STAGE M2 CHimie Inorganique, Physique et du Solide (*CHIPS*)
2021/2022

- Dates du stage envisagées :
  Février – juillet 2022

- Gratification du stage
  ☒oui ☐ non
  (rappel : les stages de durée égale ou supérieure à 44 jours sont légalement soumis en France à une gratification statutaire, sauf élèves normaliens)

- Organisme d'accueil (SIRET, SIREN,…) et représentant légal de l'organisme d'accueil (signataire de la convention) :

Nom : Université de Versailles Saint Quentin
Adresse : 45 avenue des Etats-Unis 78035 Versailles
SIRET : 197 819 444 00013
Représenté par : Alain Bui
En qualité de : Président

- Laboratoire d'accueil :

Institut Lavoisier de Versailles

- Responsable (tuteur) de stage:

Nom, prénom : Dolbecq Anne (DR) et Pierre Mialane (PR)
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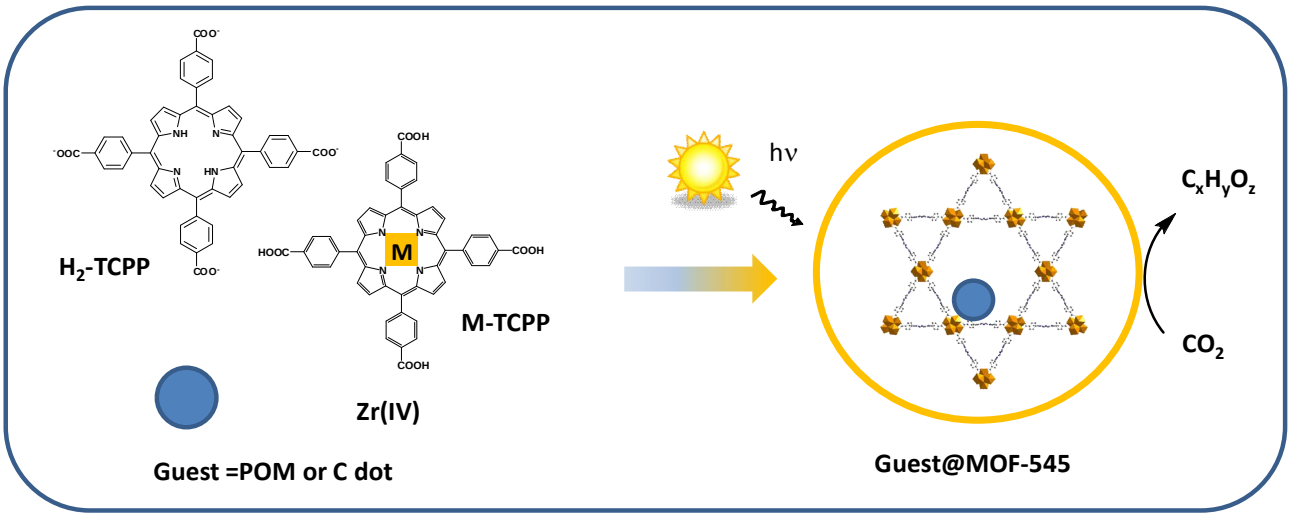
Collaboration : Caroline Mellot-Draznieks, LCPB, Collège de France, Paris

▪ Sujet :

Boosting the photocatalytic CO_2 reduction reaction of porphyrinic MOFs

Hybrid porous solids or MOFs (Metal-Organic Frameworks) constitute ideal platforms for the elaboration of new heterogeneous, selective, recyclable catalysts, which can perform reactions of major interest (oxidation of water, reduction of protons or CO_2). Thanks to the easy functionalization of the linker and the post-synthesis functionalization such as the encapsulation and the grafting of active species (noted Guest), this field has been attracting an increasing interest (Y.-H. Luo *et al.*, *Coord. Chem. Rev.* **2019**, *390*, 5107, P. Mialane *et al. Chem. Soc. Rev.* **2021**, *50*, 6152). On the one hand, we recently evidenced that POMs immobilized in the cavities of a MOF functionalized by catalytic Rh complexes can have a beneficial effect on the catalytic activity of the material for CO_2 reduction (Y. Benseghir *et al.*, *J. Am. Chem. Soc.* **2020**, 142, 9428). On the other hand, following the first report of the photocatalytic properties of the porphyrinic MOF-545 (H.-Q. Xu *et al. J. Am. Chem. Soc.* **2015**, *137*, 13440), we showed that the metalation of the porphyrin has a strong impact on the photocatalytic performances (Y. Benseghir *et al.*, submitted). These recent discoveries pave the way for the development of a new family of MOF-based composites that will be studied as photocatalysts for CO_2 reduction. We will first focus on the porphyrinic MOF-545. The Guest species (polyoxometalate, quantum dots) will be introduced either during the synthesis or by post-synthetic impregnation. Their effect on the photocatalytic activity of the MOF will be studied experimentally and rationalized via the use of DFT calculations performed in collaboration with the LCPB group in College de France.



The recruited M2 student will therefore have to carry out the synthesis of the porphyrinic MOFs and of the composite materials and their characterization (UV-Vis, IR, powder X-ray diffraction, BET measurements, EDX analysis); he/she will also study the photocatalytic properties in College de France.

- Domaine(s) concerné(s) :

☐	Théorie	☒	Matériaux
☒	Expérience	☐	Polymères
☒	Chimie Inorganique	☐	Autres :
☐	Chimie Physique		
☐	Biophysique		

- Confidentialité du stage :

☒ Non ☐ Oui