

PROGRAMME DOCTORAL GENIE DES PROCÉDES

Contrats Doctoraux Sorbonne Université de 36 mois débutant le 1^{er} octobre 2022

Intitulé du Projet de Recherche Doctoral :

CO₂ electroreduction from waste incinerator flue gas using molecular catalysts

Directeur de thèse principal :

NOM : **SANCHEZ-SANCHEZ**

Prénom : **Carlos**

Titre : Chargé de recherche

e-mail : carlos.sanchez@sorbonne-universite.fr

Unité de Recherche : Laboratoire Interfaces et Systèmes Electrochimiques (LISE) UMR 8235

Université : Sorbonne Université (Paris)

Co-Directeur de Thèse :

NOM : **FONTECAVE**

Prénom : **Marc**

Titre : Professeur Collège de France

e-mail : marc.fontecave@college-de-france.fr

Unité de Recherche : Laboratoire de Chimie des Processus Biologiques (LCPB) UMR 8229

Université : Sorbonne Université (Paris), Collège de France

Abstract

Combustion plants and waste incinerators are some of the most relevant individual contributors to carbon dioxide (CO₂) accumulation. Thus, the conversion and recycling of the annual millions of tons of CO₂ expelled by those sources is a critical concern nowadays. CO₂ electroreduction (CO₂RR) [1-3] represents an environmentally friendly approach that implies complex multi-electron and multi-proton reactions usually accompanied by competing hydrogen evolution reaction (HER). To date, most research is conducted in ideal laboratory conditions, injecting 100% pure CO₂ gas as a reactant to avoid any side effect from contaminants present in industrial flue gas. For this reason, this project aims at evaluating the sustainability of CO₂ electrochemical conversion fed from synthetic incinerator flue gas. The main aim of this project is to evaluate water soluble molecular catalysts for CO₂ electroreduction under realistic gas feeding conditions and demonstrate the potential of this approach in industrial relevant conditions.

[1] Vichou, E., Li, Y., Gomez-Mingot, M., [Fontecave, M.](#), [Sánchez-Sánchez, C.M.](#) (2020). J. Phys. Chem. C 124, 23764.

[2] Li, Y., Gomez-Mingot, M., Fogeron, T., [Fontecave, M.](#) (2021). Acc. Chem. Res., 54, 4250.

[3] Merino-Garcia, I., Tinat, L., Albo, J., Alvarez-Guerra, M., Irabien, A., Durupthy, O., Vivier, V., [Sánchez-Sánchez, C.M.](#) (2021). Appl. Catal. B, 297, 120447.

Deadline for applications: April 30, 2022