carefully prepared, comprehensive, and cross-referenced index, and the 4½-page index here is woefully inadequate for a book of 500 pages. I searched in vain in the index for the word "safety" (a not unimportant aspect of oxidations with oxygen or hydrogen peroxide). Safety is briefly mentioned on page 69 in connection with the use of oxygen compared with air, but does not appear in the index.

All in all, the book gives a good overview of heterogeneous selective catalytic oxidations, with a bias towards gas-phase oxidations with $O_2$ and towards bulk rather than fine chemicals. I can recommend it to academic and industrial researchers interested in the area of selective catalytic oxidation of relatively simple (hydrocarbon) substrates. It will be of less interest to synthetic organic chemists engaged in selective catalytic oxidations of complex organic molecules.

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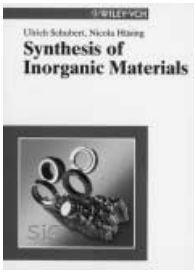
**Synthesis of Inorganic Materials.** By *Ulrich Schubert* and *Nicola Hüsing*. Wiley-VCH, Weinheim 2000. xvii + 396 pp., softcover € 49.90.—ISBN 3-527-295509-X

Based on a lecture course presented by the authors at the Vienna University of Technology on inorganic materials from molecular precursors, this book is designed to introduce the reader to the chemistry behind materials science. It is not intended to replace standard solid-state chemistry or materials science texts, but to solidify the "weakest link" between preparative inorganic chemistry and technologically important materials.




Given this approach, the text is organized according to preparation processes, with an eye toward those that are actually (or have high potential to be) used in the real world. Several strategies are employed to introduce the novice to the field. A list of some 120 abbreviations reminds one how prone many scientific niches are to creating their own languages. A glossary of 69 terms, from Alloy to Chelate to Green Body to Superconductor to Yield Strength, is included, and each occurrence of these terms is flagged in the text by referring the reader to the glossary. The examples above give an indication of the range of these terms. Clearly the authors erred on the side of caution in compiling this list, and at times the "see glossary" marker seems to overwhelm some pages. However, an undergraduate student might disagree with this assessment. The well-chosen figures, including flow charts, line drawings, chemical structures, and photo(micro)graphs, are nicely done and are a highlight of the book.

Following a very brief introduction, six chapters form the bulk of the text. A chapter on high-temperature ceramic superconductors serves to introduce solid-state reactions, followed by carbothermal reduction reactions such as the Acheson process for SiC. Combustion synthesis and some of the chemical aspects of sintering are discussed. Finally, intercalation chemistry is introduced and applied to lithium ion batteries. This is typical of the chapters with a comfortable blend of chemistry and technology. Suggested further reading is largely confined to the secondary literature. No problems or study questions are provided, but the level of language is quite accessible to a third year undergraduate or beginning graduate student. The text is relatively free of errors.

The formation of solids from the gas phase is dominated by a discussion of chemical vapor deposition, including formation of metal, diamond, metal oxides and nitrides, and semiconductors. Glasses (as opposed to crystalline materials) are first discussed in the context of the formation of solids from solutions and melts. The topic of precipitates leads to a discussion of biomineralization and the challenges of synthetically replicating or replacing biomaterials. Silicon provides the platform for sol–gel chemistry, which is then extended to hybrid organic–inorganic polymers. Inorganic polymers are dominated by the silicones, but phosphazenes, silanes, and even a few transition metal containing systems, are mentioned. The concluding chapters discuss porous and nanostructured materials—both topics of intense current interest.

The authors have succeeded in achieving their stated goal. It is unlikely that the level of the chemistry would intimidate a non-chemical scientist and, as an inorganic chemist, I found the level of treatment of the materials aspects of the science to be very approachable. A student (or instructor) seeking to understand how inorganic synthesis is actually applied in materials science will find this text useful.

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**Encyclopedia of Analytical Chemistry.** Applications, Theory and Instrumentation. 15-volume set. Edited by *Robert A. Meyers*. John Wiley & Sons, Ltd., New York 2001. 13970 pp., hardcover $ 6000.00.—ISBN 0-471-97670-9

Imagine it was your task to present the *complete* discipline of instrumental analytical chemistry in a multivolume book series with an appropriate and state-of-the-art partition between basics and applications of the individual analytical methods. Would this be possible at all considering the enormous effort required? How could one achieve a homogeneous layout and the necessary up-to-date treatment with a large number of individual authors from various subdisciplines? Robert A. Meyers, editor-in-chief of the *Encyclopedia of Analytical Chemistry*, has succeeded in fully achieving these goals by assembling a team of more than 800 authors.

Consisting of 15 volumes and over 13000 pages, this is a truly unique collection of analytical methods and applications: all parts of the analytical process, from sampling through sample preparation, separation, and detection, to data evaluation and interpretation, have been covered in a logical scheme. Volumes 1–10 contain analytical applications, and Volumes 11–15 deal with the basics of the individual analytical methods. Volume 15 is completed by

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some general chapters, as well as appendices with constants and indexes. Each individual volume starts with a list of contents of the complete encyclopedia. The chapters are easily understood without the need for additional material, and are arranged in a similar way to review articles in scientific journals. The major focus of each chapter is not a compilation of current research results but an introduction to the topic, taking into account recent developments, and thus they are best described as "tutorial reviews". All chapters start with a short table of contents, a brief summary, and an introduction to the background of the method under discussion. The chapters are concluded by lists of abbreviations, lists of related chapters within the encyclopedia, and lists of literature references.

The encyclopedia is surprisingly up-to-date, as reflected in the description of modern analytical methods and state-of-the-art applications. Considering the tremendous effort required just to compile the chapters and put them in a consistent form, it is commendable that even many references as recent as 1999 have been included. Another positive aspect is that, for a multiauthor work such as this, there is little overlapping and repetition between the individual chapters. Some redundancy is only obvious in areas where the comprehensibility of individual chapters without additional material would otherwise suffer from missing information.

To whom is this encyclopedia addressed? Teachers of analytical chemistry will appreciate the clear and vivid presentation of almost every existing analytical method. Research scientists in academia and industry can use the work to search for suitable methods to solve their analytical problems. Decision-makers in governmental and commercial institutions will find valuable information to evaluate the suitability and capability of analytical methods. The encyclopedia is an ideal complement to the existing large textbooks of analytical chemistry, which cover only the most important techniques.

This encyclopedia presents the reviewer with a particular challenge: how can a fair judgement on such a work be carried out within a reasonable timescale? Of course, that is only possible by selecting a few topics. However, my approach of concentrating on Volumes 3 and 4 (environmental analysis) and 13 (liquid chromatography and mass spectrometry) soon failed because the cross-references to related chapters triggered my interest in these, resulting in frequent excursions to other volumes and chapters. These confirmed my initial impression that the text and figures throughout the work are of outstanding quality. Keyword searches in the method-oriented volumes, e.g., for "cavity ringdown spectroscopy", "isotope ratio mass spectrometry", "capillary electrochromatography", or "electrogenerated chemiluminescence", led in each case to relevant chapters which gave all the information that one could wish for, either internally or in combination with the original publications cited. The same is also true for the application-oriented chapters.

The encyclopedia will be of great value for all scientists employing and interpreting analytical methods. Libraries in universities, governmental organizations, and industrial enterprises are strongly recommended to buy the work.

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