Towards a Biomimetic Model for the Electron Transfer Between P_{680} and the TyrZ-His190 Pair of Photosystem II

Pierre Dorlet[1], Fabien Lachaud[1], Yann Pellegrin[1], Annamaria Quaranta[2], Marie-France Charlot[1],
Sun Un[2], Winfried Leibl[2], Ally Aukauloo[1]

[1]*Laboratoire de Chimie Inorganique, Université Paris XI, France and* [2]*Service de Bioénergétique, CEA Saclay, France*

Despite the degree of sophistication which can now be incorporated into biomimetic ligand design, there is a growing awareness amongst bioinorganic chemists of the need to incorporate into their model complexes mimics of not only immediate metal coordination sphere, but also mimics of other features of the active site. The chemistry we report concerns the biomimetic model for the first electron transfer in PSII. In PSII the TyrZ-His190 pair is not directly involved in the coordination sphere of the manganese cluster. TyrZ is essential to the proper functioning of the system at the level of water oxidation. Hence with these issues in mind we have developed a family of phenanthroline based ligand holding an imidazole and a phenol rings. In one of the molecules described this pair is in hydrogen bonding interaction, as in the natural system. The study of the phenoxyl radical species on the ligand will be presented. The metallocomplexes of the type $[Ru(bpy)_3]^{2+}$ are also characterised. Our collected data evidenced the photogeneration of a phenoxyl radical when the Ruthenium complex was irradiated in the presence of an external electron acceptor, therefore mimicking the first electron trade between P_{680}^{+} and TyrZ-His190.