

Proposition de sujet de thèse

Dyes as redox-active ligands in linear arrays

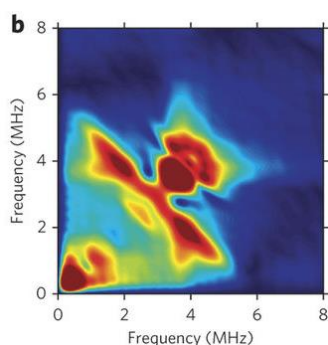
Sylvie Choua (MC, UdS, Laboratoire des Propriétés Optiques et Magnétiques des Architectures Moléculaires, UMR 7177, Institut de chimie).

Romain Ruppert (CR, UdS, , Laboratoire de Chimie des Ligands à Architecture contrôlée, UMR 7177, Institut de chimie).

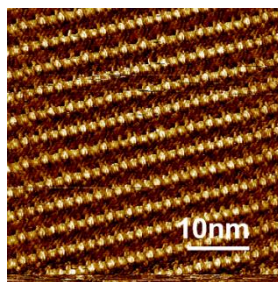
Email : sylvie.choua@unistra.fr ; rruppert@unistra.fr

We have shown earlier that metal ion linked oligoporphyrins can be obtained on surfaces by self-assembly. Using the same strategy, but with more easily accessible chromophores, we plan to build new dimers and oligomers starting from commercial dye compounds. The electronic delocalization and the magnetic properties of the new entities built from these compounds and the relationships of the properties with the structures will be studied by EPR spectroscopy and spectroelectrochemistry.

The physical-chemistry of the new molecules will be studied in solution by using locally available techniques. The redox processes of the entities will be studied by spectro-electrochemistry (UV-Vis-NIR) and by advanced EPR spectroscopy. This will give access to the localization of the added (or removed) electrons when these entities are reduced or oxidized. The extent of electronic delocalization can also be estimated from these measurements.



2D- EPR spectroscopy (Hyscore)



STM images of porphyrin complexes on HOPG

With these new building blocks (dyes bearing coordination sites and long alkyl chains), we plan in collaboration with Dr Y. Kikkawa (AIST Laboratories, Tsukuba, Japan) and the student to assemble these dyes in well-organized arrays on surfaces. The final goal is to build a conducting molecular wire on the surface.

Selected references:

- 1- M. A. Carvalho, H. Dekkiche, L. Karmazin, F. Sanchez, B. Vincent, M. Kanetsato, Y. Kikkawa, R. Ruppert, *Inorg. Chem.* **2017**, 56, 15081.
- 2- H. Dekkiche, A. Buisson, A. Langlois, P. L. Karsenti, L. Ruhlmann, L. Ruppert, P. D. Harvey, *Chem. Eur. J.*, **2016**, 22(30), 10484.
- 3- L. J. Esdaile, L. Rintoul, M. See Goh, K. Merahi, N. Parizel, R. M. Wellard, S. Choua, D. P. Arnold. *Chem. Eur. J.* **2016**, 22, 3430