
Alfred R. Conklin, Jr.

Reviewed by Sanjai J. Parikh*

The second edition of "Introduction to Soil Chemistry: Analysis and Instrumentation," by Alfred R. Conklin, Jr. is revised to include four new chapters and some chapter reorganization from the first edition. In this updated text, Conklin brings his strong chemistry background and experience with soil analysis to provide a unique view of soil chemistry and the approaches for analysis. While a number of other texts exist on the subject of soil chemistry (e.g., Essington, 2004; Sparks, 2003; Sposito, 2008) and methods for soil chemical analysis (e.g., Klute, 1986; Sparks, 1996), Conklin's presentation is novel in bringing both of these aspects together. Another key difference with this text is the author's intention for it to primarily serve as a reference for chemists and environmental scientists, although soil scientists will likely find it highly interesting and useful for aiding in selection of an analysis approach.

The book can be divided into two primary sections, with the first six chapters providing an introduction to soil chemistry and the final nine chapters addressing soil analysis. The strength of the book is in the first portion, where Conklin provides a chemist's interpretation of the basics of soil science. Here, the text gives a fairly comprehensive overview of the subject matter, starting from the fundamentals, by integrating chemical concepts in a clear and concise manner. For example, soil mineralogy is presented with mineral structures showing electron orbitals, and soil organic matter is discussed in terms of its various organic functional groups. These explanations will be very helpful to a diverse group of students and scientists looking to further their understanding of these concepts. Additionally, the problem sets at the end of each chapter would make this book a particularly useful companion text for teaching a course on the subject.

New in this edition are chapters on 1) the history of soil chemistry (Ch. 1), 2) soil sampling, transport, and storage (Ch. 7), 3) direct (X-ray, spectroscopic, NMR) and indirect (pH, Eh, chromatographic) methods of soil analysis (Ch. 8), and 4) hyphenated analytical methods (e.g., GC-MS, HPLC-MS, ICP-MS) for soil analysis (Ch. 15). Chapter one is a fascinating summary of the history of soil chemistry, providing a brief and comprehensive review of the major analytical developments in the field from 1800 to the present. This chapter is a very enjoyable read and provides important historical context for the research being conducted in the field today. Chapter seven gives a quick overview of soil sampling considerations (i.e., grab, point, nonpoint) and methods (i.e., transect, grid) for field sampling. This chapter also addresses the basics of soil solution sampling and soil sample preparation for laboratory analysis. Chapters 8 and 15 follow the approach for most of the chapters in the second half of the book, giving brief explanations of analytical techniques – usually without specific details necessary for conducting these analyses. This is therefore understandable, as some of these analytical approaches (e.g., mass spectrometry, magnetic resonance) are disciplines in themselves and condensing them for soil chemical analysis is not possible, nor necessary for an introductory text. Chapters 11 (Extraction of Inorganics) and 12 (Extractions of Organics) do give succinct summaries of procedures with some specific parameters; however, it would still be prudent to refer to more comprehensive methods before conducting these extractions. Although methods are not given in detail throughout the text, references are typically provided for obtaining this information, thus making this book a good starting point for those looking to analyze soils.

This book is a welcome addition to the various texts written for soil chemistry, and finds its own niche as a resource for scientists interested in general information on soil analysis. The scope of the book is very ambitious and therefore the level of detail on theoretical explanations and methods of analysis is often very limited; however, Conklin demonstrates an appreciation for the complexity of soil that will be of great value for scientists who have limited exposure with the unique challenges of analyzing soil. This book should be considered as a resource for educators and students in soil and environmental chemistry courses, particularly those with a laboratory component. Professionals in related fields will likely appreciate the breadth of this book in highlighting the multitude of possible approaches for analyzing soils while explaining some of the fundamental concepts of soil chemistry.

REFERENCES

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doi:10.2136/sssaj2014.0002br
Received 23 July, 2014.
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