



## Book Review

Self-Assembly in Supramolecular Systems, L. F. Lindoy and I. M. Atkinson, *Monographs in Supramolecular Chemistry*, Volume 7 (ed. J. F. Stoddart), The Royal Society of Chemistry (Cambridge), 2000. Hardcover ISBN 0 85404 5120, x + 224 pages, £69.50. [no softcover edition]

This, the seventh volume in the series *Monographs in Supramolecular Chemistry* does not have a well-chosen title, as it gives the impression that the scope of the book is much wider than it actually is. A better title would have been something like: *Oligoassemblies with supramolecular properties*. A list of the chapter titles is therefore a must. These are: Self-assembly: what does it mean?; Intermolecular interactions – the glue of supramolecular chemistry; Hydrogen-bonded and  $\pi$ -stacked systems; Rotaxanes; Catenanes; Metal-directed synthesis – rotaxanes, catenanes, helicates and knots; Further metal-containing systems. The system set which is reviewed therefore excludes many-molecule assemblies, even multiple host–guest complexes, organic templating effects, metal-templated synthesis and crystal engineering. Yet templated catenane and rotaxane syntheses are included, since the topological constraints which maintain the resulting assemblies are considered to be supramolecular. The authors finally explain some way into the first chapter that ‘In the present context, self-assembly may be defined as the process by which a supramolecular species forms spontaneously from its components’. And at the end of the chapter they state that higher oligomeric and polymeric systems including most metal clusters have been excluded from the discussion. At this stage, having at last found out what the book is about, you can now settle into a good read, beginning with this chapter on self-assembly which, besides showing that the term is too wide to use in this book title, is an original discussion of its many implications.

The second chapter, on the intermolecular interactions which are so fundamental to the entire range of supramolecular systems, seems at first to have been strangely positioned in volume 7, late in the series, but no less welcome because of that. Even after the corresponding chapter in Steed and Atwood’s ‘*Supramolecular Chemistry*’ it is still worth studying. In fact, when one considers the variety of forces at work in the systems covered in succeeding

chapters, in contrast say with the earlier volume on calixarenes, one realises that this is the best volume so far in which to place this discussion.

In a series of monographs such as this, an occasional venture beyond mere review is hoped for, some bringing together of separate strands of research in a critical context. The volume ‘*Membranes and Molecular Assemblies: The Synkinetic Approach*’ by Fuhrhop and Koenig was notable in achieving this. The present volume may be said to do this by defining the oligomeric supramolecular structures and bringing them together for comparisons. Leonard Lindoy, as a developer of self-assembly processes from the earlier metal-templated ligand syntheses is well experienced in tracing origins for the metal chapters, and there are many interesting historical references right through the book. Here as throughout the series, there are plentiful diagrams, as well as colour with purpose which has in most cases been added or improved compared with the original journal diagrams.

The H-bonded and  $\pi$ -stacked systems constitute a noticeably slim chapter in contrast to the rotaxanes, catenanes and metal systems which together occupy three quarters of the pages. The authors draw attention to the lack of *function* generally in synthetic supramolecular systems as compared with biological systems. They could also have pointed out that water-competent systems such as the cyclodextrin dimers are rarities. Chloroform is still a very important solvent in supramolecular chemistry. Even when the postponed volume on cyclodextrins appears, the series will have little to show towards fulfilling the hope expressed for it, of bringing supramolecular chemistry to biologists, still less to biology. Now that every shape from squares to helices has been demonstrated, not to mention a bow tie without a knot, challenges such as DNA constructs or the synthesis of carbohydrate mimics might be worthwhile future topics.

In spite of the general chapter on intermolecular forces, the text cannot compete with Steed and Atwood in providing essential reading for senior undergraduate and graduate courses. Still, in view of the interesting contrasts between the many systems that it describes and its fine presentation, supramolecular enthusiasts will want a copy.

RAPHAEL DARCY

National University of Ireland, Dublin, Ireland

