

Book Review

**Advances in Photochemistry, Volume 29 Edited by Douglas C. Neckers (Bowling Green State University, Bowling Green, Ohio), William S. Jenks (Iowa State University, Ames, Iowa), and Thomas Wolff (Technische Universität Dresden, Germany). John Wiley & Sons, Inc.: Hoboken, NJ. 2007. x + 384 pp. \$145.00. ISBN 0-471-68240-3.**

V. Ramamurthy

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This monograph, which consists of three independent chapters, is part of a well-known series originally initiated by Noyes, Hammond, and Pitts. Since the book is not devoted to a single topic, I will review each chapter individually.

The first chapter, by Lor et al., deals with the photophysics of polyphenylene-based dendrimers and mostly covers the work of the authors, with the introductory section placing their work in the proper context. It is both thorough and well written, so that even those who are not experts in femtosecond spectroscopy could follow the chapter and get a feeling for the central concepts. The authors provide nice illustrations of dendrimer structures, tables of data, and figures of emission and decay traces, while highlighting the differences in energy transfer dynamics between para- and meta-substituted carbon core dendrimers.

The second chapter, by Fujitsuka and Majima, covers the characterization of short-lived reactive species generated by pulse radiolysis, flash photolysis, two-color two-laser flash photolysis, and three-color three-laser flash photolysis. The authors summarize the work carried out by Majima's group and provide references to work by other groups on this topic. Generation and characterization, mostly through absorption and emission, of radical ions, radicals, and molecules in upper excited states are covered. Had the authors placed their own work in the context of what is already known on this topic, the chapter would have been much more valuable.

B. Strehmel and V. Strehmel discuss two-photon spectroscopy of organic and polymeric materials in the final chapter. It forms two-thirds of the book and is thoroughly and extensively referenced (600 references scanning between 1931 and 2005). Although the focus is somewhat physical, anyone interested in two-photon spectroscopy would find this chapter very useful. Theory, data collection, and applications of two-photon spectroscopy are covered, and extensive data in the form of tables are provided. Overall, I found this chapter to be the most in-depth and exhaustive in coverage, and most importantly, I was happy to see that the discussion was not restricted to the authors' work alone. Unfortunately, too many acronyms are used throughout the chapter, making the reading a bit difficult at times. It would have been helpful if all acronyms and what they represent had been listed at the beginning or end of the chapter.

*Advances in Photochemistry, Volume 29*, is well referenced (the latest being 2006) and well indexed. The publishers have done a superb job of presenting the book in an aesthetically pleasing manner: all figures, schemes, and structures are uniform, and all chapters have the same font, format, etc. The

book should be of great value to graduate students and researchers and should be part of any library.

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**High-Performance Gradient Elution: The Practical Application of the Linear-Solvent-Strength Model.** By Lloyd R. Snyder (LC Resources, Inc., Orinda, CA) and John W. Dolan (LC Resources, Inc., Amity, OR). J. Wiley & Sons, Inc.: Hoboken, NJ. 2007. xxviii + 462 pp. \$115.00. ISBN 0-471-70646-9.

Liquid chromatography with gradient elution is the preferred separation technique for samples with multiple components of widely varying polarity or for samples of unknown composition. Although this technique is commonly used, it may not be well understood because of the many interrelated variables that influence the quality of the separation. In this modern and authoritative book, the linear-solvent-strength model promulgated by the authors since the 1970s is applied to elucidate gradient elution and its relationship to isocratic elution. A brief theoretical foundation of this model is provided in Chapter 2, with more detailed derivation and explication in Chapter 9 and the appendices. Chromatograms, simulated using the commercially available program DryLab (LC Resources, Inc.), are used to illustrate the effects of each variable for "regular" and "irregular" samples. This treatment is both comprehensive and thorough and includes the effects of column parameters (particle size, length, etc.), system parameters (dwell volume, flow rate, etc.), and gradient parameters (time, initial and final composition, gradient shape, etc.). A systematic approach to the optimization of these parameters is presented in Chapter 3. The equipment needed for gradient elution, together with useful performance specifications and tests, is described in Chapter 4. Perhaps the most practical and useful information for routine users is contained in Chapter 5, which delineates numerous problems and artifacts that can arise, together with troubleshooting strategies to identify and correct them. The later chapters offer an extension of the linear-solvent-strength model to specific applications of gradient elution, including preparative-scale separations, macromolecular separations (both synthetic and biopolymers), ion-exchange separations, normal-phase separations, and more complex ternary and quaternary solvent gradients.

Overall, this book is clear, well written, and easy to understand despite the complexity of the subject. I have only two minor criticisms: First, resolution of the critical solute pair is the only criterion of separation quality discussed in the text. In a book that details methods for optimization, I would have expected a more thorough presentation and comparison of quality criteria. Second, although the authors provide helpful cross-references to related sections throughout most of the text,

one of the most critical aspects, *viz.*, the assumptions and limitations of the linear-solvent-strength model (sections 9.2 and 9.3), is not referenced in any of the places where such references are most likely to be useful. Hence, these sections are only likely to be read by those who are willing to venture into the chapter on detailed theory and derivations.

These minor criticisms notwithstanding, I highly recommend this book for those who routinely or occasionally use liquid chromatography but are not experts. It would also be an excellent textbook for teaching short courses or for graduate students wishing to understand the details of gradient and isocratic elution.

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**Metal Ions in Life Sciences, Volume 1: Neurodegenerative Diseases and Metal Ions.** Edited by Astrid Sigel, Helmut Sigel (University of Basel, Switzerland), and Roland K. O. Sigel (University of Zürich, Switzerland). John Wiley & Sons, Ltd: Chichester. 2006. xxiv + 464 pp. \$200. ISBN 0-470-01488-1.

This book is the first volume of the new series *Metal Ions in Life Sciences*, which more or less supersedes the old series, *Metal Ions in Biological Systems*, and will likely appeal to a significantly wider scope of scientists. In doing so, this series should stimulate the combined action of chemists, biologists, medical doctors, and physicists to contribute to new developments in this field of research. Production of Volumes 2, *Nickel and Its Surprising Impact in Nature*, and 3, *The Ubiquitous Roles of Cytochrome P450 Proteins*, is well underway.

This volume is written by 41 internationally recognized experts and is illustrated with over a hundred figures and schemes, some of them in color. Chapter 1 provides an overview of the field and sets up the organizational framework for the involvement of metals in neurological diseases. The book continues with more detailed information regarding neurological diseases: those associated with metalloprotein aggregation or misfolding (Chapters 2–6, 8, and 11); those due to defects in metal ion transport or homeostasis (Chapters 7, 9, 10, and 12); and those due to toxicological exposures to metals (Chapters 6, 11, 13, and 14). Of course, some degree of overlap in this classification is inevitable. Chapter 15, the last chapter, offers a concluding overview and outlook, followed by a subject index.

As a whole, this book is an outstanding compendium of progress in understanding the toxicology of metal ions and their role in diseases, such as amyotrophic lateral sclerosis, Creutzfeldt-Jacob, Alzheimer's, Parkinson's, Huntington's, Wilson's, Menke's, and others. The volume contains references to research articles published as recently as 2005.

Notwithstanding the remarkable merits mentioned above, in a few instances there are some inaccuracies in the chemistry discussed. For example, in Chapter 6, the authors could have benefited from abiding to the *IUPAC* recommendations for writing formulas of inorganic radicals, and it should be noted here too that the peroxy nitrite anion is mistakenly depicted as a radical. Some chemists may find some of the described mechanisms of action discussed in this volume to be somewhat vague or even perhaps incomplete at the molecular level. One hopes they will find in them an invitation to explore this area of research further and in doing so contribute to improving the conditions of those afflicted by neurodegenerative diseases.

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