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BOOK REVIEWS

Analytical Atomic Spectrometry with Flames and Plasmas: Second, Completely Revised and Extended Edition. By José Broekaert (Universität Hamburg). Wiley-VCH Verlag GmbH & Co. KGaA: Weinheim. 2005. xii + 474 pp. $130. ISBN 3-527-31282-X.

José Broekaert has a long and illustrious history in the field of atomic spectroscopy, and this reviewer approached this book with great expectation as a "completely revised and extended edition". Regrettably, the reality is that this is a largely historical survey of the field. In a number of places, we are misled, and in several places, entire areas of current research are ignored. Although there is extensive elaboration of the basic principles of atomic spectrometry and a sketch of the principles of design of spectrometers, much of this can be found in several earlier sources. In short, there is little new here. The DC plasma atomic emission instrument, an early entry into the field of plasma spectrometry, which was developed by Spectrometrics and subsequently passed through the hands of several manufacturers, has not been manufactured for years, but the author does not tell us this.

When looking for applications, there are few signposts along the way. In the field of hydride generation, which continues to generate interest as well as a number of papers in the refereed literature every year, this reviewer, who in his modest way has made some contribution to the extent that L-cysteine has been dubbed the "Brindle Reagent", receives no mention. The author perpetuates the myth of "nascent hydrogen" as the agent responsible for hydride generation, a notion that appears to have been abandoned for years in the world of chemistry except for this area of analytical chemistry. I note here that d'Ulivo's recent work has shown, by a series of elegant experiments, that nascent hydrogen is not a likely intermediary in hydride generation.

This book, then, provides little in the way of instrument design or assistance for those looking to develop methods in emerging areas of analytical applications of atomic spectrometry, such as the field of speciation. Substantial contributions by a number of researchers are also cited either little or not at all, including Sharp, Cresser, and Donard, to name but three. Researchers or analysts looking to develop these areas would be better advised to refer to books that treat these areas in detail, such as Montaser and Golightly's books on ICP and ICP-MS and Lobinski's book on speciation, for example.

Ian Brindle, *Brock University*

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Chalcogenocarboxylic Acid Derivatives. Topics in Current Chemistry, Volume 251. Edited by Shinzi Kato (Chubu University, Japan). Springer: Berlin, Heidelberg, New York. 2005. x + 280 pp. $259.00. ISBN 3-540-23012-2.

This volume of seven chapters written by a group of Japanese authors represents one of the latest additions to the *Topics in Current Chemistry* series. As expressed in the first chapter, 15 types of chalcogenocarboxylic acids are possible, in which one or both oxygen atoms of a carboxylic acid are replaced by S, Se, or Te. The authors provide thorough coverage of the chemistry of these compounds, as well as their esters, amides, salts, complexes, and other derivatives. The emphasis is on their synthesis and reactions, although some chapters also include sections on structure, spectroscopic properties, theoretical aspects, and applications. The book is well-written, with very few typographical or grammatical errors, and the schemes and structures are presented clearly and esthetically. The literature covered by individual chapters generally includes references up to 2003 or 2004. The subject index is reasonably comprehensive, but the apparently arbitrary listing of compounds under their names and/or formulas in this same alphabetical index results in occasional confusion. For example, one index entry for dimethylaluminum methylselenoate is listed under its name, while two other entries are provided under the formula $Me_2AlSeMe$. However, these are relatively minor issues. Overall, the authors provide clear, competent, and useful coverage of the title compounds. The highly specialized nature of the subject will likely limit the readership of this monograph, but it will prove valuable to individuals with interests in organochalcogen chemistry and is recommended for inclusion in chemistry libraries.

Thomas G. Back, *University of Calgary*

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Advances in Quantum Chemistry, Volume 48. Edited by John R. Sabin (University of Florida, Gainesville), Erkki Brändas (Uppsala University, Sweden), and Lene B. Oddershede (The Niels Bohr Institute, Copenhagen, Denmark). Elsevier Academic Press: San Diego, CA. 2005. xxviii + 500 pp. $180.00. ISBN 0-12-034848-9.

This latest volume in the *Advances in Quantum Chemistry* series is a collection of 24 papers, contributed in honor of Jens Oddershede's 60th birthday. Oddershede is best known for the development of methods for computing the polarization propagator and using the propagator to calculate the response of molecules to various sorts of external perturbations. Most of the contributions to this volume reflect his impact in this area, and therefore they are focused on spectroscopy (especially NMR) and molecular collisions, along with related molecular response properties like polarizabilities, chemical shifts, *g* tensors, etc.

The term "polarization propagator" may be unfamiliar to the average reader of the *Journal of the American Chemical Society*. Be forewarned, then, that the target audience for this book is primarily quantum chemists and most of the articles in this

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volume assume prior familiarity with quantum chemical concepts (e.g., the aforementioned polarization propagator) and notation (e.g., second quantization). Some chapters are exceptions: the chapter by Ogilvie and Oddershede provides a comprehensive discussion of the "algebraic approach" to the interpretation of rovibrational spectroscopy, and that by Perera and Bartlett gives a detailed discussion of the problems associated with relativistic quantum mechanics for many-electron systems before using those results to derive a relativistic treatment of NMR coupling. (Chapters by Visscher and Saue also address relativistic effects in NMR.) Many of the other chapters will be accessible to any reader willing to skim over the mathematical details of derivations, trusting that the authors—all of whom are imminently trustworthy—know what they are doing. The chapter by Sobczyk, Skurski, and Simons on molecular fragmentation induced by electron attachment falls into this category, as does the chapters by Canuto, Coutinho, and Mukherjee on the polarizability of solvated fluoride ions and the chapter by Linderberg on the molecular structure of, and chemical bonding in, the perchlorate radical and anion. Worthy of particular note is the chapter on simple wave functions for two-electron systems by Harris and Smith. Not only is this chapter highly accessible, it contains the sort of fundamental content—very simple, yet very accurate, wave functions for two-electron systems—that can be parsed for examples to enrich undergraduate quantum chemistry lectures. (Sadly, this contribution is also notable because it represents one of the last scientific contributions of Prof. Smith, who passed away in September, 2005.)

The most important question remains to be addressed: should you buy this volume? Clearly, this book is priced for library, rather than individual, purchase. As a collection of articles on disparate topics, no one except Oddershede, the editors, and this reviewer will probably ever read this volume cover-to-cover. It is probably best to use this volume like a scientific journal: peruse the table of contents, browse the abstracts, and then decide whether to commit the time and energy required to learn more. Titles and abstracts of the articles are available through *ScienceDirect*, so you can decide which articles are worth a trek to the library from the relative comfort of your computer desk.

There are, however, some among us who will find this volume so useful that we will want to buy a personal desk copy. If you know what a polarization propagator is, then you might be in this group. If learning more about powerful tools for modeling molecular spectra and related response properties sounds interesting or useful to you, then you too may wish to buy this volume.

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Nanostructured and Advanced Materials. Edited by A. Vaseashta (Marshall University, Huntington, WV), D. Dimova-Malinovska (Bulgarian Academy of Sciences, Sofia, Bulgaria), and J. M. Marshall (University of Wales, Swansea, UK). Springer: Dordrecht. 2005. xii + 426 pp. $199.00. ISBN 1-4020-3560-8.

This book was developed from the NATO Advanced Study Institute meeting entitled "Nanostructured and Advanced Materials for Applications in Sensors, Optoelectronic and Photovoltaic Technology" held in Sozopol, Bulgaria in September 2004. There are 44 chapters on a variety of topics in the area, including "Matrix embedded metal and semiconductor nanoparticles", "Silicon thin-film solar cells", and "Electronic properties of a peanut-shaped C_{60} polymer", to name a few. Several photographs, a list of participants, and a copy of the poem that was delivered during the closing ceremony are also included to memorialize the event. A rather brief index completes the book.

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Strategies and Tactics in Organic Synthesis, Volume 6. Edited by Michael Harmata (University of Missouri, Columbia). Elsevier B. V.: Amsterdam. 2005. xxiv + 476 pp. $199.95. ISBN 0-12-450288-1.

This book is a chronicle of synthetic problems and strategies written by leading organic chemists, who give their own personal accounts of the practice of organic synthesis. It is a curious mixture of art and science with each author or group of authors providing not only the experimental details of the synthesis discussed but also the vision behind the experiment, the setting, the frustrations, and pitfalls encountered, as well as the, sometimes, surprise and excitement of success. It is part lab notes and memoir and should be an interesting read for both organic chemistry students and practitioners alike.

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DNA Binders and Related Subjects. Topics in Current Chemistry, 253. Edited by Michael J. Waring (University of Cambridge, UK) and Jonathan B. Chaires (University of Louisville, KY). Springer: Berlin, Heidelberg, New York. 2005. x + 210 pp. $179.00. ISBN 3-540-22835-7.

The world of medicinal chemistry tends to be protein-centric, and with good reason. Over 90% of the drugs on the market have protein targets, and the vast majority of drug discovery programs are aimed at proteins, be they enzymes, receptors, etc. However, given recent estimates that only 10−15% of the proteome is "drugable", it is apparent that exploitation of nonprotein-based targets, such as nucleic acids, could have considerable potential. Nucleic acid targets have been validated in several therapeutic areas: DNA-modifying compounds have been a mainstay of anticancer treatments, and bacterial ribosomal RNA is the target for certain classes of antibiotics. As the targeting of nucleic acids with small molecules slowly begins to catch the fancy of medicinal chemists, it is therefore appropriate that the latest volume in the *Topics in Current Chemistry* series focuses on "DNA Binders and Related Subjects". The editors have assembled an eclectic collection of articles that give a solid overview of the current state-of-the-art in small molecule-nucleic acid targeting.

The Dervan group has been the leader in the development of rules for the sequence-specific recognition of DNA with small molecules. It is thus fitting that Dervan and co-workers kick off this volume with a detailed history of the technology of polyamide-DNA binding, including success stories in the use of such compounds to regulate gene expression. This is an excellent contribution, with a detailed discussion about the challenges of making such approaches generally applicable. Chaires contributes a chapter that touts the considerable virtues of the method of competition dialysis for the assessment of small molecule binding to subtly different forms of DNA. A following chapter authored by Armitage focuses on the cyanine (Cy) dyes and their multiple uses as probes for DNA. In another chapter, Williams writes about the caveats and uncertainties in studies of DNA crystallization.

Topoisomerases fall under the category of "related subjects", and Dias and co-workers contribute an excellent overview of both topoisomerase I and II inhibitors of marine origin. Small molecules that bind in the DNA major groove receive comparably less attention than their minor groove-binding brethren, making the comprehensive overview of DNA major groove binding by Escude and Sun timely and important. While the majority of the book focuses on small molecule binding to DNA, the last two chapters are overviews of aspects of aminoglycoside binding with RNA. First, Arya summarizes data showing that neomycin will bind the A-form of nucleic acids in vitro. Then Pilch and co-workers give detailed consideration to the protonation states of aminoglycosides and their influence on RNA binding. Notably, the studies summarized in this chapter allow considerable insights into small molecule-RNA recognition, insights that would not be possible from crystallographic data alone.

As indicated by its general title, this latest contribution to the *Topics in Current Chemistry* series is not meant to be comprehensive. Rather, a variety of topics at the forefront of small molecule-nucleic acid biochemistry are discussed in great detail. This volume will be of considerable use both to researchers in the field and to those who wish to move into this exciting area.

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Organosilicon Chemistry VI: from Molecules to Materials, Volumes 1−2. Edited by Norbert Auner (University of Frankfurt) and Johann Weis (Consortium of Electrochemical Industry GmbH, Munich). Wiley-VCH Verlag GmbH & Co. KGaA: Weinheim. 2005. xviii + xviii + 1020 pp. $210. ISBN 3-527-31214-5 (Set).

The aim of this series and of this two-volume set is to provide a survey of the latest research in the broad field of organosilicon chemistry. There are six "chapters" in this set, each consisting of a number of papers on the titled subject: (1) Organosilicon-Based Reactive Intermediates; (2) Molecular Inorganic Silicon Chemistry; (3) Transition Metals in Organosilicon-Based Chemistry; (4) Silicon in Organic and Bioorganic Chemistry; (5) Organosilicon Compounds for Industrial Applications; and (6) Silicon-Based Materials. An author and a subject index complete the two volumes.

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