PhD offer in Chemistry

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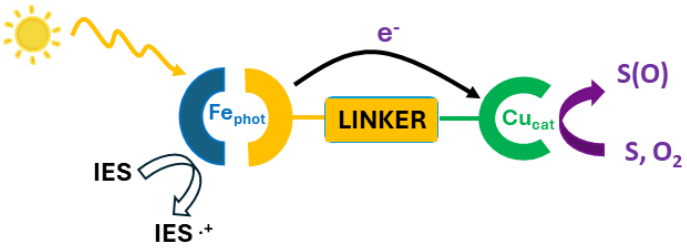
Novel photoactivatable supramolecular assemblies for bio-inspired dioxygen activation

Harnessing solar energy to sustainably produce chemicals using supramolecular assemblies is a highly active area of contemporary research. The underlying concept involves combining a photosensitizer (**PS**) that, upon solar irradiation, transfers electrons to a covalently linked catalyst (**Cat**) with a defined reactivity. Ruthenium and iridium complexes are currently benchmark **PSs** due to their outstanding photophysical and redox properties. Given the high cost and low natural abundance of these metals, the development of sustainable **PSs** based on Earth-abundant metals has become increasingly important. In this context, implementing photo(electro)catalysis with Fe-based complexes would represent a major advance. Unfortunately, compared with Ru(II) analogues, Fe(II) complexes typically exhibit much shorter-lived metal-to-ligand charge transfer (MLCT) states because they undergo ultrafast relaxation to metal-centred (MC) states, which rapidly decay back to the ground state. However, the past decade has seen remarkable progress in overcoming these limitations. Carefully designed ligands with tailored electronic properties have significantly improved the excited-state lifetimes of classical polypyridine Fe complexes, reaching the nanosecond regime.
The PhD project aligns with these long-term goals by advancing photocatalytic processes using sustainable materials. Its objective is to improve Fe(II) photophysics and to develop covalent **push–pull**, noble-metal-free **Fe_{phot}–Cu_{cat}** dyads photocatalysts for the benchmark oxidation of organic substrates. The project will focus particularly on the design and optimization of **Fe_{phot}** units to promote fast and efficient charge transfer to **Cu_{cat}**.



PhD focused on organic/organometallic synthesis and coordination chemistry, in collaboration with LCBM (CEA Grenoble), offering multidisciplinary exposure and comprehensive training.
The candidate should have excellent theoretical and practical expertise in organic synthetic chemistry, with knowledge of coordination chemistry considered an asset. Familiarity with UV–VIS spectroscopy would be advantageous. The ability to thrive in a collaborative and international research environment will favour the successful progress of the project.
Deadline for application: **April 3rd 2026**