Michael E. Essington (Ed.), Soil and Water Chemistry: An Integrative Approach, CRC Press, Boca Raton, FL, 2004, 550 pp., US$ 69.95, ISBN 0-8493-1258-2.

This book was written as a text for both undergraduate and early graduate students. It is the outgrowth of a course offered by the author; this course was required at the University of Tennessee, Knoxville, for environmental and soil science majors.

Essington, in his preface, describes the book's content well:

"This textbook begins with an overview of the soil environment and the chemical processes that operate to distribute matter between the soil solid, solution, and atmosphere. Next comes a discussion of the concept of speciation, the concept of spatial variability and spatial statistics."

"Chapters 2, 3, and 4 are devoted to the soil solids. Chapter 2, 'Soil Minerals,' begins by discussing the 'glue' that bonds atoms together in mineral structures and the rules that describe how these atoms are arranged in three-dimensional space (Pauling's rules). The remainder of the chapter describes the silicates, emphasizing the phyllosilicates, and the hydrous metal oxides. Finally, X-ray diffraction and its application to identifying clay minerals are discussed. Chapter 3, 'Chemical Weathering,' focuses on clay mineral transformations. This chapter also (re)introduces a very important capability that must be mastered by any individual in a chemistry-based course or discipline: balancing chemical reactions. Chapter 4, 'Organic Matter in Soil,' examines the organic component of the soil solid phase. The reader is (re)introduced to the organic functional groups and structural components that occur in soil organic matter. The distinction between non-humic and humic substances is drawn, as well as the mechanisms for isolating humic substances. The non-humic substances are described, as are their transformations from biomolecules to humic substances. The chemical and (pseudo)structural characteristics of the humic substances are also discussed."

Chapter 5 "... begins by discussing chemical characteristics of water, the universal solvent, and ends by examining some important analytical methods used to determine the concentrations of dissolved substances in soil solutions." The author notes that this material, by itself, constitutes a course in water chemistry.

"Chapters 6, 7, and 8 examine the processes that distribute matter between the soil and solution phases. In Chapter 6, 'Mineral Solubility,' the soil solid and solution characteristics that control the precipitation and dissolution of mineral chemicals are examined." Chapter 7, "Surface Chemistry and Adsorption Reactions," is also a very long chapter as it discusses adsorption and partitioning reactions which are the principal mechanisms by which all organic solutes and many inorganic substances are retained in soils. Chapter 8, "Cation Exchange," "... focuses on the history, methods of characterizing the soil's capacity to exchange cations, the quantitative characteristics of cation exchange, and the techniques to quantify exchange behavior."

Oxidation–reduction processes in soils are examined in Chapter 9. The final two chapters (10 and 11) treat topics of regional interest. They are entitled "Acidity in Soil Materials" and "Soil Salinity and Sodicity."

Each chapter concludes with a section containing numerous exercises, all of which have been utilized by the author in his classes.

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Lawrence K. Wang, Norman C. Pereira, Yung-Tse Hung (Eds.), Advanced Air and Noise Pollution Control (Handbook of Environmental Engineering, vol. 2), The Humana Press, Totowa, NJ, 2005, 544 pp., US$ 175.00, ISBN 1-59259-779-3.

This is the second book in the series of *Environmental Handbooks* authored by Wang and his collaborators. I have previously reviewed the other two books. Like those other two efforts, this book is excellent.

The editors note in the preface that "This volume of *Advanced Air and Noise Pollution Control*, a companion to the volume, *Air Pollution Control Engineering*, has been designed to serve as a basic air pollution control design textbook as well as a comprehensive reference book." Together, these two books are a comprehensive treatise on the topic, with the first volume focusing on the "fundamentals of air pollution control" such as fabric filtration, cyclones, ESPs, etc. This volume treats more advanced air pollution topics such as control of NOx from stationary combustion sources, control of heavy metals and odor. Also discussed are the control and cooling of thermal discharges. There are also other chapters on a variety of related topics that include indoor pollution control, radon pollution control, and noise pollution and its control.

I was particularly appreciative of Wang's technique in the chapters he authored himself of including sample problems and the calculations attendant thereto. Unfortunately, he was almost the only author to do so.

There is a chapter on carbon sequestration. The authors, Robert Kane and Daniel Kline, discuss CO_2 separation, cap-

ture, and storage. Given the worldwide interest in global warming, this is a "forward-looking chapter."

One other chapter of note was written by Wang et al. and entitled "Performance and Costs of Air Pollution Control Technologies." It is resplendent with cost data for purposes of estimating air pollution control equipment capital and operating costs.

In summary, I find this to be a good book which could be used to supplement the other air pollution control engineering book in this series (Volume 1 in the series).

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