Organosilicon Chemistry III. From Molecules to Materials, N. Auner, J. Weiss (Eds.), pp. xxv + 716, ISBN 3-527-29450-3, Wiley-VCH, Weinheim, 1998, £70.00

This is the third volume in a series of compilations of reports presented as papers or posters at biennial symposia in München, and is based on the meeting (III. Münchner Silicontage) held there in April, 1996. The volumes derived from the 1992 and 1994 meetings were very favourably received, and contained some very interesting material, but this new one is, to my mind, even better. It is certainly much superior to the great majority of complete collections of symposium contributions in that it does not contain a sizeable proportion of low-grade reports presented solely to enable the author(s) to secure financial support for their attendance, almost all of those printed here being of high quality. Moreover, all the articles are reasonably complete in themselves and are not just summaries or outlines.

The contributions are divided into two sections, the first, entitled Fascinating Organosilicon Compounds dealing essentially with the new chemistry of molecular species, and the second, entitled Silicon Based Materials, concerned mainly with polymeric species or their precursors, including specific applications. Each of the sections has a substantial introduction by N. Auner, G. Fearon, and J. Weiss, placing the separate reports into context and briefly summarising some recent advances in the relevant areas, and the first of these introductions seems to me to be especially good.

It is not realistic to select individual contributions for comment, and it should suffice to say that there is much to interest those new to organosilicon chemistry, as well as those who are specialists in the field. Of course, many of the reports have by now appeared elsewhere in a range of journals, but there are advantages in having so much related material in one volume, and I am very glad to have it on my shelves.

A remarkable feature of this publication and of the symposium upon which it is based is that so many of the contributions describe work from German laboratories—ca. 86 of the total of 105. Only two originate from each of Japan and the USA, and in view of the vast amount of good organosilicon research going on in both of those countries it is evident just how great the activity in the field now is, even without taking into account the huge growth of organosilicon compounds in organic synthesis. Indeed, I even began to wonder whether perhaps too many very able chemists in Germany may be concentrating on silicon, but I quickly decided that that was an unwise line of thought to pursue!

The book is well produced and reasonably priced.

Colin Eaborn
School of Chemistry, Physics and Environmental Science
University of Sussex
Brighton BN1 9QJ, UK

PII S0022-328X(98)00628-7

Handbook of Heterogeneous Catalysis, G. Ertl, H. Knözinger (Eds), J. Weitkamp, 5 Volumes, ISBN 3527-29212-8, Wiley-VCH, Weinheim, 1997, £965.

Organizing academics has been described as very much like trying to herd cats and anyone who has ever tried to edit a multi-author book will know the feeling. No matter how clearly the aims and objectives are specified, there will always be authors who insist on going their own way about things, and there are always a few authors who regard the deadline for manuscript delivery as a good time to start thinking about writing, and whose lateness delays the publication of everyone else's work.

Given those difficulties, to try to put together a five volume-book on a subject as diverse as heterogeneous catalysis, using over 200 authors is a valiant task. Equally, there is probably no reviewer who could do justice to the full range of the book.

The editors claim that this is 'the first comprehensive treatise on heterogeneous catalysis which attempts to describe all facets of the field, from the scientific fundamentals to the chemical engineering of industrial processes'. The remarkable fact is that, judged against that criterion, it is largely successful. Of course, it suffers from the standard problems of multi-author volumes. The depth of coverage can be uneven and some chapters are more up-to-date than others (the most recent references range from 1990 in some chapters to 1996 in others). Nevertheless, these are minor criticisms of a substantial achievement.

The five volumes divide into two parts. Part A, covering 3 volumes and 1500 pages, describes the fundamentals of heterogeneous catalysis, beginning with a fairly broad review of catalysis and moving through catalyst preparation and design to the more fundamental aspects. Part B, covering the remaining 1000 or so pages, deals with specific systems, including catalytic convertors for automotive exhausts, as well as more obvious processes, alkylation, hydrogenation, etc. As a polymer chemist, I have to let my prejudices show in saying that I felt that 20 pages on polymerization catalysis at the end of volume 5 do not reflect the industrial importance of the technology.

Overall, this book largely succeeds in its aims. No one reader is likely to read everything in it and, like most encyclopedias, individual chapters on things one knows about can seem less profound than chapters on subjects where one is more ignorant. As a reference source for the library of any laboratory working in the field of catalysis, this would be hard to fault. It could be safely taken as a starting point for new or experienced researchers wanting a good digest of a specific field.

The five volumes are beautifully produced, with very clear diagrams and a reasonably good index. Overall the book can be recommended.

N. Billingham
School of Chemistry,
Physics and Environmental Science,
University of Sussex,
Brighton, BNI 9QJ,
UK

PII S0022-328X(98)00563-4

Structure and Bonding—Metal Sites in Proteins and Models. H.A.O. Hill, P.J. Sadler, A.J. Thompson (Eds.), Springer, New York, NY, 1997 (vols. 88 and 89), 1998 (vol. 90).
Vol. 88, *Iron Centres* 225 pages, US$129, ISBN 3-540-62870-3.
Vol. 89 *Phosphatases, Lewis acids and Vanadium* 215 pages, US$129, ISBN 3-540-62874-6.
Vol. 90 *Redox Centres* 209 pages, US$129, ISBN 3-540-62888-6.

This three-part special series of *Structure and Bonding* has topics on 'Metal Sites in Proteins and Models' as it's focus, a field which has undergone vigorous expansion and development in recent years. The three-dimensional structures of many of the proteins and enzymes of interest have been determined at high resolution, opening the way for molecular engineering of metal binding sites. Additionally, the application of an array of techniques including NMR, X-ray absorption, EPR and MCD spectroscopies, coupled with the development of biomimetic chemical and structural models, has fuelled this expansion. In these volumes recent advances in inorganic biochemistry are reviewed by leading scientists of international standing. They bring together information that it is hoped will stimulate researchers attempting to understand the relationships between the chemistry of metals and their involvement in a diverse range of life processes. In broad outline, these reviews address different aspects about how a protein environment controls the properties of metal sites and how do they compare with those found in small coordination complexes?

Commensurate with the diversity of its biological roles, vol. 88 of this series is devoted to *iron-dependent systems and processes*. These include contributions on several heme-containing enzymes, the uptake of Fe(II) storage as Fe(III) in bacterioferritin, the sequestration of Fe(III) by transferrin, radical chemistry in deoxyribonucleotide synthesis and models for biomineralisation.

In an aerobic aqueous environment at neutral pH, Fe(III) is present predominantly as insoluble oxyhydroxides, yet iron is intimately involved in many biological processes. Powell discusses how the speciation of iron may be controlled in Nature using a templating matrix to control biomineralisation. A range of structurally characterised iron oxyhydroxide clusters are considered as models for the core of loaded ferritins, large protein assemblies that have a role in providing a cage for the intracellular storage of Fe(III) species. Structural, spectroscopic and chemical studies of the metal centres of bacterioferritin, a cytochrome b_5 containing member of the ferritin family, are discussed by Brun et al. The oxidative uptake of Fe(II) by bacterioferritin appears to involve a dinuclear metal centre that has structural similarities to the di-Fe(II) centre of the R2 protein of ribonucleotide reductase. Roles of these metal centres in iron uptake and released are critically reviewed.

Ribonucleotide reductases are essential to living cells since they provide precursors for DNA synthesis. Three unique classes of this enzyme that differ in composition and cofactor requirements (a Fe(III) di-iron-oxo site, an FeS cluster or a Mn site depending on the source of the material) all use radical chemistry to activate their substrates. Sjöberg describes structural, spectroscopic and directed mutagenic studies highlighting mechanistic studies of these systems.

Two chapters on heme-containing systems, one on $P450_{CAM}$ by Wong et al., and the other on 'why heme is the most versatile redox centre in biology' by Chapman et al., are highly informative, and nicely illustrate the impact which crystal structures can make on an area of research. The review on $P450_{CAM}$ focuses on the use of protein engineering to change the specificity of the enzyme by redesigning the active site to use high-energy oxo-iron chemistry for new biotechnological applications. The title of the review of Chapman et al. is deliberately provocative, but the carefully chosen examples and the subsequent discussion of the many redox functions performed by heme in biology, fully support the title of this contribution.

Transferrins are Fe(III) binding proteins that function in iron transport in serum and have antimicrobial activity. Sun et al. present a detailed discussion of methods for studying differences between the two metal binding sites and the determination of metal binding constants. They present a predictive rationalisation of metal binding properties of transferrin, based on a correlation with ion acidity. This appears to be applicable to carbonic anhydrase and carboxypeptidase enzymes that have 'entatic state' metal binding sites in