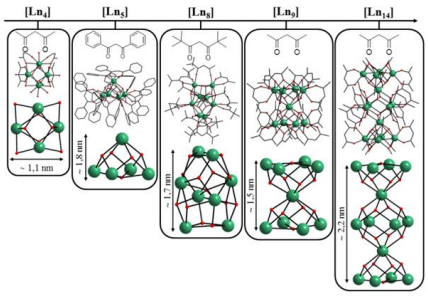
Laboratoire des Multimatériaux et Interfaces (LMI)
UMR 5615 UCBL-CNRS
Université Claude Bernard Lyon 1
Lyon, France

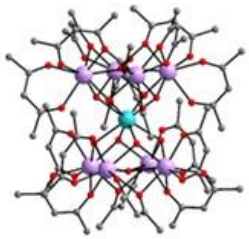
Postdoctoral researcher position funded by ANR POPUP "*PhOton Piling in UPconverting lanthanide clusters*"

SYNTHESIS AND CHARACTERIZATION OF MULTINUCLEAR DOPED LANTHANIDE-BASED COMPLEXES FOR UPCONVERSION

Duration: from 12 to 16 months (depending on candidate experiences), should start between June 1st and October 1st.



As part of the team's work, we have demonstrated that it is possible, by varying the synthesis conditions, to finely tune and control the final nuclearity (Figure left) and/or the molecular doping level (Figure right) of lanthanide ions within clusters constructed from simple organic ligands.[1] In the framework of the ANR POPUP contract, we have also highlighted that these [Ln9] doped lanthanide-based complexes are perfect molecular objects for conversion of photons to high energies (upconversion, UC) through cooperative luminescence or cooperative photosensitization mechanisms.[2]



$[Y_8Dy_1]$

The project to be carried out will build on previous results obtained by the research teams in Lyon and Strasbourg and will aim to extend the study to complexes with nuclearities different from that of [Ln9], as well as to precisely and finely control the doping between the two lanthanide ions within the isolated molecular clusters. The coordination chemistry synthesis work will be complemented by a structural study and an investigation of upconversion properties.

[1] (a) D. Guettas, C. M. Balogh, C. Sonneville, Y. Malicet, F. Lepoivre, E. Onal, A. Fateeva, C. Reber, D. Luneau, O. Maury, G Pilet, *Eur. J. Inorg. Chem.*, **2016**, 3932-3938 ; (b) D. Guettas, V. Montigaud, G. Fernandez Garcia, P. Larini, O. Cador, B. Le Guennic, G. Pilet, *Eur. J. Inorg. Chem.*, **2018**, 3336-3339 ; [2] (a) R. C. Knighton, L. K. Soro, A. Lecointre, G. Pilet, A. Fateeva, L. Pontille, L. Frances-Soriano, N. Hildebrandt, L. J. Charbonnière, *Chem. Commun.*, **2021**, 57, 53-56 ; (b) R. C. Knighton, L. K. Soro, L. Francès-Soriano, A. Rodríguez-Rodríguez, G. Pilet, M. Lenertz, C. Platas-Iglesias, N. Hildebrandt, L. J. Charbonnière, *Angew. Chem. Int. Ed.*, **2022**, 61, e202113114

Profile of the candidate sought

The recruited person will have to be very motivated and curious. Competences in synthetic and coordination chemistries are required as well as in classical synthesis techniques (inert atmosphere, purification and characterization of compounds). Knowledge in single-crystal x-ray diffraction characterizations and/or in absorption and luminescence spectroscopy will be appreciated. Fluency in English and skills in oral and written reporting of results will also be appreciated.
Interested persons can send their CV, list of publications and motivation letter to the following contact: Dr. Guillaume Pilet (supervisor), guillaume.pilet@univ-lyon1.fr.

The Multimaterials and Interfaces Laboratory (LMI) is composed by 47 permanent and almost the same number of non-permanents members. Researches carried out within this Laboratory are mainly based on the field of Material Sciences, and more specifically in Molecular and Materials Chemistry. The Laboratory is located on the Campus of University Claude Bernard Lyon 1 called "*La Doua*" at Villeurbanne, near Lyon with a direct access using three different tramway lines.