

Book Reviews

Yoshihisa Inoue and George W. Gokel (Editors), *Cation Binding by Macrocycles*, Marcel Dekker Inc. New York and Basel, 1990. ISBN 0-8247-818-2.

The subtitle of this collection of review articles is 'Complexation of Cationic Species by Crown Ethers' and the volume, which is predominantly a Japanese–American collection, is dedicated to the memory of two seminal contributors to the field under review, Iwao Tabushi and James J. Christensen. In its encyclopaedic coverage of the subject area the book pays a fitting tribute to these two gentlemen chemists and also provides a comprehensive overview which will benefit both the beginner and the specialist in the area.

The subject coverage includes fundamental aspects such as the design and synthesis of numerous cyclic systems, complexation by and selectivity studies of these systems, the kinetics and thermodynamics of complexation, and structural aspects of cation complexation. Appropriately, in an era when accountability is ever-present, it also looks at applications of the systems, introducing specialised complexing agents that act as cation transporters and as chromoionophores, that have use in ion selective electrodes and as molecular switches. In his now classic papers Pedersen revealed the complexation of alkali metal cations by cyclic ('crown') polyethers. In this text complexation studies are not restricted to these metals but also include transition metal cations, lanthanides, quaternary centres and organic cations.

The text is amply illustrated and the referencing is comprehensive for the period up to 1988 – with a few exceptions. The list of contributors, here presented in alphabetic order, reads like a *Who's Who* of the area at the time of commissioning: Adachi, Atwood, Bradshaw, Bruening, Echegoyen, Eyring, Fronczek, Fyles, Gandour, Gokel, Hakushi, Hirashima, Inoue, Izatt, Kaifer, Kimura, Lindoy, Liu, Ouchi, Petricci, Shinkai, Shono, Stoddart, Takagi, Takeda, Trafton, Tsukube and Zarzycki.

The editors are to be commended on their collation of a very useful reference text for an interdisciplinary approach to cation complexation by crown ethers. I envisage this text as being an excellent library-based reference source for chemists from all sub-disciplines. The price of the book was, unfortunately, not given; I hope, however, that it will not be so high as to restrict the volume to library shelves and inhibit its presence on the desks of beginners in the area.

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J. Vicens and V. Böhmer (Editors), *Calixarenes: A Versatile Class of Macrocyclic Compounds*, Kluwer Academic Publishers, 1990. \$99.00/Dfl.170.00/£63.00. ISBN 0-7923-0714-3.

The vitality of calixarene chemistry is demonstrated by the series of recent monographs on the topic. This well edited and well written volume focuses mostly on the extraordinary versatility of this class of host compounds.

The book consists of four parts (ten chapters) which are devoted to virtually all aspects of calixarenes and guide the reader through the diverse facets of calixarene chemistry such as preparation, structural, spectroscopic and inclusion properties of this once esoteric class of compounds.

Part one is of two chapters dealing with historical and synthetic aspects. The introductory chapter (37 pp., 100 Refs.) is due to C. D. Gutsche, the modern father and revitalizer of calixarene chemistry, while Chapter 2 (by V. Böhmer, H. Goldmann and J. Vicens, 33 pp., 64 Refs.) enlists the most important methods of synthesis of special calixarenes (e.g. fragment condensation, selective functionalization, etc.).

The second part of this book is an enchanting excursion into the solid state architecture of the different calixarenes. Chapter 3 (M. Perrin and D. Oehler, 20 pp., 44 Refs.) dwells on the conformational and structural basics starting from simple phenol precursors and ending with fairly complex structures. G. D. Andreotti gives an authoritative account in Chapter 4 on inclusion aspects as seen by X-ray crystallography (37 pp., 54 Refs.).

The five somewhat shorter chapters of Part III are rich sources of intellectual pleasure and challenges for the future. The theme in these chapters is the ability of calixarenes to bind charged species, i.e. cations of different classes of metals and their salts. The authors are dealing with carrier properties (R. Ungaro, A. Pochini, 20 pp., 51 Refs.), with the specific ion chemistry of the selective binding of monovalent cations (M.-J. Schwing, M. A. McKervey, 23 pp., 44 Refs.), with functionalized calixarenes especially suited for uranium salt complexation, micelle formation, etc. (S. Shinkai, 23 pp., 71 Refs.), with water soluble calixarene salts that may be visualized as bioorganic clay models (J. L. Atwood, S. G. Bott, 11 pp., 22 Refs.) and finally with interesting lanthanide ion complexes (J.-C. G. Bünzli, J. Mac B. Harrowfield, 19 pp., 58 Refs.). All these contributions are supported neatly with extensive references to spectroscopic (NMR, luminescence, UV-VIS, IR, CD), crystallographic etc. evidence.

The closing part and chapter (by R. Perrin and S. Harris, 22 pp., 87 Refs.) reconciles some of the facts and gives a fair overview of the present industrial applications. It also signals the potential future applications. Ion sequestering, ISFET applications, ion scavengers of electronic devices, phase transfer, and adhesive accelerators are among the most promising ones.

The volume is a good survey of recent developments of a demanding chemistry both in facts and concepts. The title of the book is indeed reflected in the contributions. Editing is thorough and readers are served very well by editorial notes and directives and by the usually well chosen lists of references.

The reviewer has the pleasure to recommend this volume to anyone interested in this particular field in the academic or hi-tech industrial world.

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