

# INFLUENCE OF THE AXIAL LIGAND ON IRON PHTHALOCYANINE TOWARD THE REDUCTION OF MOLECULAR OXYGEN.

Ingrid Ponce, Ruben Oñate, J. Francisco Silva, Carmen Castro, Marcos Caroli, José H. Zagal, Jorge Pavez.

Facultad de Química y Biología, Universidad de Santiago de Chile.  
Avenida Libertador Bernardo Ohiggins 3363, Estación Central, Santiago, Chile.

e-mail: [ingrid.ponce@usach.cl](mailto:ingrid.ponce@usach.cl)

Self assembled monolayers (SAMs) of 4 pyridinium salts functionalized with iron phthalocyanines complexes adsorbed on gold (111) electrodes have been constructed and characterized. Their activity for the reduction of molecular oxygen in aqueous solution has been examined. Electrochemical and scanning tunneling microscopy (STM) studies confirm the functionalization of the SAMs by iron phthalocyanine complex. The electrocatalytic studies carried out on the Au(111)/SAMs/FePc electrode, showed that the O<sub>2</sub> reduction has shifted to low potentials of almost 0.1V by the mere presence of the pyridinium anchor, compared to Au(111)/FePc system. This effect is surprising since the presence of a spacer should decrease the overall electron transfer rate. Further, the structure of each molecule influences the electrocatalytic activity for the reduction of molecular oxygen.

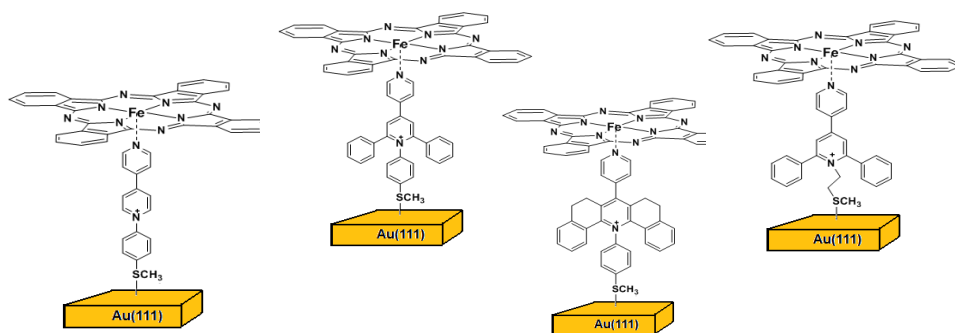


Fig. 1. SAMs of Pyridinium functionalized with Iron phthalocyanine, Au(111)/SAMs/FePc systems.

**Acknowledgments:** We are grateful to USACH-DICYT and Fondecyt projects 1100773, 1100022, 11100450 and 1131062 for financing this work. I.P. and R.O are thankful to Conicyt for a Doctoral Fellowship.

## References:

1. Ingrid Ponce, Ruben Oñate, J. Francisco Silva, Jorge Pavez, José H. Zagal *Electrochemistry Communications* 13 (2011) 1182–1185.
2. Ingrid Ponce, J. Francisco Silva, Ruben Oñate, Marcos Caroli Rezende, José H. Zagal, and Jorge Pavez, Fernando Mendizabal and Sebastián Miranda-Rojas, Alvaro Muñoz-Castro and Ramiro Arratia-Pérez, *J. Phys. Chem. C*, 2012, 116 (29), pp 15329–15341.