## Molecular systems related to Artificial Photosynthesis: Mechanistic insights

The chemical valorization of $CO_2$ or $H_2O$ as carbon and oxygen building blocks using photocatalytic processes is a challenge that presents several facets for the chemists. To list a few, one must manage efficient and directional multielectron transfers, build earth-abundant metal catalysts able to function at low overpotential, couple these processes together. Capitalizing on our combined synthetic, spectroscopic and computational expertise, we've conducted in our team several complementary studies in order to bring basic knowledge on the functioning of relevant artificial photosynthesis sub-modules. In this webinar I will explain how, starting from a Ru-Fe dyad able to promote photooxidation using water as an oxygen source, we've come to explore a water-gated multi-electron multi-proton transfers in a P680 Tyr-His model or build a new iron complex allowing reversible metal-ligand Oxygen insertion. Closing the loop, we've shaped and studied Fe porphyrin catalysts that promote efficient $CO_2$ reduction thanks to second sphere coordination control. Ongoing work on the transposition of some of these concepts to the Nitrogen chemistry will also be discussed.


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