

Preface

Over the past two decades, porous coordination polymers (PCPs) and metal organic frameworks (MOFs) have been highlighted as a family of crystalline solids. They are constructed from metal ions and organic ligands via coordination bonds, and self-assembly to provide open structures. In this field, scientists with inorganic, organic, and theoretical backgrounds have produced novel complexes that show remarkably selective chemical behavior including ion and molecular separations, transport and catalysis, and so on. Cucurbit[*n*]urils are a family of molecular container hosts bearing a rigid hydrophobic cavity and two identical carbonyl-fringed portals. Because of their superior molecular recognition properties in aqueous media, they have attracted much attention in supramolecular chemistry. Recent studies reveal that weak noncovalent interactions such as hydrogen bonding, $\pi\cdots\pi$ stacking, $C-H\cdots\pi$, as well as ion–dipole interactions play an important role in the formation of cucurbit[*n*]urils/metal-based coordination architectures. In particular, a number of examples in which the use of a ‘structure inducer’ (often an anionic species or an organic molecule) is employed to make the coordination structures of cucurbit[*n*]urils with metal ions from simple complex to complicated poly-dimensional polymers and even further promote the isolation of new $Ln^{3+}-Q[n]$ species. All these processes and phenomena imply a particular property, i.e., ‘cucurbit[*n*]urils-based coordination’—the key word and leading idea of the present book.

This short communication book starts with the first chapter discussing the development of cucurbit[*n*]urils and their derivatives-general properties and the concept of outer-surface interactions. Chapter 2, on the combinatorial development of the host–guest coordination fashions, describes the details of simple coordination complexes of cucurbit[*n*]urils with metal ions. Chapter 3 discusses particular types of complicated coordination polymers derived from supramolecular assemblies of cucurbit[*n*]urils with metal ions and the significant importance of the third ‘structure inducer’ species. Finally, Chap. 4 concerns the potential applications of $Q[n]$ -based coordination complexes and polymers.

We hope that this book will be useful for scientists and graduate students working in the fields of coordination and supramolecular chemistry, and in material science.

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Supramolecular Assemblies of Cucurbit[n]urils with
Metal Ions

Coordination, Structures and Properties

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