tion company), I am far from an expert on the topic. However, I believe that I can recognize good writing and organization; this book has both.

The contributors have nicely balanced theory and practice. The theory is mathematically supported when required in depth while the practical material is well illustrated with diagrams and photographs of specific equipment.

My only criticism of the book involves the index that was less complete than I would have liked. Specifically, I went hunting for air pollution discussions. For NO_x, I found 11 citations, 1 of which refers to the theoretical of excess air on NO_x, but a section on low-NO_x burner technology (p. 581) was not referenced.

The above is a minor criticism (since to include all citations in the index would extend it infinitely), indeed, of a very good book that should make an excellent resource for both researchers and practitioners.

Gary F. Bennett *
Department of Chemical and Environmental Engineering, The University of Toledo, Mail Stop 305, Toledo, OH 43606-3390, USA

* Tel.: +1 419 531 1322; fax: +1 419 530 8086.
E-mail address: gbennett@eng.utoledo.edu

14 June 2005

Available online 17 November 2005

doi: 10.1016/j.jhazmat.2005.06.048

Fernando J. Beltran (Ed.), Ozone Reaction Kinetics for Water and Wastewater Systems, Lewis Publishers (a CRC Press Company), Boca Raton, FL, 2004, 384 pp., US$ 139.95, ISBN 1-56670-629-7.

Ozone, a powerful oxidant, is finding increased use as a disinfecting agent for water and wastewater. Although the cost of its use exceeds that of chlorine, it does not generate unwanted trihalomethanes (THMs). The book's author addresses the above concern but not in a chemical byproduct sense. Rather, the text is a study of the basic mechanisms that govern the ozonization process, and as such, will serve well as a basic theoretical text for courses on the topic.

The author has presented his material in 11 well-written chapters described as follows in the preface:

> "Chapter 1 presents a short history of naturally occurring ozone and explains electronic structure of the ozone molecule, which is responsible for ozone reactivity. Chapter 2 reviews the chemistry of ozone reaction in water by studying direct and indirect or free radical reaction types. Chapter 3 focuses on the kinetics of direct ozone reactions and explains that these studies can be developed through experimental homogeneous and heterogeneous reactions. Chapters 4 and 5 continue with studies on direct ozone reaction kinetics, but they deal exclusively with heterogeneous gas–liquid reaction kinetics, which represents the way in which ozone is applied in water and wastewater treatment—that is, in gas form."

In Chapter 5, as well as in other places in the text, Beltran conveys his information in extensive tables that concisely cite the literature on the topic.

Chapter 6, the preface notes:

> ". . . focuses on wastewater ozonization reactions, including classification of wastewater according to its reactivity with ozone, characterizing parameters, the importance of pH, and the influence of ozonization on biological processes. Chapter 6 also addresses the kinetics of wastewater ozone reactions and provides insight into experimental studies in this field."

> "Chapters 7 through 9 examine the kinetics of indirect ozone reactions that can also be considered advanced oxidation reactions involving ozone: ozone alone and ozone combined with hydrogen peroxide and UV radiation . . .. Chapter 8 explains the kinetic study of ozone–hydrogen peroxide processes, including those aspects related to the rate constant determination, kinetic regimes, and competition with direct ozone reactions. Chapter 9 focuses on the UV radiation/ozone processes: the direct photolytic and UV radiation/hydrogen peroxide processes."

> "Chapter 10 discusses the art of heterogeneous catalytic ozonization . . .. Chapter 11 presents the kinetic modeling of ozone reactions, beginning with a detailed classification of possible ozone kinetic modeling based on different kinetic regimes of ozone absorption."

The book is a detailed technical review of the extensive literature available on this topic, much of which was written by Beltran himself (the preface notes that he has published over 100 papers in a wide variety of peer-reviewed journals, including this journal for which he reviewed papers on the topic).

In summary, perhaps the back cover of this book describes the coverage best:

> "Ozone Reaction Kinetics for Water and Wastewater Systems analyzes the ozonization kinetics of compounds in water, specifically the kinetics of organic compounds that are usually considered to be pollutants. Grouping together a wide array of kinetic ozone information, this general overview discusses absorption and solubility of ozone, stability and decomposition, reactivity, and reactor modelling . . .."

Gary F. Bennett *
Department of Chemical and Environmental Engineering, University of Toledo, Mail Stop 305, Toledo, OH 43606-3390, USA

* Tel.: +1 419 531 1322; fax: +1 419 530 8086.
E-mail address: gbennett@eng.utoledo.edu

14 June 2005

Available online 17 November 2005

doi: 10.1016/j.jhazmat.2005.06.049