

MULTIPORPHYRIN ARRAYS BASED ON A SIX-COORDINATED TIN(IV) PORPHYRIN SCAFFOLD

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The constructions of highly ordered multiporphyrin arrays have drawn considerable attentions in many research areas encompassing biomimetic photosynthesis, molecular electronics, and supramolecular catalysis. A great variety of metalloporphyrin arrays has been investigated to this end. However, it is clear that the full potential of main group metalloporphyrins as components of multiporphyrin supramolecular arrays and nanostructures is yet to be realized. Tin(IV) porphyrins offer the chemist many advantages due to the particular properties conferred by the highly charged main group metal center. Due to the oxophilic nature of tin(IV) center, the complexes with carboxylate and aryloxy axial anions are readily prepared and tractable, making them ideal building blocks for the construction of elaborate arrays containing more than one porphyrin. Using carboxylate binding to tin(IV) porphyrins coupled with complementary binding of pyridines to zinc(II) and ruthenium(II) porphyrins, elaborate multiporphyrin arrays can be readily prepared. In particular, among various multiporphyrin arrays, container assemblies in which a molecule is encapsulated within a box-like architecture have been of great interest since their confined environment inside the box provides unusual chemistry. We here present the assembly of 3D multiporphyrin arrays based on a six-coordinated tin(IV) porphyrin scaffold, and the synthesis of a hexaporphyrin nano-box templated by a six-coordinated tin(IV) porphyrin in a thermodynamically controlled manner.