

Examples (drawn from the author's own experience) of compatible industrial complexes are given: pulp and paper mill; tannery; sugarcane; textile; fertilizer-cement; fossil fuel power plant; steel mill-fertilizer-cement; plastic; cement-lime and power plant; and lumber mill.

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Industrial Organic chemicals, by H.A. Wittcoff and B.C. Reuben, John Wiley, New York, NY, 1996, \$74.95, 531 pp. ISBN: 0-471-54036-6

The authors of this book come with a long list of other texts (and audio tape courses) published. Between them, Wittcoff and Reuben have published six texts and created two ACS topic courses over almost a 51-year period.

In the preface, the authors write: "In this book, our main objective is still to present the technology of the organic chemicals industry as an organized body of knowledge, so that both the neophyte and the experienced practitioner can see the broad picture. Nonetheless, we have expanded its new processes but many apparently that are significant because they scope to include not only less important reactions give rise to the more profitable specialty chemicals. The lesser volume chemicals have been clearly delineated as such, and the reader who wishes to see the industry on the basis of its large tonnage products can omit these sections". To that end, the authors have included the following:

- A survey of the organic chemicals industry that stresses economic and environmental factors and alternative reaction pathways
- A review of the seven basic raw materials derived from petroleum and natural gas
- A discussion of the latest processes and reactions, including metallocene catalysts, which yield more profitable specialty chemicals

The book has 16 chapters. Chapter 1 shows how the chemical industry fits into the overall economy and then defines the industry in terms of its characteristics. The following several chapters discuss chemicals (classes) from natural gas and petroleum and chemicals and polymers from ethylene, propylene and the C₄ stream, C₅ stream, benzene, toluene, xylenes, and chemicals from methane, alkanes and coal.

Next are chapters on classes of compounds, fats and oils, and carbohydrates. Two final chapters discuss how polymers are made and industrial catalysis.

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Basic Hazardous Waste Management, 2nd edn, by W.C. Blackman, Jr., Lewis, Boca Raton, FL, 1995, \$59.95, 397 pp. ISBN: 1-56670-168-6

To begin a book review, I page through a book reading chapter titles, glancing at tables and scanning photographs. In performing this task for *Basic Hazardous Waste*

Management, I was impressed by the large number of excellent photographs that cover a wide variety of topics from problem disposal sites to new treatment equipment. They add much to the text.

The book was written as an introductory course text using an overview format with copious references supplied for further reading. Topics for discussion are provided at the end of each chapter, but no quantitative problems are included.

The first seven chapters deal with conventional hazardous waste management practices and statutory and regulatory controls which have evolved around them. Chapters deal with the definition of hazardous waste, pathways, fates and disposition of hazardous waste, releases, toxicology, generators and transportation of waste.

Chapter 7, entitled "Treatment and disposal methods and processes", is where my interest lies. It, too, follows the pattern of previous chapters by beginning a topic with a discussion of generic practices or technology and following it with the regulatory requirements of RCRA. Indeed, this is one of the books' major strengths—an understandable but reasonably comprehensive guide to one of the most convoluted (and complex environmental laws on the books—RCRA. Unfortunately, space limitations preclude a satisfactory discussion (at least from my perspective) of the various waste treatment technologies; most were too perfunctory. Neutralization/precipitation received 1/3 page and solidification 1/2 page. Incineration fared a little better (four pages of text and two pages of diagrams) but not nearly enough to cover the topic well (viz. the potential emissions of incomplete combustion products is not mentioned).

"Hazardous waste minimization, reuse, and recycling" are discussed in Chapter 8. Included are discussions of both the Pollution Prevent Act of 1990 and RCRA's recycling regulations. While I found the chapter fairly complete, I would have liked a few more pertinent references. Missing was mention of Harry Freeman's classic hazardous book on waste minimization.

As I noted before, one of the strengths of this book is its clear explanation of RCRA regulations (or as clear as they can be to a non-legal mind). I also like the outline of objectives that begins each chapter as is illustrated by citing Chapter 9, "RCRA permits, compliance and enforcement".

"At completion of this chapter, the student should: understand the basic outline of the Resource Conservation and Recovery Act (RCRA) permitting process; be familiar with the four steps of the RCRA corrective action process and the application of each of the steps; understand the goals of the RCRA enforcement program and the actions which may be taken to achieve these goals; be familiar with the administrative, civil, and criminal enforcement provisions of RCRA."

The problem of old (contaminated) industrial and hazardous waste sites is discussed in the next two chapters. Site assessment is the topic of Chapter 10 (including environmental assessment procedures). A discussion of site remediation technologies follows in Chapter 11, which, although it contains the required list of clean-up processes, is necessarily brief (given that each process could well have a chapter devoted to it).

Up to now (in my reading) the book has dealt with the conventional topics, i.e. those discussed in other books on waste management practices including the one I reviewed recently by Wentz (*Hazardous Waste Management*). But Chapters 12–15, “Medical/biomedical/infectious waste management”, “Radioactive waste management”, “Underground storage tank management”, and “Hazardous waste worker health and safety”, add much to the text. Few other books treat these topics at all, or at all well. Since I am personally involved in the clean-up of a radioactively contaminated site, I reviewed Chapter 14, “Radioactive waste management”, with much interest. Although I would have (as I commonly do) liked more coverage of the topic, what was written was good and up-to-date and quite adequate from the text’s perspective.

In conclusion, I would like to commend the author for his efforts. Good topics, good material, comprehensive, well-written (easy to read style) and, most important, almost makes the laws governing hazardous waste understandable.

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Combustion and Incineration Processes: Applications in Environmental Engineering, 2nd edition, by W.R. Niessen, Marcel Dekker, New York, 1994, 680 pp. \$175.00. ISBN: 0-8247-9267-X

This book is an update of the author’s first edition that was published 15 years ago. Its focus, as was that of the earlier book, is on “the fundamentals of incineration and combustion processes rather than on specific equipment.”

Understandably, the 15-year period since the last book has resulted in a number of changes in this book. Among these changes is a focus on incinerator emissions and their removal. Another major focus change was on the combustion of municipal waste and the perplexing (regulatory) problem of the combustion of hazardous waste as regulated by RCRA. Thus, the section of the book dealing with techniques for waste data analysis and waste characterization has been expanded, reflecting the strong influence of waste composition on the incineration process and the increased regulatory attention paid to emissions of toxic, carcinogenic and otherwise environmentally significant trace elements found in wastes.

Not the least of the innovations was the inclusion of a computer disc “Spreadsheet Template for Heat Transfer and Material Balance Calculations.” The use of this program is discussed in Chapter 2, “Stoichiometry,” which is the fundamental basis on which the rest of the book is built.

Because I teach a course in air pollution control, I turned to Chapter 14 which deals with this topic to review the author’s treatment of air emissions. He did well, beginning with control of large particulates by settling chambers (a limited review suits the topic well) continuing through a discussion of cyclones and ending with scrubbers. Even dry scrubber injection technology for control of acid gasses is discussed.