



AMCEL / John van Geuns Lecture September 15th

Reduction of CO₂ with molecular catalysts beyond 2 electrons and 2 protons

Prof. Marc Robert, Université de Paris, France



Venue : Science Park 904, room L1.01

Time: 14:00h

Abstract

Reduction of carbon dioxide has as main objective the production of useful organic compounds and fuels - *renewable fuels* - in which solar energy would be stored. Molecular catalysts can be employed to reach this goal, either in photochemical or electrochemical (or combined) contexts. They may in particular provide excellent selectivity thanks to easy tuning of the electronic properties at the metal and of the ligand second and third coordination sphere. Recently it has been shown that such molecular catalysts may also be tuned for generating highly reduced products such as formaldehyde, methanol and methane, leading to new exciting advancements. Obtaining C-C coupling products is an additional intriguing possibility. Our recent results will be discussed, using earth abundant metal (Fe, Co) porphyrins and phthalocyanines as well as related complexes as catalysts.

Recent references from our group :

1. Nat. Catal. 2023, <https://doi.org/10.1038/s41929-023-01005-3>; 2. Nat. Commun. 2023, 14, 3401 ; 3. Angew. Chem. Int. Ed., 2022, e2021116832; 4. Science 2019, 365, 367-369 ; 5. Nat. Catal. 2019, 2, 801-808; 6. Nature 2017, 548, 74-77

Short bio

Prof. Marc Robert is a Distinguished Professor at Université Paris Cité (Paris, France) and a Senior member (Innovation Chair) at the Institut Universitaire de France (IUF). His work is dedicated to electrochemical and photochemical approaches of electron-transfer processes and to the catalytic activation of small molecules (CO₂, N₂), in an effort to solve contemporary energy challenges.

Among several distinctions, M. Robert was a JSPS Research Fellow (2016); he was awarded the first International Prize *Essential Molecules Challenge - Air Liquide* (2016), a French National Innovation Prize (2021) and the Senior Researcher Prize from the French Chemical Society (Physical Chemistry division, 2022). He is an International Advisory Board member at *Angewandte Chemie International Edition*, *ChemSusChem* and *ChemPhysChem*.