Polymeric Cu(I) ion Luminescent Assemblies with Modular Proton Transfer Properties

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Luminescent materials have become essential in numerous applications such as lighting, displays, and detection systems. A current challenge is to develop multifunctional, stimulus-responsive materials addressing various needs, such as the detection of hazardous chemical substances (chemical weapons, poisons) or serving as luminescent markers for non-destructive quality control, traceability, and anti-counterfeiting.

This **two-year post-doctoral position** is funded by an ANR PRC project research. It will focus on the preparation of novel photoactive molecular systems combining luminescent Cu(I) ions precursors and functional ligands including systems carrying Excited State Intramolecular Proton Transfer (ESIPT) properties. The synthetic approach adopted in this project will be general and adaptable, paving the way for new families of efficient and environmentally friendly luminophores. Based on straightforward and already-established synthetic methods developed in our group,[1] this project will generate a wide variety of structures and associated photophysical properties. This will enable the emergence of innovative materials combining intrinsic luminescence with sensitivity to external stimuli (temperature, pressure, atmosphere, solvents...), offering a broad range of emission colors and behaviors. The approach will notably involve derivatives with ESIPT properties developed by partner team at ICPEES Strasbourg, which will be used as linking ligands with Cu(I) TADF-emitting precursors to obtain supramolecular polymers with enhanced luminescence efficiency and innovative sensitivity to external stimuli.



As part of this research, the recruited candidate may be invited to actively participate in ongoing collaborations (including short-term research visits) with our partner at ICPEES Strasbourg, but also with the research groups of Prof. Dr. Manfred Scheer at the University of Regensburg (Germany) and Prof. Leonard MacGillivray at the University of Sherbrooke (Canada).

Candidate Profile

The candidate should have an expertise in solid-state characterizations and solid-state photophysical studies. In addition, a strong knowledge in molecular chemistry and standard analytical techniques (NMR, UV-Vis, IR, etc.) is essential. Experience in embedding molecular materials into polymer matrices would be appreciated, as well as good practice of English.

For more information about the application procedure, please contact: guillaume.calvez@insarennes.fr and christophe.lescop@univ-rennes.fr

[1] a) Schlachter, A.; Moutier, F.; Utrera-Melero, R.; Schiller, J.; Khalil, A. M.; Calvez, G.; Scheer, M.; Costuas, K.; Lescop, C. Photoluminescent Cu(I) Assemblies With High Temperature Solid-State Transitions as a New Class of Thermic History Tracers, *Adv. Opt. Mat.*, **2024**, *20*, 2400347; b) Schlachter, A.; Xu, C.; Schiller, J.; Utrera Melero, R.; Kerneis, S.; Calvez, G.; Costuas, K.; Scheer, M.; Lescop, C. High-Temperature Solid-State Post-Synthetic Modification of Highly Luminescent Cu(I) Metallacycles toward New Luminescent Thermic Tracers *Angew. Chem Int. Ed.*, **2024**, e202413151.