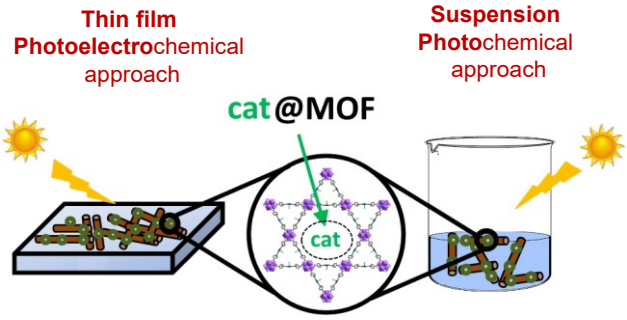
POSTDOCTORAL POSITION
Starting Fall 2020 (no later than December 1st)

cat@MOFs photosytems

Encapsulation of molecular catalysts in MOFs for CO_2 reduction

The reduction of CO_2 into useful organic compounds and fuels is a major and very intense research field. One route consists in first converting sunlight energy into electricity that could be used to reduce CO_2 electrochemically. Another route is to directly use the visible photons from sunlight to photoinduce the reduction of the gas into "solar fuels" in which solar energy is stored in chemical bonds.

The LEM group has shown that molecular catalysts (cobalt quaterpyridine and phthalocyanine, iron porphyrins) are among the most efficient catalysts for the CO_2-to-CO reduction in both aprotic and aqueous solvent (Science 2012, 338, 90; JACS 2016, 138, 16639). Fe-porphyrins were even proved to be the first molecular catalysts able to reduce CO_2 into CH_4 upon visible light irradiation (Nature 2017, 548, 74; JACS 2018, 140, 17830).



To go one step further, this joint UParis / ILV / Collège de France project supported by the DIM RESPORE network, aims at building a ***new 3-in-1 hybrid photosystem for CO_2 reduction*** by the heterogenization of CO_2 molecular catalysts into photosensitive MOF-based porous 3D matrix. Starting with the well-defined Zr-based MOF-545, we will encapsulate targeted molecular catalysts by impregnation (ILV group) and then evaluate their catalytic ability towards CO_2 reduction (LEM group) both as particulate suspension (*photochemical* approach) and as thin films (*photoelectrochemical* approaches).

In parallel to experimental investigations, theoretical calculations aiming at giving atomistic level structural/electronic insights (accessible volumes, cat-MOF interactions) will be conducted by the CDF group.

Candidate profile:

The candidate must hold a PhD in chemistry. She/he should be familiar with material chemistry and related characterization techniques (XRD, BET, EDX, etc). Experience in thin films and/or photoelectrochemistry would be highly valuable.

Autonomy (the project being conducted between two labs) and fluent English are mandatory.

The position is for **12 months**. Net monthly salary (before income tax) ca. 2200 €.

Contact:

CVs and motivation letters must be address to both persons below

Dr. Julien BONIN, LEM, UParis (julien.bonin@u-paris.fr)

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