

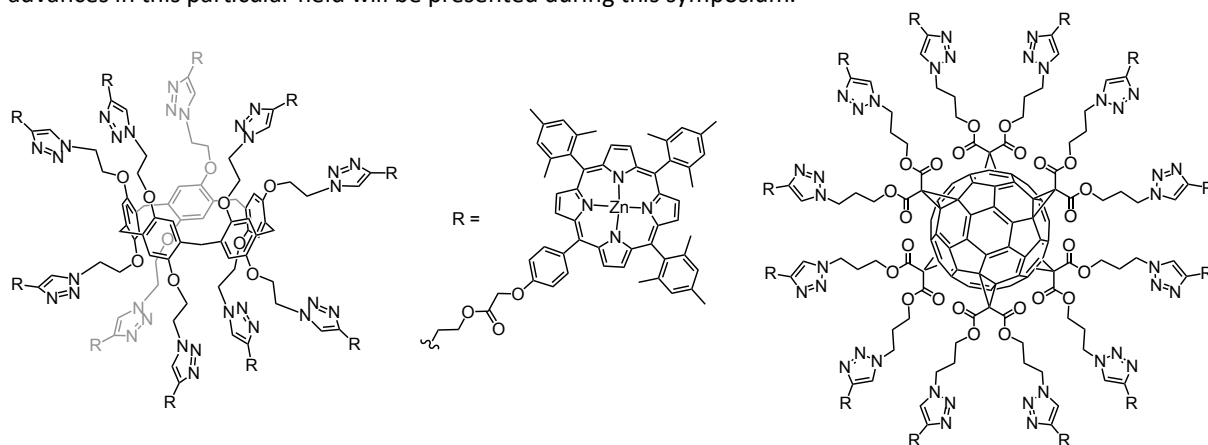
Coordination-driven folding in multi-Zn(II)-porphyrin arrays constructed on pillar[5]arene and fullerene scaffolds

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The conformational control of biological macromolecules and their ability to self-assemble into complex ensembles provide highly sophisticated multifunctional systems. Chemists are far from achieving such advanced molecular devices but natural systems have been always an amazing source of inspiration for the design of artificial molecules with specific properties. [1] As part of this research, we became interested in controlling the conformation of giant multiporphyrinic arrays constructed on pillar[5]arene [2] and fullerene scaffolds. It has been shown that weak interactions resulting from the intramolecular coordination of metalloporphyrin moieties with 1,2,3-triazole subunits are responsible for the folding of these systems. As in the case of H-bonds in proteins, the intramolecular coordination process is leading to a globular compact secondary structure at low temperature. By increasing the temperature, denaturation occurs as the weak intramolecular interactions are disrupted. This effect is perfectly reversible. On the other hand, these compounds are also molecular machines mimicking the blooming of a flower. Effectively, their degree of folding can be reversibly controlled by an electrochemical or a chemical input. In the neutral state, the compounds adopt a partially folded structure at room temperature. Upon oxidation, the peripheral Zn(II)-porphyrin moiety are coordinated with triazole units thus generating totally folded polycations. In contrast, reduction of the peripheral Zn(II)-porphyrin moiety disrupts the triazole-Zn(II) interactions and promotes therefore the complete blooming of the molecular flowers. On the other hand, addition of 1-phenylimidazole to the multiporphyrin arrays also disrupts the weak intramolecular interactions between the metalloporphyrin moieties and the 1,2,3-triazole subunits. The latest advances in this particular field will be presented during this symposium.



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