SINCHEM doctoral research subject

Novel Photoactive Organometallic Catalysts for Solar Energy Harvest and Storage

Catalysis is a key technology for sustainable industrial chemistry. Just as it has been strategic in the fossil-fuel based systems, catalysis will play a pivotal role in the transition toward renewable energy -based societies. In particular, with about 10,000 time more energy being received from the sun with respect to the world's total energy use, solar energy harvesting and storage is likely to play a crucial role in the future scenarios where an increase in energy consumption has to be coupled with drastic reduction in fossil-fuel consumption. The difficulty in integrating such fluctuating renewable energy source in the current infrastructure, makes its transformation into stable, transportable and available-on-demand chemical energy a sustainable route.

This thesis will thus focus on the development of original molecular complexes and their integration on a solid device to achieve energy storing reactions (solar-to-molecule). The chemical foundation of the project is the original surface organometallic chemistry, mastered by the Lyon 1 team, which will be applied to semiconductor supports. The photocatalytic performances of the resulting new materials will be tested in collaboration with the team at Università di Messina, expert in the field of artificial photosynthesis and photochemistry.

Candidate: The ideal candidate will have a solid background in molecular chemistry and synthesis and at least two of the following three fields: organometallic chemistry, organic synthesis and/or catalysis.

Supervisors:
in LYON (FRANCE - *HOME Location*) : Dr. E.A. QUADRELLI (LYON 1 university – C2P2 Unit (UMR 5265 CPE-CNRS-Unily1)
in MESSINA (ITALY- *HOST Location*) : Prof. Siglinda PERATHONER, Prof. Gabriele CENTI (UNIME)
in LYON (FRANCE- *ASSOCIATE Location*) : (IRCELYON)