Canadian Mineralogist
Vol. 25, pp. 794-795 (1987)

BOOK REVIEWS

Geology of Sedimentary Phosphates. By Maurice Slansky. Elsevier, Oxford, England, 1986, 205 pages. US$45.00.

Slanskys' *Geology of Sedimentary Phosphates* is a comprehensive volume discussing the nature, occurrence and uses of this particular mineral family. Originally written in French, the translation by Peter Cooper is very readable. Well-organized topics include an overview of phosphorus in nature followed by chapters dealing with the mineralogy, petrography, chemistry, sedimentology, exploration techniques, and industrial applications of phosphate minerals. The bulk of the text deals with the sedimentological aspects, describing the aqueous chemistry and biological interactions of phosphate formation as well as diagenetic processes. The occurrence of syn- and epigenetic economic accumulations are also discussed and examples of world-class deposits are described.

The chapters dealing with the chemistry and mineralogy are succinct and provide useful and up-to-date information on the composition and behavior of the sedimentary phosphate species. The chapter on petrography is very detailed and would be a valuable reference for any mineralogy or sedimentary petrography course. It suffers, however, from poor-quality photographic plates. In contrast, the quality and readability of the figures, tables, and maps are excellent.

The apparent emphasis of this book on the economic occurrences and aspects of phosphatic deposits may mislead some readers. This volume provides valuable information not only for economic geologists working with sediment-hosted deposits, but also for sedimentologists and sedimentary geochemists as well. The chemical aspects of low-temperature phosphate mineral formation, especially the organic–inorganic interface, are well presented and pertinent to diagenetic studies in a wide spectrum of depositional environments. Over 400 references provide access to more extensive treatment of specific topics. At about $60.00, this book might be considered a reasonable expense by many who deal with sedimentary rocks on a regular basis. It is a handy and very complete source of information for this group of commonly occurring sedimentary minerals.

John D. Bloch
University of Calgary

Mineral Powder Diffraction File, vol. 1 Data Book and vol. 2 Search Manual. By Peter Bayliss, Dick C. Erd, Mary E. Mrose, Ann P. Sabina, and Deane K. Smith. JCPDS International Centre for Diffraction Data, Swarthmore, Pennsylvania, 1986, 1396 pages and 467 pages. $550.00 (US) per set.

This edition of the Mineral File (previous editions were published in 1974 and 1980) contains data on 2700 species represented by 3400 patterns. Since 1980, 850 patterns have been added; however, coverage of data published in 1984/85 is somewhat uneven. For this period, the majority of new patterns represent minerals for which data for the synthetic phases had been published prior to I.M.A. approval of the species. Annual updates giving additions and corrections to the Mineral File continue to be published in the Powder Diffraction File.

This edition has been compiled on computer, and the crystallographic data have been evaluated using the computer program NBS*AIDS83. In addition to indexing the data, the program calculates a figure of merit (F_N) with which the user can quickly evaluate the quality of the data. Unfortunately, as the program is not equipped to deal with two-dimensional structures, the cell refinement and indexing of the patterns of smectite-group minerals is incorrect.

The quality of presentation is excellent; the introductory sections are well-written and extremely informative, and the data cards are easy to read. The data cards now contain up to fifty diffraction reflections (where available) and Pearson symbol codes (PSC) to aid in the identification of isostructural minerals. More information on type locality and description, and further references have also been provided.

There is some difficulty in locating hyphenated mineral names as hyphenated words are pulled from normal alphabetical sequence and are alphabetized as a group before "a". For example, magnesioriebeckite immediately precedes magnesioaxinite in the listing. This can be especially confusing when cross-referencing to a publication which does not use I.M.A.-accepted spelling of mineral names. As well, two minor inconsistencies in data presentation were observed: (1) *hkl* values which have been altered from the original reference are indicated by "c" or "[]", and both symbols are used in some patterns; and (2) the journal title *"Zapiski Uzbekistanskogo otdeleniia Vsesoiuznogo mineralogicheskogo obshchestva"* has been abreviated as *"Zap. Vses. Mineral. Obschch."* and as *"Zap. Vses. Mineral. O-va."* which is actually a different journal.

The Mineral File is essential for all geology libraries, especially, but not exclusively for any X-ray diffraction work.

Kimberley J. Freeman
University of Calgary

Mindex-87. Compilation of recent X-ray powder diffraction data for minerals. By E.H. Nickel and B.W. Robinson. CSIRO, Division of Minerals and Geochemistry, Perth, Australia, 1987, 18 pages.

This book contains powder-diffraction data for 300 minerals not included in the 1986 edition of the *Mineral File.* Most of these minerals have just recently been approved by the I.M.A.. The information is presented as: an alphabetical listing providing mineral name, chemical formula, five to nine strongest reflections in descending order of intensity and references to the source of the data; and, a numerical search manual of X-ray reflections organized similarly to the Hanawalt search manual of the *Mineral File.*

The type is in very small pitch and difficult to read, and the data in the numerical search manual are single-spaced whereas at least 1½ spacing is required. The mineral names and chemical formulae in the search manual are terminated randomly, due to space restrictions, in the attempt to get up to nine reflections printed per line. Frequently the last letter of the mineral name appears to be part of the formula.

MINDEX is published annually, and the quality and currency of the data make it a valuable supplement to the *Mineral File* and a useful addition to mineralogical reference collections.

Kimberley J. Freeman
University of Calgary

A Handbook of Determinative Methods in Clay Mineralogy. Edited by M.J. Wilson. Blackie & Son Ltd., Glasgow, Scotland, 1987, 320 pages. CND $86.00, £40.00 (hard back).

This book is touted by the editor to be an "introductory text covering the practical aspects of the main investigative methods in clay research" as well as a guide to those who deal with clay mineralogy for a living, so to speak. It is organized into nine chapters, six of which deal with X-ray diffraction, thermal analysis, infrared methods, scanning electron microscopy, transmission electron microscopy, and chemical analysis. The remaining chapters discuss clays in general, as an introduction, a closing overview on determinative methods, and a discussion of chemical methods for the determination of poorly ordered minerals. With one exception, all the contributing authors are associated with the Macaulay Institute in Aberdeen.

This volume is a long overdue attempt to provide one comprehensive reference describing analytical techniques particular to clay mineralogy and to provide the reader with practical solutions to some complicated analytical problems encountered in the analysis of clay minerals. Although it is generally a well-crafted attempt, it is not entirely successful.

The major problem with this volume is that it consistently references other sources for critical aspects of clay analysis. For example, the section on oriented sample preparation for XRD analysis is less than four pages in length and refers the reader, for detailed treatment on the subject, to a *proposed* USGS Open File Report. A subsequent chapter stresses the importance of sample preparation as a critical aspect of analysis. Stokes' Law cannot be found in the index. On an introductory level, these types of omissions are a major oversight.

On the positive side, the chapter on chemical analysis provides detailed information on the treatment of samples for removal of amorphous and adsorbed material, and for quantitative analysis. Chapters dealing with SEM, TEM, IR, and thermal analysis are well-presented and provide concise, practical means of specific mineral identification. These chapters, as well as the one on XRD methods, also contain a section or sections on instrumentation that introduces the reader to the principles of the particular technique and the types of equipment that are currently available. The section dealing with energy dispersive spectrometry, in conjunction with SEM, is especially well-done.

For the clay mineralogist, most of the information in this volume may be redundant. It is, for the most part, an abridged, but adequate successor to *Methods of Soil Analysis* (now out of print), despite the previously mentioned flaws. It is not intended to be a replacement, but better a supplement, with an updated bibliography (with approximately 500 references). This is especially true of the chapter on TEM.

For those new to or only occasionally involved in clay mineral analysis, this book provides insights into the methods and problems one may encounter, and some practical information on the preparation and identification of specific clay species. The price of CDN $86.00 is pretty steep but may be a justifiable expense for those individuals or libraries that don't have an established collection in this particular field. Providing the equivalent information from a wide variety of existing volumes would probably cost a lot more.

John D. Bloch
University of Calgary