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Post-Doctoral position (20 months ; Start : February 2025)

Catalysts grafting on carbone electrodes: towards cleaner and more efficient chiral electrochemical reactions (GrefOrgCat)

Electrosynthesis has experienced a revival during the last ten years due to the numerous advantages; the major one being the replacement of chemical oxidants or reductants by simple electrons. Nevertheless, electrochemical process still suffers drawbacks relying on the technique on its own as if to say mass transfer of the chemical species from the electrode to the bulk solution. Through this **GrefOrgCat** project we intend to tackle this challenging issue by developing new chemically modified carbone electrodes encompassing chiral organocatalysts with the aims of allowing the enantioselective chemical reaction to occur at the surface of the electrode in order to improve both the reactivity and the selectivity of a given reaction. The **GrefOrgCat** project focuses on the covalent grafting of chiral organic catalysts onto carbon electrodes, with the aim of achieving cleaner electrochemical reactions combining the advantages of asymmetric organocatalysis and electrosynthesis. For this purpose, an electrochemical grafting strategy will be studied allowing, in a first step, the grafting of a linker via covalent bond that can be functionalized, in a second step, by a dedicated organocatalyst. The reactivity and selectivity of the original grafted electrodes thus obtained will be evaluated in two electrochemical enantioselective aldehyde α -functionalization reactions by radical coupling: (1) a first reaction involving xanthene-derived radicals, for which a version using an unsupported organocatalyst has been reported in the literature with modest yields and selectivities, and which will serve as a model reaction,¹ and (2) a second original reaction involving the generation of alkyl or fluorinated alkyl radicals by anodic oxidation.

The position will be held in the *e*-CatCH group (Heterocycles team, COBRA laboratory) located near Rouen. The *e*-CatCH group has a long-standing and well-recognized experience in organocatalysis and asymmetric synthesis² and, since recently, has ventured in the field of electrosynthesis.³

The post-doctoral position is funded by the region Normandy (co-funded by the EU through ERFD) for 20 months. The gross salary will be approximately between 2500-3000 € per month.

Expected skills: We are looking for an outstanding and highly motivated candidate with **extensive experience in organic chemistry** and products characterization. Knowledge in catalysis, electrosynthesis, or covalent grafting of carbone surface would be an additional asset.

Application procedure: The applicant should provide a CV, a cover letter and 2 recommendation letters or contact that might be contacted. Applications have to be sent to Dr Sylvain Oudeyer (sylvain.oudeyer@univ-rouen.fr) and Dr Vincent Levacher (vincent.levacher@insa-rouen.fr).

¹ Ho, X.-H.; Mho, S.-i.; Kang, H.; Jang, H.-Y. *Eur. J. Org. Chem.* **2010**, 4436-4441 (DOI: 10.1002/ejoc.201000453).

² For selected publications from the group, see: (a) Poisson, T.; Dalla, V.; Marsais, F.; Dupas, G.; Oudeyer, S.; Levacher, V. *Angew. Chem. Int. Ed.* **2007**, *46*, 7090-7093 (DOI: 10.1002/anie.200701683). (b) Legros, F.; Oudeyer, S.; Levacher, V. *Chem. Rec.* **2017**, *17*, 429-440 (DOI: 10.1002/tcr.201600111). (c) Segovia, C.; Godemert, J.; Brière, J. F.; Levacher, V.; Oudeyer, S. *Adv. Synth. Catal.* **2022**, *364*, 3794-3799 (DOI: 10.1002/adsc.202200857).

³ For selected publications from the group, see: (a) Leleu, L.; Martzel, T.; Fall, A.; Sanselme, M.; Levacher, V.; Oudeyer, S.; Brière, J. F. *Chem. Commun.* **2022**, *58*, 6100-6103 (DOI: 10.1039/d2cc01795d). (b) Maret, C.; David, N.; Pierrot, D.; Léonel, E.; Levacher, V.; Brière, J.-F.; Oudeyer, S. *Molecules* **2023**, *28* (18), 6704-6716 (DOI: 10.3390/molecules28186704).