

Funded Ph.D. position 2022-2025 Grenoble, France

Copper-Based Molecular Electrocatalyst for Strong C-H bond Activation

Institution: Univ. Grenoble Alpes/Department of Molecular Chemistry ([DCM](#))

The project will be developed within two groups (BIOCEN and CIRE) in DCM possessing complementary recognized expertise in chemical design and synthesis, characterization techniques such as advanced ultrafast spectroscopies, molecular electrochemistry and in functionalization of carbon-based nanomaterials.

Context: The direct oxidation of aliphatic C–H bond is faced by several drawbacks such as the use of stoichiometric amounts of toxic or rare-metal-based oxidant. Recently new bio-inspired high-valent copper species demonstrated their capability to perform strong C–H bonds activation.¹ Translating homogeneous electrocatalyst by immobilization on nanomaterial (carbon nanotubes, graphene...)^{2,3} appears to be a promising approach for development of efficient heterogeneous catalysis for activation of inert alkanes.

Job description: Capitalizing on our experience with dicopper complexes based on heterocyclic ligand and grafted copper complexes, this PhD position will be focused 1) on the preparation of new ligands and corresponding copper complexes with anchoring groups 2) the functionalization of carbon-based nanomaterials by the copper derivatives and 3) the electrochemical investigation of the targeted high-valent species and the electrocatalytic C-H activation properties of these nanohybrids.

Thus, the candidate should have a master degree in organic/inorganic chemistry, with interest in nanomaterials functionalization and electrochemistry willing to work in a multidisciplinary cooperative environment.

Additional knowledge in catalysis would be appreciated (although it is not required).

Location: Surrounded by mountains, the campus benefits from a natural environment and a high quality of life and work environment.

Application: Candidates should send a CV, a cover letter, recommendation letters and grade transcripts by email to Alan Le Goff (alan.le-goff@univ-grenoble-alpes.fr) and Aurore Thibon-Pourret (aurore.thibon@univ-grenoble-alpes.fr). Deadline: March 11th, 2022.

¹ Isaac, J. A.; Thibon-Pourret, A.; Durand, A.; Philouze, C.; Le Poul, N.; Belle, C., *Chem. Comm.* **2019**, 55, 12711,

² S. Gentil, J. K. Molloy, M. Carrière, A. Hobballah, A. Dutta, S. Cosnier, W. J. Shaw, G. Gellon, C. Belle, V. Artero, F. Thomas and A. Le Goff, *Joule*, **2019**, 3, 2020–2029.

³ S. Gentil, J. K. Molloy, M. Carrière, G. Gellon, C. Philouze, D. Serre, F. Thomas and A. Le Goff, *Inorg. Chem.*, **2021**, 60, 6922–6929.