



Photo-Induced Hydrogen Formation from Food Waste

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The production of clean energy is one of the most actual issues of our society. Among the different envisaged clean energy sources, hydrogen is an extremely relevant and non-polluting source. Indeed, the latter possess a much more energy efficiency than fuel and produce only water as by-product for its reaction with oxygen of air. Unfortunately, the hydrogen is actually produced from fossil-based sources which limit significantly its impact as clean energy source. Several approaches are being developed in order to produce hydrogen from widely available sources such as water (*water splitting*) or biomass (*carbonization and pyrolysis of the biomass*).¹ The manufacture of hydrogen from food waste is a particularly interesting approach since it will allow the production of this energy from local and really available sources in particular using light as driving force.

The proposed master 2 internship aims to synthesize original mono and bi-metallic photo-redox catalysts based on metallic complexes of Ce, Co, Ir... in order to catalyze dehydrogenating reactions of diverse chemical products (*fatty acids*,² *alcohols*,³ *lactic acid*, etc...) produced by food waste fermentation.



Skills used in the project: Organic and inorganic syntheses, gas and liquid chromatography, NMR, manipulation using inert atmosphere technics (*use of schlenk line and glovebox*), electrochemistry, etc....

Duration: 6 months (started in beginning of 2021)

Funders: Agence Innovation Defense

Laboratory: LCM, Ecole Polytechnique

Salary: 591.51 € / month

¹ Bessarabov, D.; Wang, H.; Li, H.; Zhao, N. PEM electrolysis for hydrogen production, **2016**, CRC Press.

² Sun, X.; Chen, J.; Ritter, T. *Nature Chem.*, **2018**, *10*, 1229.

³ Trincado, M.; Banerjee, D.; Grützmacher, H. *Energ Environ. Sci.*, **2014**, *7*, 2464.