INTERNSHIP PROGRAM FOR INTERNATIONAL STUDENTS

INTERNSHIP SUBJECT FORM

Name of the Host Laboratory	Laboratoire de Chimie Moléculaire
Website of the Host Laboratory	https://portail.polytechnique.edu/lcm/fr
Research Group	Grégory Nocton
Internship Supervisor	Grégory Nocton
Internship Subject	Synthesis of heterometallic complexes based on lanthanides for the development of novel photochemical reactions
Student's level	☒ Advanced Undergraduate Students (3rd or 4th year) ☒ Master's students (1st or 2nd year) ☒ PhD students
Proposed Duration	☒ 3 months ☒ 4 months ☒ 5 months ☒ 6 months
Prerequisites	
Internship description (max. 15 lines)	Photochemical reactions are a very important topic of research because light is uses as a trigger to induce the necessary electron transfers allowing chemical bonds being cleaves or being made. The study of the electron transfer is a specificity of our research group and we use an original approach based on the use of low-valent lanthanide complexes[1] that are able to transfer electron *via* a redox non-innocent ligand up to a reactive transition metal center. This strategy already allowed us to develop interesting reactivity and unusual oxidation states.[2] When the transition metal fragment is photoactive, a second electron transfer may occur, possibly via the same redox non-innocent ligand. This, two-steps/two-electrons sequence is fundamentally interesting for photochemical transformations and constitutes a great originality compared to the known photochemical reactions. A novel chemical reactivity is therefore envisaged. This new topic is the foundation of a recent collaboration with the group of Prof. Corinna Hess at the Technische Universität München (TUM, Germany), who's interest in photochemical reactions is well-established with nickel and cobalt complexes.[3] The objective of this internship is to vitalize this collaboration by preparing and study new heterometallic complexes. **References:** [1] Xemard et al., *J. Am. Chem. Soc.* **2018,** *140*, 14443; [2] Goudy et al., *J. Am. Chem. Soc.* **2017,** *139*, 10633; [3] Grübel et al., *Chem. Sci.* **2018**, *9*, 3313