Photoinduced Energy Transfer and Charge Separation in Porphyrin-Based Multi-Component Arrays

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Porphyrins are photo- and electro-active components with outstanding properties, widely used since the early stages of supramolecular photochemistry in the construction of multipartite systems able to respond to light input. Their use, at first essentially based on a biomimetic approach to achieve light energy conversion, rapidly developed into several fields, as the construction of complex architectures for molecular recognition, and the development of novel materials. Their ready availability and robustness, in connection to the possibility of finely tuning the spectroscopic and electrochemical properties by simple substitution or metallation, makes porphyrins very convenient building blocks in the construction of systems able to perform light triggered functions. Moreover this class of molecules, due to the intense spectroscopic signatures associated with their radicals and/or excited states, is particularly well suited for time-resolved spectroscopic investigations and their study has greatly contributed to the fundamental knowledge of photoinduced energy and electron transfer processes.
Our recent activity in the study of photoinduced processes in porphyrin-based molecular architectures, including multi component covalently linked arrays, interlocked structures, and self-assembled donor-acceptor systems will be presented.

In collaboration with the groups of M. R. Johnston (Adelaide, Australia), M. J. Gunter (Armidale, Australia), J.-P. Sauvage (Strasbourg, France) and E. Alessio (Trieste, Italy).