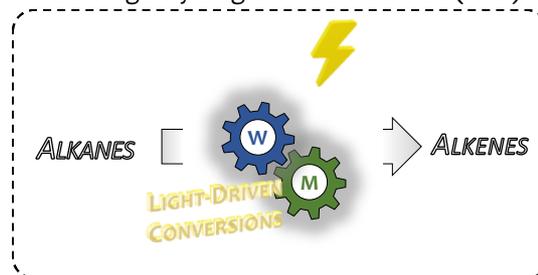


## PhD position available in Inorganic Chemistry @Sorbonne-Université, Paris

### Topic: Photocatalyzed Alkane Conversion by Polyoxometalates

The PhD work will be carried out in the team 'Edifices POLyMétalliques' under the supervision of **Dr. Geoffroy Guillemot** at the **Institut Parisien de Chimie Moléculaire** (<http://www.ipcm.fr>), from **Oct. 2022 to Sept 2025** (ANR project developed in collaboration with researchers of the CP<sub>2</sub>M-M<sup>2</sup>AGIC<sup>2</sup> team at the UCB-Lyon)

**Project.** The PhD candidate will take part to a project that aims at converting alkanes into chemical building blocks of higher added value, a major challenge yet to be achieved in homogeneous catalysis. Dehydrogenation of alkanes into olefins represents one of the most desirable path to this end.<sup>[1]</sup> However, this reaction is reversible, endothermic, and high kinetic barriers are associated with C-H bond activations. To circumvent these energy issues our approach is to develop a photo-assisted dehydrogenation of alkanes. Achievement of our objectives requires the design of robust and well-suited catalysts. In recent years we have developed a family of metal complexes of hybrid polyoxometalate ligands (Metal-SiloxPOMs) which represent unique entities that combine a redox-active platform, possibly photoactive, and a remote coordinatively well-defined metal center, thus able to tackle the challenging targeted catalytic reactions.<sup>[2-4]</sup> The PhD candidate will be in charge of a research program that encompasses the development of a family of earth-abundant Metal-SiloxPOM complexes (Fe, Co), the study of their redox properties and ability to promote photo assisted C-H activation through Hydrogen Atom Transfer (HAT).<sup>[5]</sup> This approach aims at coupling in a single system the capacity of the POM to promote HAT in tandem with single electron transfer (SET) chemistry typical of first row transition metals in order to realize the dehydrogenation of alkanes in mild conditions, thus meeting the requirements of greener processes and controlled energy costs.



**Candidate profile.** The candidate should be highly motivated to work in the fields of inorganic, organometallic chemistry and (photo)catalysis. Experience in standard techniques for the synthesis and spectroscopic characterization of air-sensitive compounds (glove box and Schlenk techniques) will be appreciated. The ideal candidates should therefore hold a M. Sc. degree in the field of molecular inorganic and organometallic chemistry and homogeneous catalysis. He/she has to develop quickly his/her experimental skills to work independently and must be autonomous to organize its own work program and to deliver results according to milestones. Good adaptability, inclination to teamwork, and good communication skills are also required to efficiently report the progress of his/her work (both in French and in English). Interested candidates are invited to send CV, copy of the master degree, motivation letter and the contact info of two referees to the PhD supervisor, Dr. G. Guillemot (see contact info).

**Contact. Dr. G. Guillemot:** Team Edifices POLyMétalliques (EPOM), Institut Parisien de Chimie Moléculaire, Sorbonne Université, Paris ; e-mail : [geoffroy.guillemot@sorbonne-universite.fr](mailto:geoffroy.guillemot@sorbonne-universite.fr); tel. +33 1 44 27 35 22.

**References :** [1] J. J. H. B. Sattler, J. Ruiz-Martinez, E. Santillan-Jimenez, B. M. Weckhuysen, *Chem. Rev.* **2014**, *114*, 10613. [2] G. Guillemot, E. Matricardi, L.-M. Chamoreau, R. Thouvenot, A. Proust, *ACS Catal.* **2015**, *5*, 7415. [3] T. Zhang, A. Solé-Daura, S. Hostachy, S. Blanchard, C. Paris, Y. Li, J. J. Carbó, J. M. Poblet, A. Proust, G. Guillemot, *J. Am. Chem. Soc.* **2018**, *140*, 14903. [4] F. Li, S. H. Carpenter, R. F. Higgins, M. G. Hitt, W. W. Brennessel, M. G. Ferrier, S. K. Cary, J. S. Lezama-Pacheco, J. T. Wright, B. W. Stein, M. P. Shores, M. L. Neidig, S. A. Kozimor, E. M. Matson, *Inorg. Chem.* **2017**, *56*, 7065. [5] G. Laudadio, Y. Deng, K. van der Wal, M. Nuno, M. Fagnoni, D. Guthrie, Y. Sun, T. Noël, *Science*, **2021**, *369*, 92-26.