



Center for Molecular Biophysics
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PhD position available in Orléans – France Starting October 2018

Design, Synthesis and Spectroscopic Characterization of Polymetallic Luminescent Lanthanide Complexes for Applications in Optical and Photoacoustic Imaging

PhD Advisors: Dr. Svetlana V. Eliseeva and Prof. Stéphane Petoud

The global goal of the project is the design, synthesis and advanced photophysical characterization of polymetallic lanthanide compounds for use in optical and photoacoustic imaging modalities.

Optical and photoacoustic imaging share a common need for reagents possessing very high molar extinction coefficients associated with good resistance to light-induced degradation from excitation sources (photodegradation or photobleaching).

In order to benefit from the properties of such imaging agents, it is crucial to ensure their compatibility with the biological systems to be studied (cells and small animals).

The design of efficient luminescent lanthanide compounds implies the presence of conjugated chromophores capable of sensitizing lanthanide cations emitting in the visible and in the near infrared.

The design of photoacoustic imaging agents implies the ability to deactivate residual fluorescence to maximize radiative deactivation (molecule vibrations). It requires a good knowledge of the electronic structures of these systems.

To meet all requirements, we propose to explore three types of polymetallic compounds on which the team has established an extensive expertise: a) metal-organic frameworks (MOFs), b) dendrimer complexes and c) beads incorporation both chromophore and lanthanides.

The abilities of these compounds to emit either photons or induce vibrations will be controlled by the nature of the lanthanide cations.

More specifically, the proposed PhD work will include the synthesis of compounds and their characterization using specialized physical and photophysical methods developed within the group

in order to establish relationships between the structures of these molecules and the relevant functional properties.

Another particular aspect of this work will include toxicity tests of the synthesized compounds and the evaluation of their behavior in biological media. The PhD candidate will participate in testing molecules as optical imaging agents in pertinent biological models using the state of the art microscopy and macroscopy equipment.

Photoacoustic imaging tests will be performed with our partner in Orléans. The candidate will be fully involved in these experiments.

*To apply, please forward us electronically your CV and a letter of motivation. Applications must be received by **April 12, 2018** to ensure full consideration. The search will eventually continue until the position is filled.*

For any information and to apply, you can contact us at:

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