

X-ray and Inner-Shell Processes. 19th International Conference on X-ray and Inner-Shell Processes. Edited by Antonio Bianconi (Università di Roma "La Sapienza"), Augusto Marcelli (INFN-LNF, Rome), and Naurang L. Saini (Università di Roma "La Sapienza"). American Institute of Physics: New York. 2003. xiv + 534 pp. \$190.00. ISBN 0-7354-0111-X.

This book is a collection of the papers presented at the 19th International Conference on X-ray and Inner-Shell Processes held in Rome in June 2002. There are 59 chapters, which are organized under the following headings: Historical Reviews; New X-ray Sources and Techniques; Advances in X-ray Optics; Photoionization Processes and Highly Charged Ions; Atomic and Nuclear X-ray Processes; X-ray Scattering; X-ray Applications to Solids and Surfaces; and Biological Applications. A subject index completes the book.

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Additives in Water-Borne Coatings. Edited by Gerry Davison and Bruce Lane (Consultants). Royal Society of Chemistry: Cambridge. 2003. viii + 88 pp. \$219.00. ISBN 0-85404-613-5.

This book was developed from the conference titled "Water-borne Coatings – The Way Forward" held in Runcorn, UK in September 2002. It was the fourth in a series held on the topic since 1989. The book consists of two plenary papers that give an overview of the field and seven specialty chapters on key additives that are used currently. These include biocides, cellulose ether thickeners, water-based dispersants, associative thickeners, matting agents, antifoams, and silicone surface-active agents. A subject index completes the book.

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Sample Preparation Techniques in Analytical Chemistry. Edited by Somenath Mitra (New Jersey Institute of Technology). From the series *Chemical Analysis*, Volume 162. Edited by J. D. Winefordner. John Wiley & Sons, Inc.: Hoboken, NJ. 2003. xx + 458 pp. \$89.95. ISBN 0-471-32845-6.

This multi-author reference book covers some of the more important and widely used sample preparation techniques that are crucial to the measurement process. The book opens with an overview of the main issues in the field and the associated quality control. The remaining nine chapters are divided into the following three sections: Extraction and Enrichment in Sample Preparation; Sample Preparation for Nucleic Acid

Analysis; and Sample Preparation in Microscopy and Spectroscopy. A subject index completes the book.

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Plasma Source Mass Spectrometry: Applications and Emerging Technologies. Edited by J. G. Holland (University of Durham, UK) and S. D. Tanner (PerkinElmer SCIEX, Canada). Royal Society of Chemistry: Cambridge. 2003. x + 412 pp. \$269.00. ISBN 0-85404-603-8.

This book presents a selection of papers given at the 8th International Conference on Plasma Source Mass Spectrometry held in Durham, UK in September 2002. Its 34 chapters are organized under the following headings: BioAnalytical Applications; Environmental Applications; Archaeological Applications; Preparatory and Delivery Methods; Reaction Cells and Collision Cells; and MultiCollectors. Both author and subject indexes are also included.

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Colloid Chemistry II. Topics in Current Chemistry, 227. Edited by Markus Antonietti (Max Planck Institute of Colloids and Interfaces, Potsdam). Springer-Verlag: Berlin, Heidelberg, New York. 2003. x + 230 pp. \$189.00. ISBN 3-540-00418-1.

In the opening paragraph of his introduction to *Colloid Chemistry II*, the editor writes: "Over the past forty years, good-old fashioned colloid chemistry has undergone something of a revolution, transforming itself from little more than a collection of qualitative observations [...] into a discipline with a solid theoretical foundation...". It is perhaps not fair to define all of the revival of colloid science—in my opinion a better term than colloid chemistry—as having taken place in the last four decades. This once sleepy science had another major period of revival after the second world war, when the theoretical foundations of colloid stability established by Russian and Dutch scientists before and during the war years started to find wide recognition and application. Volume one of Kruyt's "Colloid Science", titled "Irreversible Systems" and containing Overbeek's main summaries of the Deryaguin, Landau, Verwey, and Overbeek (DLVO) theory of colloid stability, appeared in 1952, incongruously 3 years after publication of its sister second volume on so-called hydrophilic colloids. Although colloid science did indeed disappear from the headlines for many years after the publication of Kruyt's books, the importance of its applications in diverse areas ranging from mineral beneficiation to physical pharmacy was well recognized and utilized by scientists and engineers involved with a wide variety of industrial applications.

More than two decades later, Matijevic called colloid science “the world of neglected dimensions”, and his work on the synthesis of homogeneous inorganic particles, comparable to what we would now call nanoparticles, was very much at the forefront of the current revival, later boosted even more by the appearance of the ACS journal “Langmuir” devoted fully to colloid and surface science.

This volume brings us eight chapters on a variety of topics dealing with molecular recognition, emulsion polymerization, various colloid chemical methods of synthesizing nanoparticles, imprinting and molecular recognition, and organic reactions in microemulsions. These topics are indeed highly representative of much of the leading edge work in colloid science. Except for the case of the traditional inorganic colloids, the distinction between hydrophobic colloids (Kruyt’s irreversible systems) and hydrophilic colloids—thermodynamically stable or at least meta stable systems—has all but disappeared, and much current research is concerned with topics closely related to polymer science, self-assembling systems, nanoparticle engineering, and materials science. In an edited collection of chapters, quite naturally the choice of topics and their individual content reflects the interests of the editor and the authors. Expressing my own interests, I was particularly impressed by the longest chapter, titled “Miniemulsions for nanoparticle synthesis” by Landfester. This chapter gives a concise but complete description of the characteristics of this class of emulsions and their use in preparing homogeneous latex particle emulsions. The other chapters are equally clearly written and contain a wealth of material and references useful to both expert and novice in the particular topic. That six of the chapters describe methodologies for the synthesis of nanoparticles and their application demonstrates how colloid science, polymer science, materials science, and even certain aspects of genetic engineering have started to converge, leading us into a whole new era of discovery.

With nearly 500 references, this volume will serve as a very useful source of information for researchers directly in the field or from related disciplines. Each of the eight chapters is very readable, and the quality of the figures and illustrations is excellent. I can recommend this volume both to the expert reader, as a useful summary of the topics described, and to researchers interested in modern aspects of colloid science, as an excellent introduction to some fascinating topics in this rapidly growing field.

Jan C. T. Kwak, *Dalhousie University*

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CRC Handbook of Chemistry and Physics, 84th Edition. Edited by David R. Lide (National Institute of Standards and Technology). CRC Press LLC: Boca Raton. 2003. 2616 pp. \$139.95. ISBN 0-8493-0484-9.

This famous reference work continues to provide current, critically evaluated chemical and physical data. The 84th edition features a completely revised table of Physical Constants of Organic Compounds that includes data on ca. 11 000 compounds, new structure diagrams, and a new, more convenient format. Other changes to this edition include an updated and expanded table on Critical Constants of Fluids; a new version

of Properties of Refrigerants; a new table on Fermi Energy and Related Properties of Metals; new tables on Flame and Bead Tests, Flame Temperatures, and Density of Ethanol–Water Mixtures; updated lists of Chemical Carcinogens and Interstellar Molecules; and an updated Appendix B: Sources of Physical and Chemical Data, which includes new sources as well as current Web addresses.

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Encyclopedia of Electrochemistry, Volume 2: Interfacial Kinetics and Mass Transport. Edited by Ernesto Julio Calvo (Universidad de Buenos Aires, Argentina). Series Edited by Allen J. Bard and Martin Stratmann. Wiley-VCH: Weinheim. 2003. x + 553 pp. \$320.00. ISBN 3-527-30394-4.

This second volume in Bard and Stratmann’s 11-volume set covers topics associated with interfacial kinetics and mass transport. Although other primers and monographs on this subject have been published previously, the present volume contains more modern accounts of specialized electrochemical topics that have not heretofore been consolidated in a single source.

The first chapter presents a brief introduction of basic electrochemical fundamentals and provides an overview of the theoretical underpinnings of quantum theory of electron transfer reactions. A timely description of recent approaches for modeling the electron-conduction (electron-transmission) properties of molecular bridges, assemblies, and junctions is also included. This topic is particularly relevant for those working in the emerging areas of molecular electron transfer and nanoscale electronic devices.

Chapter 2 is an advanced discussion of mass transport to electrodes by diffusion and migration and features a section on digital simulation of voltammetry under both stagnant and hydrodynamic conditions. This chapter is heavily biased toward the modeling and simulation of transport phenomena, with very little emphasis being placed on applications.

Chapter 3 is a description of in situ experimental techniques of electrochemical NMR, EPR, STM, AFM, and FTIR spectroscopies. A comprehensive summary of in situ spectroscopic methods and cell designs is presented, and recent progress in the spectroelectrochemical characterization of solid/liquid and liquid/liquid interfaces is outlined.

Chapter 4 is a review of interfacial structure and kinetics, including theoretical issues connected with charge-transfer processes between immiscible liquid/liquid interfaces. A significant portion of this chapter focuses on anion adsorption and underpotential deposition at single-crystal electrodes. An additional section on electrochemistry in micelles and microemulsions, despite being informative, seems oddly out of place.

The final chapter is a description of mechanisms and electrocatalysis of CO, formic acid, and methanol in acidic solutions. Of specific interest here is an instructive account of recent progress in the elucidation of mechanistic pathways for methanol and formic acid oxidation. Also included is a thorough discussion on the modeling of 2D and 3D electrochemical nucleation and growth processes, with specific application toward mercury deposition.

In summary, this text is particularly strong in describing modern theoretical constructs for modeling of electrochemical kinetics and mass transport, with the exception of Chapter 3, which focuses primarily on experimental spectroscopic investigations. The volume does suffer from the common shortcomings found in most multicontributor texts in that certain sections are somewhat disjointed and lack continuity with other chapters. Some redundancy of material between chapters is also evident, especially with regard to the oxygen reduction reaction.

Overall this volume strongly complements others in the series and provides reliable, updated information of electrochemical kinetics, energetics, and mass transport. The quality of presentation of this volume is excellent, with first-rate formatting, indexing, and referencing (as current as 2002). This text has definite value as an important reference resource for researchers, scientists, and graduate students interested in the broad field of electrochemistry.

Keith J. Stevenson, *University of Texas at Austin*

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Modern Mass Spectrometry. Topics in Current Chemistry, Volume 225. Edited by Christoph A. Schalley (University of Bonn). Springer-Verlag: Berlin, Heidelberg, New York. 2003. xii + 318 pp. \$269.00. ISBN 3-540-00098-4.

This book is a collection of nine chapters authored by known experts in the field covering various topics of mass spectrometry. The four broad categories of the reviews include Reactivity (first three chapters), Metalorganic Chemistry (the fourth and fifth chapters), Mass Spectrometric Methodology (two chapters), and Medicinal Chemistry (final two chapters). In general, the chapters are extremely well written, up-to-date, and thoroughly referenced. Readers should be cautioned that this book does not offer a complete nor integrated review of mass spectrometry, but instead focuses on specialized topics that touch on physical, organic, and biochemical areas of mass spectrometry and gas-phase ion chemistry. Most of the chapters assume a fairly high level of proficiency.

The first chapter, entitled "Physical Organic Chemistry of the Gas Phase. Reactivity Trends for Organic Cations" (Uggerud), is a summary of the major types of reactions in organic gas-phase ion chemistry, such as nucleophilic aliphatic substitution and electrophilic aromatic substitution, in addition to important principles of solvent effects and substituent effects. The chapter is supported by over 300 references, and thus readers are guided to dig more deeply into the literature. "Mass Spectrometric Approaches to Interstellar Chemistry" (Petrie and Bohme), the next chapter, is a review of the experimental methods used to study interstellar chemistry and provides numerous examples of the types of interactions and reactions that have been studied. It also contains some particularly interesting sections on metal ion chemistry and positive ion/electron interactions. The third chapter, entitled "Transient Intermediates of Chemical Reactions by Neutralization-Reionization Mass Spectrometry" (Tureček), is a tour-de-force and one of the longest chapters in the book. The introductory section for this chapter clearly states the importance of neutralization-

reionization mass spectrometry, whereas the rest of the chapter covers instrumentation and methods and provides numerous examples of studies of transient intermediates. It is nicely illustrated and contains many literature citations.

Schröder and Schwarz contributed the fourth chapter, entitled "Diastereoselective Effects in Gas-Phase Ion Chemistry". This specialized topic is covered thoroughly and focuses on efforts to determine stereochemical information about flexible organic molecules. Plattner's chapter, "Metalorganic Chemistry in the Gas Phase: Insight into Catalysis", follows. This chapter covers applications of electrospray ionization mass spectrometry related to organometallic gas-phase ion chemistry, including intermediates in catalytic cycles. There is also a section on the use of collision-induced dissociation threshold measurements for determining ion-ligand dissociation energies. This latter section overlaps with Armentrout's chapter (see below). The relatively long introductory section on electrospray ionization was perhaps not the best choice for this chapter on metalorganic chemistry; an introduction focusing on aspects of catalysis might have been preferable.

The third section of the book, which is devoted to mass spectrometric methodology, contains the chapters "Gas-Phase Conformations: The Ion Mobility/Ion Chromatography Method" (Wytenbach and Bowers) and "Threshold Collision-Induced Dissociations for the Determination of Accurate Gas-Phase Binding Energies and Reaction Barriers" (Armentrout). The chapter on ion mobility covers instrumentation, the determination of cross sections, and thermochemical parameters, and then closes with a brief overview of some applications related to gas-phase biological ions and clusters. The chapter on threshold collision-induced dissociation provides an excellent review of the instrumentation, the data analysis, and numerous applications, ranging from the thermochemistry of inorganic cations to organic ions, metal ligand complexes, metal clusters, and small biological molecules. The section on data analysis, which explains kinetic and competitive shifts, and the section entitled "necessities for accurate thermochemistry", which covers the details critical for accurate thermodynamic measurements, are particularly well presented.

The final section of the book, "Medicinal Chemistry" (perhaps not the best descriptive title), includes a chapter by Trauger, Junker, and Siuzdak entitled "Investigating Viral Proteins and Intact Viruses with Mass Spectrometry" and a chapter by Brønstrup entitled "High-Throughput Mass Spectrometry for Compound Characterization in Drug Discovery". The first covers the newly developed methods and applications of mass spectrometry for identification of viruses and viral proteins and related topics such as identification of mutations, a description of peptide mass mapping, analyzing whole viruses, and screening of antiviral drugs. This chapter touches on many of the latest and greatest mass spectrometric methods for examining enormously complex biological molecules—this reader wishes that this chapter were a little longer to allow expansion of some of the topics. The final chapter focuses on the use of mass spectrometry to support drug discovery and offers an excellent comprehensive overview of the impact of mass spectrometric methods on compound characterization in the pharmaceutical industry. Many practical and important analytical developments are included, such as the use of flow injection analysis, separation strategies, and ways to facilitate high-throughput analysis.

In summary, the chapters in "Modern Mass Spectrometry" are well written and provide a wealth of information. Because the book is not focused on a central unifying theme and assumes a fairly sophisticated background in the subject matter, it should not be viewed as an all-purpose reference but rather should be appreciated by those with a background in mass spectrometry needing to learn about a specialized topic covered in one of the nine chapters.

Jennifer S. Brodbelt, *University of Texas at Austin*

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Studies in Natural Products Chemistry, Volume 28: Bioactive Natural Products (Part I). Edited by Atta-ur-Rahman (University of Karachi). Elsevier: Amsterdam. 2003. xiv + 798 pp. \$406.00. ISBN 0-444-51415-5.

The 15 chapters of this multi-author book cover the latest developments in bioactive natural product research. Some of the topics discussed include bioactive compounds from the genera *Broussonetia*, *Licania*, and the species *Ginkgo biloba*. Other natural compounds and structural classes that are covered include retinoids, tetramic acid metabolites, isoprenylated flavonoids, plant polyphenols, crocin, marcfortine and paraherquamide, acaricides, podolactones, triterpene glycosides, and sulfur-containing marine compounds. There are also chapters on the antitumor activities of lipids and the use of natural

products for the prevention of drug-induced adverse reactions in cancer chemotherapy. A subject index completes the book.

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Riegel's Handbook of Industrial Chemistry, Tenth Edition. Edited by James A. Kent (Morgantown, WV). Kluwer Academic Publishers: New York, Dordrecht. 2003. 1374 pp. \$495.00 until April 1, 2004, \$595.00 thereafter. ISBN 0-306-47411-5.

This handbook provides introductory and detailed information about the chemistry, engineering, economics, and technological infrastructure within the chemical process industries. It provides extensive information on the major classes of industrial chemistry, such as plastics, rubber, adhesives, and textile fibers, to name a few, and offers detailed coverage of such topics as coal utilization technology, dyes and dye intermediates, chlor-alkali and heavy chemicals, paints and pigments, etc. This edition includes a new chapter on industrial cell culture, which together with the well-established chapter on industrial fermentation aims to provide new insight and information to the field of biochemical engineering. The chapter on agrochemicals has been revised and features tables of information on pesticides, herbicides, and fungicides, including chemical structure, biochemistry, mode of action, and environmental fate. An index completes the book.

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