

Doctoral position and proposed research

Magnetogenic, molecular probes activated by a target enzyme

Laboratoire de Chimie, ENS de Lyon

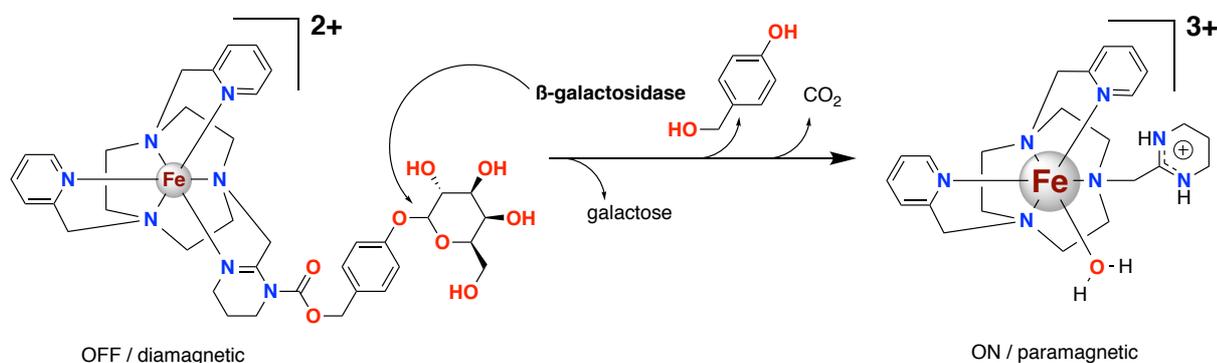
Prof. Jens Hasserodt (advisor)



We look for a talented chemistry student with a completed MSc. degree to apply together for a 3-year PhD fellowship to the Lyon Graduate School of Chemistry (government funding). The successful candidate has a demonstrated track record of excellence in the study of the chemical sciences.

The host group develops a class of unprecedented coordination compounds as molecular probes that are chemically converted by an enzyme of interest. The initial probe is diamagnetic but the one resulting from the chemical conversion is paramagnetic. Our probes thus report on the presence of that enzyme activity by turning the non-magnetic sample into a magnetic one. Among several potential applications of such a molecular tool is the use in Magnetic Resonance Imaging and the depiction of a target enzyme activity in a particular tissue. Another application we wish to explore is in Targeted Therapy.

The PhD student's principal task is the exploration of synthetic pathways towards target structures that are designed to respond to the requirements of the applications mentioned above. In other words, they should operate optimally at physiological conditions and enter spontaneously into live cells where necessary. These applications add another multi-disciplinary dimension to the PhD project. In fact, the PhD student will measure the water relaxation rates caused by the presence of his molecule candidates in aqueous samples, and collaborate with a biologist in order to explore their performance in contact with cultured live cells (*in vitro*) and live animals (*in vivo*). In parallel, the student will continue to optimize his skills in the synthesis of complex, multi-dentate ligands based on poly-aza macrocyclic or cage compounds, and their crystallization for the purpose of purification and x-ray structure determination.



Contact :

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Références :

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- [2] Hasserodt, J.; Kolanowski, J. L.; Touti, F. "Magnetogenesis in Water Induced by a Chemical Analyte", invited review article, *Angew. Chem. Int. Ed.* **2014**, 53, 60-73
- [3] Hasserodt, J., Kolanowski, J., Touti F. Magnetogenesis in water induced by a chemical analyte, *Angew. Chem. Int. Ed.*, **2013**, 60-73.
- [4] Touti, F., Maurin, P., Canaple, L., Beuf, O., Hasserodt, J. ; Awakening of a ferrous complex's electronic spin in an aqueous solution induced by a chemical stimulus, *Inorg. Chem.*, **2012**, 31-33.
- [5] Touti, F., Singh, A., Maurin, P., Canaple, L., Beuf, O., Samarut, J., Hasserodt, J. ; An electroneutral macrocyclic Iron(II) complex that enhances MRI contrast *in vivo*, *J. Med. Chem.*, **2011**, 4274-4278.