



Anion Coordination Chemistry

The complexation and supramolecular chemistry of anionic species continues to attract a significant amount of attention and research focus. In recent years exciting developments such as the synthesis of systems employing anion- π interactions, triazoles as an anion binding motifs, halogen bonding, anions as templates for the synthesis of interlocked structures, and the synthesis and study of families of small molecules and synthetic anion channels capable of mediating the transport of anions across lipid bilayer membranes have driven the field forward. Hence it is timely that Bowman-James, Bianchi, and García-España have recently published a new book *Anion Coordination Chemistry* containing a collection of chapters from research groups working in this area. It follows their previous volume *Supramolecular Chemistry of Anions* published in 1997. The field has grown significantly since then and the new book covers many of the more exciting recent developments in the area.

Overall the new book is structured rather differently to other books on anion receptor chemistry but starts similarly to the 1997 volume, with an overview of the historical development of the area (which will be valuable to those new to the area of anion complexation). Interestingly this chapter also includes a discussion of anion coordination in a number of proteins. This includes solely hydrogen bonding binding sites (for example the sulfate binding protein) and metal-based anion binding sites (e.g. alkaline phosphatases). The second chapter covers the thermodynamics of anion complexation illustrated with data from a range of different anion receptor systems.

The third chapter is a compendium of anion hosts classified by structure (acyclic, macrocyclic, cryptands, transition metal-assisted ligands, and Lewis acid based receptors) and then subdivided by denticity. This for me was the heart of the book providing an inorganic chemist's view anion recognition. I found this a valuable read, well illustrated

with crystal structures of anion complexes. The synthetic chemist is not neglected and in the next two chapters a series of strategies for host synthesis including the use of anionic templates in the creation of macrocycles, cages, and interlocked molecules are discussed.

Anion- π interactions have grown in importance in receptor design. A chapter is devoted to them starting with an explanation of the physical nature of the binding interaction and the effect of geometry on binding strength before moving on to a discussion of example system including those that use anion- π interactions in addition to other more classical binding interactions to complex guest species.

The synthesis of receptors and sensors for biologically relevant anions is an important application of this area of chemistry. The book provides comprehensive coverage focusing on phosphates and carboxylates including amino acids, nucleotides and phosphate esters. A range of receptors is discussed here from simple isophthalamides to more complex macrocycles and cleft-type receptors composed of amino acids for anion complexation in aqueous solution. By structuring the chapter based on the identity of the anionic guest, a wide variety of systems are covered in each section resulting in an interesting read.

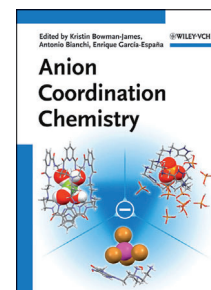
The final two chapters in the book cover the applications of anion receptor systems in the transport of anions across lipid bilayers and anion sensing by fluorescence quenching or revival. In the former chapter the focus is on channel systems whilst in the latter the chemistry of metal-containing complexes as fluorescent sensors is covered.

The book provides a mixture of chapters that give a comprehensive look at a particular area and chapters that focus on the work coming from the chapter authors' laboratories. As a result some important work is not covered. However as a whole the book does provide a fresh perspective on the anion complexation, is timely and is highly recommended.

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