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Book reviews

The Elements; by John Emsley, Oxford University Press, Oxford, 1989, vii + 256 pages, £9.95 (soft cover). ISBN 0-19-855237-8.

This volume is a data complilation on the elements, rather than a textbook. It is intended to be useful to all scientists rather than just chemists, and the author hopes that it will be particularly useful for scientists working in the media. To that I would add that I think that many chemists (and other scientists) will find it very useful in their teaching, and a useful settler of arguments.

The layout of the data is excellent. For each element there is a double page spread, with properties listed under four main headings. The chemical properties include reactions with air, acid, or alkalis, practical uses, atomic radii, electronegativity, effective nuclear charge, reduction potentials, bond lengths, and oxidation states. Beyond the most obvious, the physical properties listed include thermal conductivity, electrical resistivity, mass magnetic susceptibility, coefficient of linear expansion, lattice structure and molar volume. Under the heading of nuclear properties are listed the key isotopes, and data useful for NMR spectroscopy. Electron shell properties include ionisation energies, term symbols and principal lines in the atomic spectrum. Footnotes refer to abundance in the earth's crust, and biological role. One or two of the entries under the latter heading are a little odd; for example a number of elements are described as stimulatory, and I was left unsure as to exactly what that meant. Platinum is described as non-toxic, though the recommended limits for the handling of platinum halides are similar to those for beryllium, and zinc is said to be non-toxic except in large excess, but also carcinogenic. I suspect that some of the discrepancies arise from distinctions between the element and various groups of its compounds, but some of these entries could be misleading.

At the end of the entries on the individual elements there are sixteen tables of properties in order of the elements, and in ranking order of the properties. The choice of which items to extract from the main entries seems on the whole to me to be a good one, including abundance, boiling points, coefficients of linear thermal expansion, densities, electrical resistivities, electron affinities, ionisation energies, and NMR spectroscopic properties.

The sources of all the data are listed at the start of the book, so that the reader needing further details should be able to find them readily. The author notes that not all of these present the data in SI units (used throughout this volume).

It is quite instructive to compare the data presented here with the tables on the Elsevier Periodic Table. Much of the information is common to the two, with the Periodic Table perhaps winning marginally on the range of data and the comparisons drawn. The comparison between the two formats is in some senses unfair, since one is intended for the office wall, and the other for the library shelf, or to be taken home in one's briefcase. The information is less easily extracted from the wallchart

(particularly for anyone short-sighted), but the chart is clearly more inherently beautiful.

Overall this is a very useful and reasonably priced volume. It should certainly be bought by all scientists, and by all chemistry undergraduates and their instructors. A significant amount of the information would be of interest to advanced students in secondary education, and at this price schools should consider adding it to their libraries.

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United States–Japan Seminar on Host–Guest Chemistry; edited by George W. Gokel and Kenji Koga, Advances in Inclusion Science, Vol. 6, Kluwer Academic Publishers, Dordrecht, 1989, viii + 279 pages, Dfl. 160, $88.00, £49.00. ISBN 0-7923-0262-1.

This volume presents the proceedings of the U.S.–Japan Seminar on Host–Guest Chemistry held in Miami, Florida in November 1987, and is reprinted from the *Journal of Inclusion Phenomena and Molecular Recognition in Chemistry*, Volume 7, Numbers 1 and 2. It is dedicated to the memory of Professors Iwao Tabushi and James J. Christensen.

The first section of the volume opens with a review by Julius Rebek entitled "New Molecular Shapes for Recognition and Catalysis", setting the scene for later discussions of molecules which have clefts within which appropriate guests can be accomodated. The flavour of this section is principally organic/biological, with several papers discussing systems for the recognition of nucleotides and coenzymes. I particularly enjoyed the elegant paper by Misumi and Kaneda on chiral recognition in crown ethers with attached chromophores, and Martell's work on copper and cobalt derivatives of cryptand polyamines.

In general, however, it is the second section which is the more concerned with metal complexes. Of particular note are the papers on the modelling of haem proteins by Busch, and that on the chemistry of macrocyclic polyamines and their metal complexes by Kimura. There is little true organometallic chemistry, other than in an excellent contribution from Burrows' group, in which new nickel complexes of amine macrocyles have been developed as catalysts for oxidation of alkenes to epoxides, alcohols, or carbonyl derivatives. Mechanistic studies indicated that the course of the reaction was extremely sensitive to the coordination sphere of the nickel, and there was some progress towards the design of new receptors, intended to encapsulate both the catalytic site and the organic substrate.

The production standards of the volume are excellent. In particular the diagrams are clear, which is most important if the reader is to understand the complex three-dimensional interactions in these molecules. There is an author index, which is well laid out, if scarcely necessary, and a subject index, which conveys considerably less useful information than the page giving the titles of the articles.

The quality of the papers in this book is high, and it represents a useful overview of current developments in the area. The price is not excessive, but I must have some doubts about the practice of reprinting journal issues, even when the journal is