau, T. Mallah et al, *Magnetochemistry* **2024**, 10(12), 102 ; b) S. Delaporte, N. Bridonneau, F. Lambert, R. Guillot, N. Suaud, N. Guihéry, G. Wang, T. Rajeshkumar, L. Maron, T. Mallah, **2025** accepted ; c) Y. Wang, F. Lambert, E. Rivière, R. Guillot, C. Herrero, A. Tissot, Z. Halime and T. Mallah, *Chemical Communications*, **2019**, 55, 12336 ;