

pressure, diffusivities, gas–liquid and gas–solid equilibria, and chemical reactions (kinetics and thermodynamics). VOC control by incineration, gas adsorption, gas absorption, and biofiltration are the subjects of the next three chapters. As noted, the chapter on biofiltration was added to this edition. Control of sulfur oxides and nitrogen oxides are the topics of the next two chapters. These chapters clearly have been updated as evidenced by the recent reference citations. As with particulates, a control problem (this time for vapors) follows the gas control section.

A chapter on mobile sources is followed by an extensive chapter on air pollution meteorology and one on atmospheric dispersion modeling. The book ends with a chapter on indoor air quality control.

Each chapter contains problems to be worked by students. A new addition is found in the appendix: practice problems (with solutions) in air quality for the P.E. examination in environmental engineering. Solutions and tips to be considered are given.

To say the least, I am enamored by this book. It is one of the best text books I have ever utilized and like, good wine, it improves with age.

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### **Hazardous Air Pollutant Handbook: Measurements, Properties, and Fate in Ambient Air**

Chester W. Spicer, Sydney M. Gordon, Michael W. Holdren, Thomas J. Kelly, R. Mukund, 2002, Lewis Publishers, Boca Raton, FL, 240 pp. US\$129.95

The term “toxic air pollutant” has evolved in the United States in both the legislative and regulatory processes. The term “Hazardous Air Pollutant (HAP)” appeared in the U.S. Clean Air Act of 1970. It represents a group of 188 air pollutants capable of causing adverse health effects.

“This book represents the consolidation of a series of studies conducted by the authors to support the EPA’s mission of understanding and quantifying the health risks from HAPs. The studies were focused on the various aspects of the presence of HAPs in ambient air, and addressed chemical and physical properties, currently available measurement methods, the current database of information on the measured ambient concentrations of HAPs in urban areas of the U.S., and our current understanding of the atmospheric transformation products and lifetimes of the HAPs. In contrast to other published handbooks and reference literature on the HAPs, this book is focused on presenting the current state of information on the presence of the HAPs in ambient air, as distinct from information on HAPs emission sources, emission measurement methods, control technology and regulatory initiatives and policy. The purpose of this book is to provide readers with a convenient compilation of the information currently available, enabling them to assess the risks posed by HAPs in ambient air, to conduct qualitative comparisons between measured ambient levels of HAPs at specific sites, to guide in understanding the basic chemical and physical properties of the HAPs, and to identify critical research needs at this juncture.”

“This book begins (Chapter 2, Classification and Basic Properties) with a grouping of the HAPs into classes of compounds. Following the division of the 188 HAPs into organic

and inorganic compounds, vapor pressure (VP, mm Hg at 250 °C), boiling point (or melting point), and water solubility (at 250 °C) data are presented for all HAPs. Vapor pressure data are used to categorize the 188 HAPs, using quantitative (but subjective) VP criteria to define very volatile, volatile, semivolatile, and nonvolatile compounds.

Chapter 3, Measurement Methods, surveys the current status of ambient measurements methods for the 188 HAPs in Title III of the Clean Air Act Amendments. Measurement methods for the HAPs are identified by reviews of established methods and by literature searches for pertinent research techniques. Methods are segregated by their degree of development into applicable, likely, and potential methods. This survey includes more than 300 methods, applicable to one or more RAPs, in varying stages of method development. The results of the methods survey are tabulated for each of the 188 RAPs, and recommendations for method development initiatives are included.

Chapter 4, Ambient Air Concentrations, presents the results of surveys of ambient air concentrations of the 188 HAPs, illustrating what information is currently available and what is lacking for assessing the public health risks from these RAPs. The ambient concentration survey consists of an extensive table that lists for each HAP the locations, dates, number of samples, means (or medians), and ranges of ambient concentrations, along with citations to the pertinent literature. Comments on the sampling and the number of nondetects reported in ambient samples are also included in the table.

Chapter 5 reviews the methods used to study atmospheric transformation of toxic air pollutants and discusses the concept of atmospheric lifetime of chemicals. It then presents the results of a literature survey on the transformation products, lifetimes and removal pathways for the HAPs, a survey that resulted in 190 literature citations relating to RAP transformations. The chapter concludes with a discussion of gaps in our knowledge of HAP transformation, and recommends that additional information be gathered on the transformation products and removal rates of certain RAPs.”

An extensive Appendix entitled “Summary of Hazardous Air Pollutant Transformations and Lifetimes” follows Chapter 5. It is a 30-page summary of (1) Compound and CAS Number, (2) Chemical Formula/Structure, (3) Major Removal Processes, (4) Reported Atmospheric Lifetimes, and (5) Transformation Products.

As advertised, the book will indeed serve the needs of a broad range of professionals responsible for emission monitoring, risk assessment, and permitting and compliance duties.