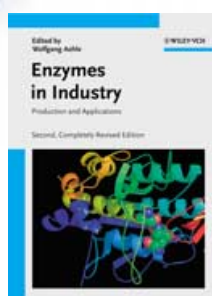




Enzymes in Industry



Production and Applications. 2nd ed. Edited by *Wolfgang Aehle*. Wiley-VCH, Weinheim 2004. 484 pp., hardcover
€ 149.00.—ISBN 3-527-29592-5

Enzymes in Industry is an excellent introduction into the field of applied enzymology for the reader who is not familiar with the subject. Chapters 1 to 4 offer a broad overview of the basics of enzymes and enzyme activity, enzyme assays, production of enzymes, screening methods, and protein engineering, without going into great detail on any one of these topics. The reader looking for detailed ready-to-use protocols will be disappointed. Those willing to consult the original literature can depend, however, on a very thorough list of original citations. The reference list of the book contains more than two thousand entries!

Chapter 5 is the heart of the book and introduces the reader to a wide range of topics in the field of food and nonfood enzyme applications. Each contribution is a story in itself, easy to understand and well-illustrated with clear and easy-to-read pictures, graphs, and tables. The extensive coverage of this field of applied enzymology will be of equal interest to life scientists, engineers, and those interested in marketing aspects. Chapter 5 does not cover all possible themes. Missing are contributions on the use of enzymes in agriculture, for example, in the preparation of

silage, in waste treatment, as probiotics, or as digestive aids.

The organic chemist interested in learning how enzymes can be used in organic synthesis will be pleased with the concise introduction to this topic in Chapter 6, which demonstrates the general principles by describing several concrete examples taken from industrial practice.

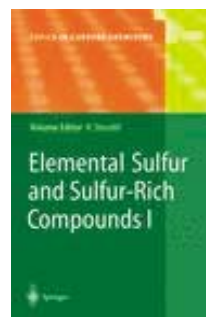
The second part of Chapter 6 deals with the use of enzymes for therapeutic, diagnostic, and analytical purposes. Again the contributions cover a wide range of topics but in no great depth. The remainder of Chapter 6 deals with the use of enzymes in genetic engineering. The authors offer quite detailed information on the properties and use of these enzymes. This portion of the book will probably be the least interesting to the reader. The topics covered are already well-known to those familiar with genetic engineering, and too detailed for the chemist or marketing expert looking for a general introduction.

The final chapter gives a short but informative overview of regulatory and safety aspects of enzymes, sufficient for making the reader familiar with the basic terminology and philosophy of enzyme regulation in the USA and Europe.

Enzymes in Industry offers a broad overview of the use of enzymes in industrial applications. It is up-to-date and remarkably easy to read, despite the fact that almost 50 different authors contributed. The book has been written to introduce the reader to the many applications of enzymes in industry. It was not conceived as a manual of ready-to-use recipes. But the reader will most likely find the original literature sites he or she might need for more detailed work, amongst the extensive and accurate list of references, with more than 2000 entries. The scientist involved in enzyme work should have this book in his or her library. But it will also be of great value to the marketing expert interested in the present use of enzymes and their future in food and nonfood applications.

Bryan Cooper
BASF Aktiengesellschaft
Ludwigshafen (Germany)

Elemental Sulfur and Sulfur-Rich Compounds, Vols. I and II



(Series: Topics in Current Chemistry, Vols. 230, 231.). Edited by *Ralf Steudel*. Springer Verlag, Heidelberg 2003. Vol. I: 202 pp., hardcover
€ 139.95.—ISBN 3-540-40191-1. Vol. II: 248 pp., hardcover € 169.95.—ISBN 3-540-40378-7 (Prices exclude VAT.)

The series “Topics in Current Chemistry” presents critical reviews of the present and future trends in particular fields of chemical research. The Springer Verlag has now published two further volumes of this long-standing series, dealing with the chemistry of elemental sulfur and sulfur-rich compounds. The appropriate guest editor, Ralf Steudel, has worked for 40 years in basic research on sulfur chemistry. He has invited numerous colleagues to write review articles for these two volumes, and has also contributed several of his own. Altogether 12 articles draw a comprehensive picture of this field of research, ranging from the chemistry and physics of elemental sulfur, through sulfur cations and anions, to coordination compounds of main-group and transition-metal complexes. In addition, various chapters provide surveys concerning the chemistry of polysulfanes, sulfur-rich oxides, and biologically produced biosulfur S⁰.

Due to the particular characteristics of the book as a compilation of several review articles, the conceptual arrangement of the six chapters per volume seems to be done in a rather random manner. A short preface introduces the reader to the comprehensive chemistry of sulfur. The editor, Ralf Steudel, particularly emphasizes that the contributions cover the latest primary literature, and that a list of useful previous reviews and monographs related to this chemistry is available on-line as supplementary material to these volumes. Although the

latter is in fact not the case, it has to be acknowledged that all the authors have cited mainly up-to-date literature.

The first three chapters provide a clear survey of elemental sulfur in the solid state, and in the liquid and gas phases. All three review articles were contributed by the guest editor Ralf Steudel, partly in cooperation with co-authors. The decision to divide the subject according to the states of aggregation, for reasons of complexity, was certainly sensible. Each chapter is very comprehensible and clearly arranged. It should be particularly emphasized that all findings mentioned in the text are critically reviewed and classified within the historical context. In this way the reader is provided with an interesting and readable survey of recent developments.

In the following chapter, I. Krossing presents work on homoatomic sulfur cations S_m^{n+} . The author particularly focuses on the application of quantum-chemical calculations aimed at describing the bonding situation in these cations. However, a better position for this fine review article would have been the second volume, because a conceptual discontinuity takes place with the next contribution of R. Steudel concerning aqueous sulfur sols. This shortest, but by no means less interesting, of the articles in the first volume, deals amongst other aspects with the main differences between hydrophilic sulfur sols (Raffo, Selmi). The article forms an appropriate introduction to the final chapter, by W. E. Kleinjan, A. de Keizer, and A. J. H. Janssen, which gives an overview of biologically produced sulfur. The authors introduce the reader to this biochemically orientated topic, and describe the special characteristics of biosulfur produced by sulfur-compound-oxidizing bacteria. Various applications are discussed, including removal

of sulfur compounds from gas streams, and use in fertilizers.

The second volume starts with a general overview of quantum-chemical calculations on sulfur-rich compounds (M. W. Wong). However, the reader needs a little patience and sometimes loses track of important information in the text, because there are not enough clarifying illustrations. The contrary is the case for the following contribution by B. Eckert and R. Steudel about the most important methods for the characterization of sulfur molecules and of solid allotropes. This well illustrated review is primarily concerned with classical vibrational spectroscopy (Raman, IR), which has become a valuable tool in the structural elucidation of sulfur compounds. Chapters 3 and 4, both contributed by the guest editor, describe the synthesis and reactivity of metastable polysulfanes (3), and the class of polysulfide dianions S_n^{2-} and radical anions $S_n^{\cdot-}$ (4). Once again, the central theme of the monograph is unambiguously recognizable: although the chemistry of sulfur is one of the best investigated areas and has been well-known for many years, it is also one of the most complex systems, and despite that complexity it is here made accessible to the reader in an excellent fashion.

Next, N. Takeda, N. Tokitoh, and R. Okazaki give a detailed discussion of the coordination chemistry of sulfur-rich main-group and transition-metal complexes. The synthesis, and especially the reactivity, of compounds of the general formula MS_n is lucidly reviewed. The book ends with the final chapter by R. Steudel concerning the synthesis and solid-state structures of sulfur-rich oxides S_nO and S_nO_2 .

Each of the two volumes contains an author index of the topics volumes 201–239/231 as well as a comparatively good subject index, although for some key-

words the latter gives too few references. In my opinion, however, a collected index for Volumes I and II would have been better. The schemes and figures are clearly arranged and of good black-and-white quality, and the numbering is systematic for the individual chapters. The number of certainly unavoidable typos in the written text is pleasingly low. However, some not very obvious factual mistakes were also found, such as wrong literature citations. But these marginal deficiencies are not capable of diminishing the very good impression of the monograph. In particular, the interesting comments on general topics (e.g., sulfur volcanoes on Jupiter's moon Io, or lapislazuli in the days of the Sumerian civilization about 5500 years ago) are nicely embedded within the descriptions and have a stimulating effect for the reader. As these two compactly produced volumes represent a comprehensive survey of the vast chemistry of sulfur, and emphasize its far-reaching character by many fine contributions, they will be very useful for the interested chemist who wishes to explore this field thoroughly. Although the discussions are certainly too detailed for students in the first terms, even the nonspecialist reader should benefit greatly from reading this monograph as an essential reference source. That applies especially because the work provides a fresh perspective on the well-established chemistry of a main-group element, that has been developed for several decades.

Frank Breher

Department of Chemistry and
Applied Biosciences
ETH Zürich (Switzerland)

DOI: 10.1002/anie.200385167