# Book Reviews *

**Environmental Sampling for Trace Analysis.** Edited by Bernd Markert (Institute for Inland Water Research). VCH: Weinheim, Germany. 1994. xiv + 524 pp. $145.00. ISBN 3-527-30051-1.

There is an old fable about a village in India that was plagued by a tiger. To solve the problem it was suggested that a bell be tied around the tigers' neck so the villagers would be alerted to his approach—how to actually accomplish the feat was another problem altogether. Environmental sampling is much like trying to "bell the tiger". Researchers agree on the significance of the problem, but with some notable exceptions, suitable and practical references on the subject have been limited. The text by Markert et al. provides much needed treatment on this topic.

The book is divided into four parts. Part I (Historical Aspects) is of limited practical value; the general conclusion from this very short chapter is that the solution to the sampling problem is likely to be a mathematical/statistical formulation. Part II (General Aspects) consists of four chapters and provides an introduction to the practical aspects of sampling, including an excellent chapter on the statistics of error estimation by M. H. Ramsey. This section of the book would be suitable, as is, in any course in Environmental Chemistry. The 21 chapters in Part III (Examples for Sampling) contain many practical applications of sampling from various media: air, water (mostly freshwater), soil and sediment, and plants and animals. This section has some excusable limitations. The subject of wet deposition (snow, rain, etc.) is dealt with in only three pages in Chapter 8 (Sampling of Freshwaters). This subject has received extensive coverage in other texts, however, so this scant treatment does not detract from the value of the text. While Part III–D nominally deals with plants and animals, the only example of animal sampling involves red wood ants. Part IV (Literature Survey) contains a sizable and relatively recent compilation of references, organized by topic, ranging from statistical methodology to sampling of various environmental and specialized media (e.g., waste/sewage).

There appears to be some bias in the selection of contributors. Of the 50 or more authors represented in this work, 38 are from Europe (most from FRG and Hungary), while only 10 are from the U.S. and Canada. The cause of this bias is unknown. Whatever the reason, I believe the editor(s) unwittingly overlooked a vast pool of experts from this part of the world that could have made significant contributions to this text. Still, the contributors and editor(s) should be commended for producing an easily readable and practical text that will prove to be an essential reference book for environmental researchers.

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JA9551401

**Studies in Inorganic Chemistry. Volume 19. Molybdenum: An Outline of its Chemistry and Uses.** Edited by E. R. Braithwaite (London) and J. Haber (Polish Academy of Sciences). Elsevier: Amsterdam. 1994. xviii + 662 pp. $311.50. ISBN 0-444-88198-0.

The incredibly diverse chemistry shown by the element molybdenum leads to uses which pervade both natural and human applications. In this book, the editors and their distinguished list of contributors cover the vast realm of molybdenum chemistry from its geological origins to its industrial uses by man to its vital role in biochemical reactions that support life.

The book is organized into 11 self-contained chapters (essentially unrelated reviews), each focusing on a specialty of the individual author. It is obvious that the individual chapters were completed over an extended time period because the most recent references in individual chapters vary from 1989 to 1993. The exciting announcement of the solution of the crystal structure of nitrogenase in 1992 occurred during production of the book, and several chapters were revised to include this important result.

In the opening chapter, one of the editors, E. R. Braithwaite, covers the mining and production of technical grade materials as well as the industrial uses of oxides, sulfides, and alloys. The brief mention of agricultural uses overlaps the more extensive coverage in later chapters. In chapter two, M. L. H. Green provides a very broad introduction to the general structural motifs and reaction chemistry of molybdenum and introduces the fundamentals of MLX plots of classifying covalently bonded metal complexes by the number of donor pair, acceptor pair, and shared covalent bonds of the metal. Changes in MLX category correspond to particular reaction classifications, and the number of representative compounds in each category can be related to a general stability. The presentation of this chapter is that of an advanced inorganic text rather than a research review. In Chapters 3 and 5, respectively, the oxides and halides of molybdenum are reviewed. Particular attention is given to the structures of compounds and their uses as starting materials in other chemistry. Chapter 4 describes molybdenum sulfur chemistry and highlights ligands that have been used to model enzyme sites. The chapter is well written, but unfortunately the coverage ends with 1989. The longest chapter, by J. A. McCleverty, surveys the general aspects of organomolybdenum chemistry; the extensive list of references covers the literature through 1990. Chapters 7–9 are devoted to biological aspects of molybdenum chemistry. C. D. Garner gives a succinct and relatively current description (1993) of the iron–molybdenum cofactor (FeMoco) from nitrogenases and the molybdenum cofactor (Moco) from the molybdo-oxidases. R. J. P. Williams' much more biologically oriented chapter describes molybdenum chemistry from an evolutionary point of view. The bulk of his chapter was written prior to the solution of the nitrogenase structure, but an addition compares FeMoCo with points made earlier. Chapter 9 provides a thorough review of the toxicity and nutritional aspects of molybdenum in ruminants with emphasis on molybdenosis and copper–molybdenum antagonism. The final two chapters review heterogeneous and homogeneous catalytic systems. A substantial section is devoted to heterogeneous hydrodesulfurization, while the homogeneous systems focus on olefin metathesis and oxo-transfer reactions.

This book suffers from many of the problems of multiple author books produced in camera ready format. The time span of production resulted in some of the best written chapters being the most dated at publication. There are many typographical errors throughout the text, beginning with the preface noting that "Its oxidation states [vary] from 2× to 6×...". A portion of Chapter 8 is missing (p 447), and the index is incomplete for a research reference of this type. Nevertheless, the book does bring together a large quantity of information on molybdenum chemistry in a single source and provides a convenient and excellent entry into the diverse chemistry of this fascinating element that plays significant roles in both biological and industrial catalysis.

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JA9551087

**Resorcinol: its uses and derivatives.**. Edited by Hans Dressler (formerly of INDSPEC Chemical Corporation). Plenum Press: New York. 1994. xv + 500 pp. $115.00. ISBN 0-306-44850-5.

The chemistry, manufacture, and uses of the specialty chemical resorcinol (1,3-dihydroxybenzene) have a rich history, variety, and current interest. This book is intended to be the first detailed review of this product. The numerous references and the Index given in the book are intended to help users of resorcinol and resorcinol derivatives in their work, perhaps even to help in the development of new ideas. The chemical industry in the United States, as well as in many other parts of the world, is being challenged on many fronts, old and new, due to global competitive, environmental, governmental, political, and technological trends that seems more variable than ever before. The case of resorcinol mirrors this array of challenges and demonstrates the broad range of successes and some of the problems of the industry. It is shown how a sprout of a chemical grew over time into a sizable, still growing item of commerce. In the description of this development it becomes apparent how many different talents and trades it takes to develop, manufacture, and market a product. Also given are indications of how academic research and applied research/development quite often, intentionally or not, influence each other and can spur the creative process to the benefit of both. Areas are outlined where the current, often intense, work employing resorcinol is aimed. Thus, the old chemical is shown to be involved in an intriguing tomorrow.

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*Unsigned book reviews are by the Book Review Editor.