



Contribution ID : 14

Type : Poster

Controlling the construction of chiral coordination cages

The integral components of natural systems like the human body are often chiral, as evident in the helical nature of DNA strands and the right-handed bias of glucose and related sugars. However, the same is not always true in the field of supramolecular chemistry. Though the spontaneous resolution of chirality is possible, it is more often the case that chirality is imparted on a supramolecular assembly through deliberate design. Coordination cage complexes – which consist of metal ions bridged by bent organic ligands into an enclosed cage-like structure – can form helical structures serendipitously, but only in racemic mixtures. Obtaining homochiral coordination cages comes as a result of carefully selecting enantiopure ligands.

Numerous design strategies have been developed in recent years to control the self-assembly of coordination cages, such as manipulating the induction of chirality in helical structures, and using steric interactions to influence the self-sorting of multi-component complexes. These approaches allow coordination cages to be tailored towards desired architectures or applications. Specifically, our group has focused on the design and combination of diphthalimide-derived ligands, which can be conveniently appended by amino acids to add coordinating groups and sources of chirality to the system. The core substituents in the diphthalimide backbone and the amino acids side chains can then both be altered to tune the properties of resulting cages.

This poster presentation will illustrate new chiral lantern-type coordination cages constructed using the synthetic strategies mentioned above. X-ray crystal structures of these cages will be presented, along with chromatograms monitoring their mixing.

Level of Expertise

Student

Presenter Gender

Man

Pronouns

He/Him

Do you intend to attend UM2022

In person - Melbourne

Students Only - if available would you be interested in student travel funding

No

Students Only – Do you wish to take part in the Student Poster Slam

No

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Yes

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Session Classification : Poster

Track Classification : Chemistry, Catalyses & Soft Matter