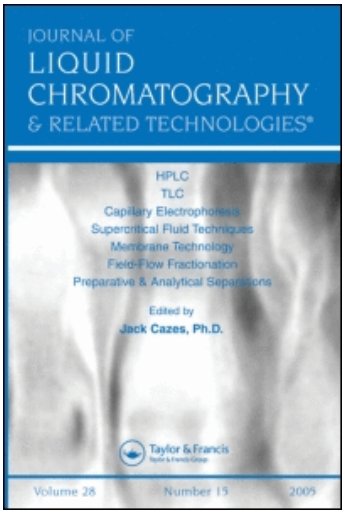

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The Book Corner

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The Book Corner

Solubility in Supercritical Carbon Dioxide, by Ram B. Gupta and Jae-Jin Shim, CRC Press-Taylor & Francis Group, New York, 2007, 909 pp. Price: $189.95

Solubility in Supercritical Carbon Dioxide is a massive book. Supercritical fluid is defined as a substance (in this book it is carbon dioxide) present at above its critical temperature and critical pressure. Supercritical fluids exhibit liquid-like solvent properties and gas-like transport properties. The combination of these properties makes supercritical fluids suitable for various applications.

Carbon dioxide is the supercritical fluid of choice due to its mild critical temperature, nontoxicity, nonflammability, and low cost. Carbon dioxide becomes a supercritical fluid when it is heated above 31.1°C and simultaneously compressed above 73.8 bar.

Major advancements in the technology aspects of supercritical fluids have occurred, especially over the last 25 years, in the extraction of petrochemicals, foods, pharmaceuticals, fragrances, flavors, nutraceuticals, and pesticides; polymerization and biological reactions, and various organic and inorganic chemical reactions; cleaning of semiconductors and precision machinery; aerogel manufacturing; textile dyeing and dry cleaning; metal de-binding; and manufacturing of micro- and nano-particles. Commercial applications include coffee and tea decaffeination, nicotine removal from tobacco, extraction of fragrances and flavors, plant wastewater treatment, dry cleaning, and residuum oil extraction. The scope of supercritical fluid technology is expanding into a variety of areas including chemistry, biology, food science, environmental science, military, cosmetics, textile engineering, metallurgical engineering, semiconductors, and polymers.

The book provides a compilation of solubility data in supercritical carbon dioxide for various liquids, solids, polymers, foods, drugs, nutraceuticals, pesticides, dyes, metal complexes, etc. The data were compiled from various research articles, reports, and theses. A reasonable effort was made by the authors to ensure that all published data are compiled in this book. The authors state that there may be some research papers that are not tracked in literature searches, especially those written in non-English

languages, which is understandable. The solubility data are arranged in alphabetical order of the compound name for easy access, and the data are provided in both tabular and graphical format for better understanding and easier comparison of the solubility behavior of these compounds. At the end of each table, compound synonym(s) and the reference for the original data are provided. Although the source articles provide data in various units, this book uses a uniform unit of mole fraction solubility, or weight fraction solubility if the molecular weight is not known, both in the order of 10^6 (i.e., parts per million). This book provides only actual experimental solubility data, and does not contain any empirical or theoretical correlations or predictions, except for a brief discussion of modeling in the Introduction.

Each of the more than 1,200 tables is arranged, as mentioned earlier, in alphabetical order by compound, includes a graphical plot of its data, and features the following information:

- Compound name, molecular formula, and molecular weight
- Temperature and pressure given in Kelvin and bar, respectively
- Name and amount of cosolvent, if applicable
- Molar or mass solubility, when applicable
- Mole- or mass-fraction solubility
- Synonyms for the compound, where available
- Reference source for the data

Density data for CO_2 appears in one appendix, while a complete list of solutes by molecular formula appears in the other. Clear, consistent, and carefully organized, *Solubility in Supercritical Carbon Dioxide* is a convenient quick-lookup guide for reliable data.

The Table of Contents consist of an introduction and twenty-six chapters starting with Chapter 1 that gives solubility data of compounds starting with the letter "A" and ending with Chapter 26 that deals with "Z" compounds. Appendix A lists density data of carbon dioxide and Appendix B lists the solutes by molecular formula. The book ends with an Index. The authors should be congratulated for such a pain-staking effort.

Haleem J. Issaq, Ph.D.
Book Corner Editor

Assigning Structures to Ions in Mass spectrometry, by John L. Holmes, Christiane Aubry, and Paul M. Mayer, CRC Press-Taylor & Francis Group, New York, 2007, 446 pp. Price: $159.95

Summarizing our present knowledge of the structures and chemistry of small organic cations in the gas phase, *Assigning Structures to Ions in*

Mass Spectrometry presents the methods necessary for determining gas-phase ion structures. It is a comprehensive resource of background material that is essential for the interpretation and understanding of organic mass spectra. In the past 40 or so years, great technical advances have resulted in mass spectrometry becoming the analytical method of choice in many scientific fields. This stems from the very great sensitivity of the method as well as our present ability to convert almost any organic substance into a beam of positively charged ions that can be separated and identified by their mass-to-charge ratio. In addition, the production of smaller, simpler, almost wholly software-controlled instruments has allowed this powerful analytical technique to become accessible to a much wider group of scientists.

The purpose of this book is to be a *vade-mecum* for all users of the technique for whom the structure of the ions present in the mass spectrum of an organic compound is important or of general interest. The book is made up of two main parts with a total of 3 chapters. Part one deals with theory and methods and part two deals with ions containing carbon atoms.

Chapter 1 briefly surveys current experimental methods for ion production and separation, followed by a more detailed presentation of the experiments designed to reveal qualitative and quantitative aspects of gas-phase ions. Emphasis is placed on those methods that are used to probe ion structures, namely, the determination of ionic heats of formation and generalities derived therefrom, controlled experiments on the dissociation characteristics of mass-selected ions, and the reactivity of ions. Because of the increasingly important contribution of computational chemistry to the development of the field, a brief discussion of these methods and how to use them to advantage is also presented. This first section is not intended to be encyclopedic; references to further reading are given, including inter alia, the new *Encyclopedia of Mass Spectrometry* currently being published by Elsevier.

Chapter 2 presents five selected case studies. They have been carefully chosen to present the reader with the type and range of difficulties associated with ion structure assignment and thermochemical problems. In each case, sufficient data are presented and discussed and it is shown how experiments and when appropriate, molecular orbital theory calculations were used to solve the problem. This also necessitates some discussion of the mechanisms by which ions dissociate and also touches on difficulties with reference sources, particularly thermochemical data for ions and neutral species. This chapter concludes with a brief guide of the best way to assign a structure to a new ion and the pitfalls to avoid.

The last, and major, section of the book contains the data sufficient for the description and identification of all ions containing C alone and C with H, O, N, S, P, halogen, from C_1 to C_3 and is intended to be a primary source of such information. The book is well organized and referenced.

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Separation Methods in Proteomics, Edited by Gary B. Smejkal and Alexander Lazareu, CRC Press-Taylor & Francis, 2006, 510 pp. Price: $159.95

Separation Methods in Proteomics is an important and timely book for all those interested in the analysis of the "proteome." As an analytical separation chemist myself, I would say that as CE played an important role in the analysis of the genome separation science, liquid phase-based and gel-based separation techniques play an important and essential role in proteomics and in disease biomarker discovery.

Separation Methods in Proteomics provides a comprehensive examination of all major separation techniques for proteomics research. Written as a compilation of hands-on methods, exemplified by the work of several recognized leaders in the field, this book may serve as a guide for selection of the optimal separation strategies to solve particular biological problems.

The book is divided into five sections dealing with sample preparation, sample prefractionation and analysis, applications of electrophoresis with emphasis on gel electrophoresis, applications of HPLC including use of monolithic columns, and multidimensional separations. The final section deals with related techniques, such as gel staining, which I believe should have been

included in the section dealing with electrophoresis. The book features the following:

- A compilation of modern applied proteomics methods which cover the entire process, from sample preparation to identification of potential drug targets and biomarkers of disease.
- Strategies for protein recovery from samples that are resistant to usual solubilization methods.
- Practical examples of sample pre-fractionation for analysis of low abundance proteins.
- A good summary of recent improvements in the field of Two-Dimensional Gel Electrophoresis (2DGE).
- Optimized strategies for protein visualization in 2D gels.
- Automated liquid phase separation methods employing High-Performance Liquid Chromatography (HPLC).
- Use of Nuclear Magnetic Resonance (NMR) for the analysis of protein-DNA, protein-lipid, and protein-carbohydrate interactions.

Including applications of the separation methods currently employed in proteomic analyses for both clinical and basic research, *Separation Methods in Proteomics* contains practical information that can enhance the current and future endeavors of scientists in proteomics, genomics, transcriptomics, biomarker discovery, and drug discovery.

As mentioned earlier, the book is recommended as a reference for all interested in protein/peptide analysis.

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Spectral Techniques in Proteomics, Edited by Daniel S. Sem, CRC Press-Taylor & Francis Group, New York, 2007, 442 pp. Price: $139.95.

Spectral Techniques in Proteomics, edited by Daniel S. Sem is a timely book, since proteomics, the same as other "omics" such as genomics, transcriptomics and metabolomics, is a "hot" topic that is drawing great interest and attention at different research centers around the globe. The book is divided into six parts. Part I discusses the scope of proteomic and chemical proteomics studies and includes 3 chapters. Part II is made up of 5 chapters that deal with mass spectral studies of proteome including CE-MS, protein and peptide analysis by MALDI, characterization of glycosylated proteins by MS and protein chip technology. Part III includes 4 chapters that discuss protein-protein interaction. Part IV includes 4 chapters that deal with studies of protein-ligand interactions. Part V has 3 chapters that are dedicated to the study of structural proteomics. The book ends with a summary which is Part VI.

The book is very well presented and illustrated. Some of the features of the book include:

- Presents an overview of structural proteomics and chemical proteomics;

- Covers new approaches in structural proteomics, metabolomics, and structure-based drug design;
- Addresses widely used methods such as MALDI, SELDI, ICAT, tandem MS, and shotgun proteomics;
- Includes spectroscopic tools including ESI, SPR, EPR, NIR fluorescence, x-ray crystallography and NMR.

Spectral Techniques in Proteomics will be useful for graduate students and other scientists wanting to develop and apply spectroscopic methods in proteomics. It will also be of value to more experienced researchers thinking of moving into this field or those in proteomics looking to broaden the scope of their studies. In short, it is intended for anyone wanting to take a systems-based approach to studying proteins, their function, and their mechanisms using various spectroscopic tools. The book is recommended to all those interested in protein and peptide analysis.

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Trace Environmental Quantitative Analysis Principles, Techniques, and Applications, Second Edition, Paul R. Loconto, CRC Press-Taylor & Francis, 2006, 731 pp. Price: $139.95

Trace Environmental Quantitative Analysis Principles, Techniques and Applications written by Paul R. Loconto is a massive book filled with useful material including illustrations and references. The current volume is the second and updated reference book for the environmental chemist. The book is made up of 5 major chapters discussing current techniques and applications being practiced in analytical laboratories dedicated to trace environmental analysis.

Trace Environmental Quantitative Analysis: Principles, Techniques and Applications, Second Edition offers clear and relevant explanations of the principles and practice of trace environmental quantitative analysis (TEQA). The author updated each chapter to reflect the latest improvements in TEQA that have resulted in greater levels of sensitivity.

The book begins with an overview of regulatory and EPA methods followed by data reduction and interpretation, then sample preparation, and analytical instrumentation. Among the more than two dozen new topics are the underlying principles of GC-MS, GC-MS-MS, LC-MS, and ICP-MS; column chromatographic cleanup; gel permeation chromatography; applications to biological sample matrices; and matrix solid-phase dispersion. The chapter on sample preparation now includes more alternatives to liquid-liquid extraction, particularly SPE, SPME, and SBSE. The final chapter contains laboratory-tested experiments to practice the techniques, appearing in the text. Appendices include a convenient glossary, applications to drinking water, computer programs for TEQA, instrument designs, and useful Internet links for practicing environmental chemists. This is a good reference for all involved in environmental analysis.

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