BIOMIMETIC MOTIFS TO ORDER PHOTO- AND REDOXACTIVE FULLERENE ARCHITECTURES

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In nature both covalently-bonded and self-assembled motifs are widely spread organization principles that regulate size, shape and function down to the nanometer scale. Exceptional and aesthetical illustrations for the sophistication of this course are protein shells – including those of the photosynthetic reaction center – with highly complex performances such as energy storage, protection and transport of inorganic or organic molecules. The ability to engineer extended 1-D, 2-D, or 3-D architectures at the molecular level, by modifying individual chemical building blocks, sparks a very active field.

This contribution will highlight the exceptional progress made in the design, synthesis and study of supramolecular fullerene architectures that are based upon biomimetic organization principles. Simple self-assembly principles ensure the facile preparation of precise donor-acceptor architectures. Importantly, the implementation of $\mathbf{C_{60}}$ as a 3-dimensional electron acceptor holds great promise on account of its small reorganization energy in electron transfer reactions and has exerted noteworthy impact on the improvement of light-induced charge-separation. Therefore, owing to the presence of fullerenes, as an integrative building block, the majority of the presented molecular assemblies exhibit unique and remarkable features.