

Book Reviews

Environmental Assessment of Products. Volume 1. Methodology, Tools, and Case Studies in Product Development. By Henrik Wenzel, Michael Hauschild, and Leo Alting. Kluwer Academic Publishers: Dordrecht, The Netherlands. U.S. \$150 (85 GBP). ISBN 0-412-80800-5.

It is exciting to see such a thorough text on life cycle assessment. This book will steadily replace the early, more qualitative and conceptual SETAC text as the best explanation of life cycle techniques. The origins of this book are in the commitment by Danish industry and Environmental Protection Agency to encourage, with substantial resources, the use of life cycle for improvement of manufacturing and products. The magnitude of this commitment is impressive and is reflected in the material available to the reader of this book. A major benefit of this book is the education of professionals and students to life cycle principles and tools. However, a number of the figures, tables, and examples are of such good quality that these will be of immediate use to those currently involved with life cycle technology.

The organization of the book centers on three areas: (1) need and use of life cycle evaluations, (2) methods and techniques, and (3) detailed examples of life cycle uses. A second book by these authors deals more with the scientific background of their approach. For the first area, the authors present a series of forces that are driving the expansion of life cycle applications. The historical summary is an important contribution of this book, describing the multiple legislative and environmental management systems that potentially influence industry to take a more unified approach. Clear information is given on the models of industrial systems and the flow of material, energy, and processes over a cradle-to-grave boundary. The authors achieve a world perspective in the development of life cycle and in the impacts that are described by the multi-national manufacturing system.

The methodology used in this book follows the classical three-tier life cycle approach. However, in-depth applications have been used to significantly expand the content and to explain the subtleties involved in inventory, assessment, and decision-making. Since the authors have also developed extensive life cycle software, the progression of the book chapters has a very clear structure. The book information is generally more assessment than inventory.

The third area is examples and these are very rich in information and insight. The five examples are generally complex products, such as a refrigerator. Each begins with description and market context leading into the cradle-to-grave life cycle. The assessment allows determination of areas with the greatest influence. The authors are careful to identify what information is missing and often why. The decision-making aspects demonstrate the capability of life cycle to find pollution prevention options. It is of particular interest that the authors can integrate results into marketing, long-term corporate objectives, and the actual product development cycle.

In summary this book is excellent and is highly recommended to those in the manufacturing field. It really clarifies current and future implications of environmental issues on products and manufacturing. This book has an important role in the fields of industrial and chemical engineering, management, university education regarding life cycle, and sustainability.

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Advances in Photochemistry, Volume 23. Edited by Douglas C. Neckers (Bowling Green St. University), David H. Volman (University of California–Davis), and Gunther Von Bunau (University of Siegen). Wiley-VCH: New York, 1997. \$125.00. ix + 362 pp. ISBN 0-471-19289-9.

The stated purpose of the *Advances in Photochemistry* series is to “explore the frontiers of photochemistry through the medium of chapters written by pioneers who are experts.” The present volume is no

exception, and contains an eclectic mix of topics in five chapters. The first chapter, “Spectroscopy and Photochemistry of Polyatomic Alkaline Earth Containing Molecules” by P. F. Bernath, is an interesting and lucid exploration of gas-phase inorganic chemistry. The emphasis is on rotational–vibrational spectra of simple metal–organic fragments, and comparison of experimental data to theory. Thankfully, there are clear descriptions of the Broida oven and molecular beam apparatus for data collection. A molecular survey is undertaken for a dozen or so classes of compounds. Good use is made of isoelectronic analogies to interpret data. Of the ~145 references, 68 are from 1992 or later.

The second chapter, “Photochemically Induced Dynamic Nuclear Polarization” by M. Goez, is stated to be aimed “at the nonspecialist”. Nonetheless, the section on Theoretical Principles is heavy going, and likely not to be that helpful to the nonspecialist. There is a welcome but short section on instrumentation and techniques. A large part of the work is devoted to kinetic and mechanistic organic radical chemistry as analyzed by CIDNP. There is a brief section on biomolecules at the end of the chapter. One shortcoming to this chapter is the lack of a statement of future prospects for the field in general. Of the ~270 references, 92 are from 1992 or later, and they include papers from journals that many libraries are not likely to have (*Z. Phys. Chem. Neue Folge*, for example).

“Photophysics of Gaseous Aromatic Molecules: Excess Vibrational Energy Dependence of Radiationless Processes” by E. C. Lim is probably the least “hot” chapter; of its ~90 references, only 5 are from 1992 or later (the most recent is 1995, unless one counts “unpublished results” as recent). Over twenty references are to the author’s own work. The chapter has theoretical sections that are reasonably clear. The Experimental Sections are particularly noteworthy in their emphasis on comparing predicted outcomes from theory to experiment. The concluding section is a good summary of progress and also points out what kind of studies are needed in the field.

“Lanthanide Complexes of Encapsulating Ligands as Luminescent Devices” by N. Sabbatini, M. Guardigli, and I. Manet is the chapter that has the most practical flavor. The initial introductory section on lanthanide luminescence is followed by a description of the bioanalytical uses of Eu(III) and Tb(III) complexes in immunoassay and DNA hybridization devices. The bulk of the chapter, however, surveys lanthanide complexes with macrocyclic ligands in terms of their absorption and emission properties in solution. The short, final “State of the Art” section correlates the basic photophysics of these inorganic complexes with their uses in devices, bringing the chapter full circle. Of the 120 references, 43 are from 1992 or later.

The final chapter is “Advances in the Measurement of Correlation in Photoproduct Motion” by C. G. Morgan, M. Drabbels, and A. M. Wodtke. This chapter is the one with the most physical chemistry flavor, and it is “hot” stuff; almost half of its ~200 references are from 1992 or later. After an excellent introduction, the emphasis is on new gas-phase measurements, including frequency modulation doppler spectroscopy, extraction time-of-flight and ion imaging methods, and neutral time-of-flight methods. The reactions given as examples range from acrylonitrile photolysis to ozone photodissociation. The descriptions of the various experimental setups and their principles of operation are very clear. The final “Future Outlook” section is excellent.

All in all, this volume of *Advances in Photochemistry* would be a valuable addition to any chemistry library. Besides an index to the current volume, it contains a cumulative index of topics in all 23 volumes of the series.

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