Title	Catalysis for artificial photosynthesis
PI	SARTOREL Andrea
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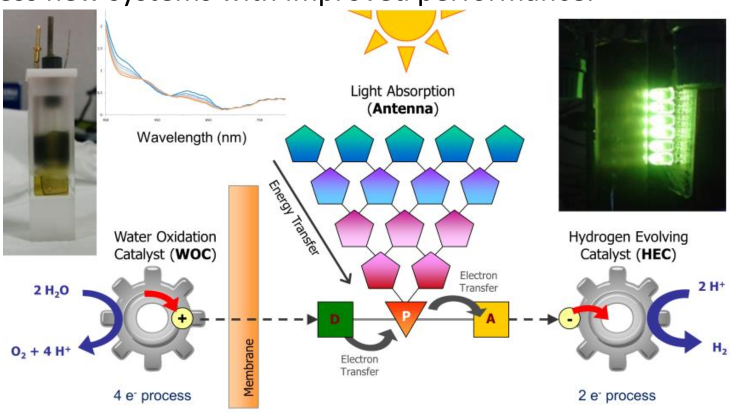
Project description:

Artificial photosynthesis is a promising strategy to capture and transform solar energy into renewable fuels or commodity chemicals, by photocatalytic processing of low cost and abundant resources such as water and carbon dioxide. Within such scheme, a key role is the development of suitable catalysts to conduct the redox reactions involved: proton reduction to hydrogen, water oxidation to oxygen, carbon dioxide reduction. The goal of the project is to develop synthetic transition metal cores capable of conducting the aforementioned reactions, by combining the design, synthesis and characterization of metal complexes, their application in electro- and photocatalysis; mechanistic evaluation by kinetic analysis, electrochemical and spectroscopic characterization of reaction intermediates, structure-reactivity correlations, isotopic labelling, DFT calculations, will provide fundamental information to address new systems with improved performance.

The student will acquire expertise in synthesis and characterization of ligands and of their metal complexes (mass spectrometry, NMR, UV-Vis, IR, electrochemical techniques including CV, spec-troelectrochemistry), and in electro- and photocatalysis. The student will also have the opportuni-ty to be part of international collaborations.



Publications:

Mechanistic Insights into Light-Activated Catalysis for Water Oxidation, M. Natali, F. Nastasi, F. Puntoriero, and A. Sartorel, VIP article in *Eur. J. Inorg. Chem.*, **2019**, in press.

Proton coupled electron transfer from Co3O4 nanoparticles to photogenerated Ru(bpy)33+: base catalysis and buffer effect, , G.A. Volpato, A. Bonetto, A. Marcomini, P, Mialane, M. Bonchio, M. Natali and Andrea Sartorel HOT article in Sust. Energy & Fuels **2018**, *2*, 1951.

Collaborations/Network:

The project will be conducted within current collaborations with several Italian and International groups.

Research funding:

Funding from Ateneo (PDISC): PHOETRY artificial photooxygenase for light assisted selective organic reactivity