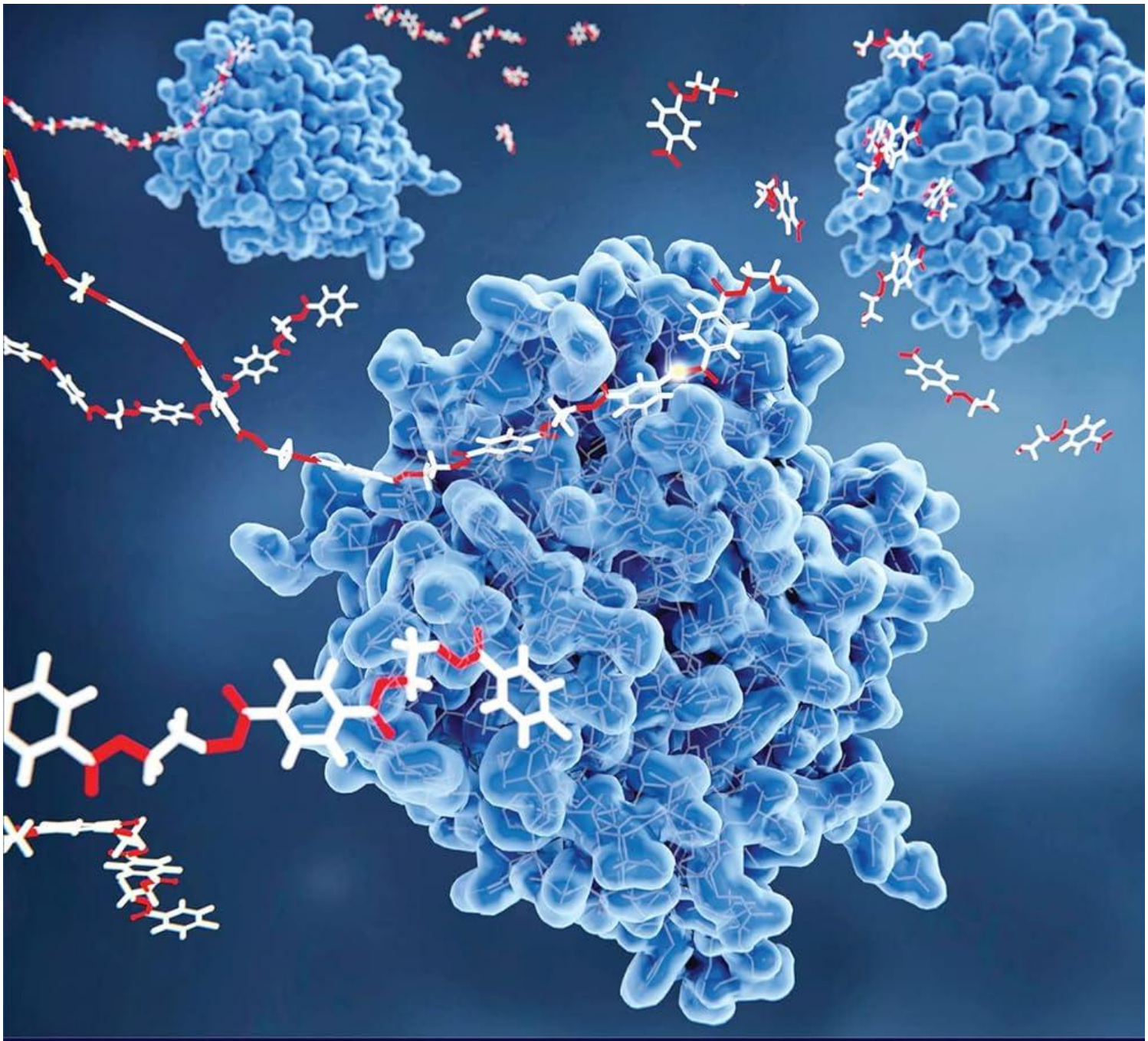

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Design, Synthesis, and Applications

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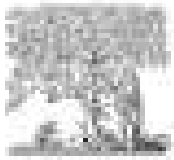

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Metal ion sensing applications of finite supramolecular coordination complexes

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17.1 Introduction

Supramolecular chemistry has led to the discovery of stunning views and complex functional structures in varied sizes and shapes during the last few decades [1]. Within the supramolecular chemistry, the coordination-driven self-assembly of discrete supramolecular coordination complexes (SCCs), ranging from two-dimensional (2D) assemblies (rhomboids, squares, rectangles, triangles, and pentagons, etc.) to three-dimensional (3D) assemblies (trigonal pyramids, trigonal prisms, cubes, cuboctahedra, cages, double squares, adamantanoids, dodecahedra, and a variety of other cages and containers) has attracted considerable attention not only because of their beautiful structures of complexity but also their diverse applications in catalysis [2], sensing [3], separation [4], biomedical [5], and in host–guest chemistry [6], and other fields [7–11]. Synthetic advantages include fewer steps, fast and easy creation of the final products, one-pot synthesis, high yield, inherent self-correction, and defect-free assembly leading to the formation of thermodynamically stable products, compared to the classical covalent technique [12,13].

Self-assembly driven by coordination has shown to be a successful method for the formation of a wide variety of complex supramolecular structures, presented with the opportunity of cationic metal nodes with numerous coordination sites and multidentate Lewis base ligands to spontaneously self-assemble. Since the early pioneering work by Lehn [14] and Sauvage [15] coordination-driven self-assembly in the construction of infinite helicates, grids, ladders, rack, knots, rings, and related species has been studied by numerous groups on the feasibility

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