UMR 6226 CNRS - UNIVERSITE DE RENNES

Institut des Sciences Chimiques de Rennes

Post-doctoral Research Fellow (1 year)

Photoswitchable lanthanide complexes for next generation bio-imaging

Keywords : **photochromism, luminescence, lanthanide complexes, bio-imaging**.

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Research challenge. « *Today, nanoscopy is used world-wide and new knowledge of greatest benefit to mankind is produced on a daily basis* » says the Nobel Prize in Chemistry 2014 press release on the importance of super-resolved fluorescence microscopy to the field of Biology. Indeed, Super-resolution fluorescence microscopy has transformed biological imaging by overcoming the diffraction limit of conventional optical microscopy.[1] The development of photoswitchable fluorescent probes has played a key role in this revolution.[2] The ultimate goal of this project is to provide new molecular tools that can further extend the scope and use of super-resolved microscopy thanks to the specific features of lanthanide luminescence allowing superior *in vivo* imaging in the red and NIR ranges.[3]
We have a long-standing expertise on the design of photoswitchable lanthanide complexes[4] made by the incorporation of photochromic organic moieties within appropriate ligand scaffolds and have provided the first NIR-emitting lanthanide-based photoswitches.[5-6] The concept has recently been extended to various emitters such as Samarium(III), or Erbium(III).[7]

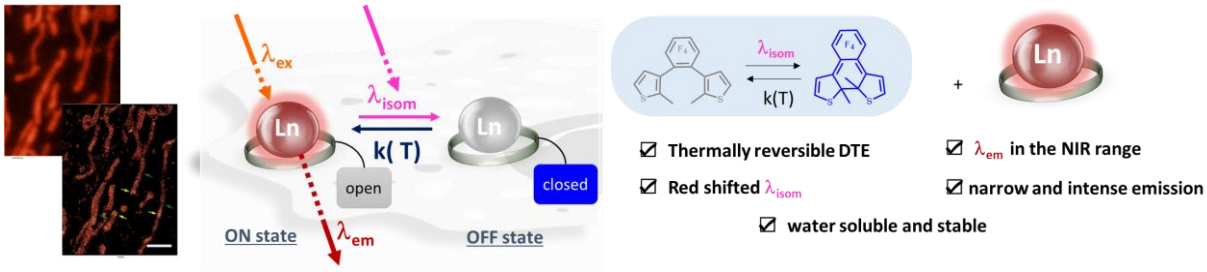

Figure 1: Salient features of project Bio-switch-Ln.

We now aim to take a significant step forward by demonstrating that these photoswitchable lanthanide complexes are promising candidates for NIR bioimaging. The project aims at developing molecular systems combining:

-high stability and water solubility;
-efficient NIR emission with enhanced quantum yields;
-red-shifted photoactivation wavelengths, avoiding UV irradiation;
-efficient photoisomerization together with spontaneous thermal recovery to the emissive state at room temperature.[8]

Profile and skills: We are looking for a motivated scientist (F / M) holding a PhD degree in molecular chemistry. The candidate must have no more than two years of postdoctoral experience. The candidate should have good skills in multistep organic synthesis and ligand design, and ideally bio-vectorization strategies. He/she should show interest in lanthanide coordination chemistry and have a basic background in lanthanide spectroscopy and photophysics, or be willing to develop these skills. Short stays in ENS Lyon in the group of Olivier Maury will ensure high level training of the candidate on these aspects.

The fellow will design and synthesize new photochromic ligands, prepare their lanthanide complexes, investigate their photophysical properties and participate in the dissemination of the results through publications and conferences. The fellow will join a friendly and collaborative research group and is expected to actively contribute to the scientific life of the team. ISCR is a large chemistry institute with an active scientific life and Rennes is a medium size French city offering a relaxing life style with many cultural and sport activities.

Funding : EUR LUMOMAT. Monthly salary > 2200 euros

Application : Please provide your resume and the name and email of two references we can contact. Application deadline : September 15.

Starting date of the contract : No later than December 2026

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