

BOOK REVIEWS

Smith, J. V. and Brown, W. L. *Feldspar Minerals: 1. Crystal Structures, Physical, Chemical, and Microtextural Properties*. 2nd Edition. Berlin, Heidelberg and New York (Springer-Verlag), 1988. xviii + 828 pp., 352 figs. Price DM360.00.

When I was asked to review this book I accepted the offer without considering how it could be done. It is virtually impossible to do justice to a book of this scholarship and magnitude in the space available, and instead of writing about the book I have been so engrossed in reading it that I have not produced the review as quickly as I ought to have done. In consequence I have selected only a few aspects to discuss.

It is described as a Second Revised and Extended Edition of volumes 1 and 2 of 'Feldspar Minerals' by J. V. Smith, published in 1974. In his review of volume 1 of the First Edition, J. Zussman remarked that J. V. Smith had emphasized where there are likely to be fruitful fields for further research and he continued 'One should not assume that because of the colossal task of producing and updating these volumes, Joe Smith will not be among the fruit pickers'. In fact, not only has he been one of the active fruit pickers but here is a completely new book in which the whole of the text has been rewritten with the collaboration of W. L. Brown.

As students, some of us had to sell the third edition of a well-known mineralogy text-book to finance the purchase of the fourth edition but it would be unwise to do this with 'Feldspar Minerals' because the second edition has not rendered the first edition out of date. Instead frequent references to the first edition have been made throughout the text in order to avoid repetition of much valuable and explanatory material. In this way it has been possible to consider all the studies on feldspars since 1973 in addition to condensing 1315 pages in the first edition (2 volumes) to a total of 828 pages in this one volume. A saving in space has been made by collecting all the references at the end of the volume so that it has not been necessary to reproduce a reference title more than once and each reference is identified by the author's name in bold type without the necessity of beginning a new line. The result is the most impressive reference list ever assembled containing in my estimate, about 5500 references.

The work is divided into twenty chapters and these retain titles which are either the same or very similar to those in the first edition. Ten chapters have been completely rewritten by J. V. Smith and ten have been written by W. L. Brown. The first two chapters written by Brown are 6 and 7 and together they occupy 63 pages whereas in the first edition the content of these chapters occupied 176 pages. This has been made possible by omitting details of the X-ray oscillation technique from the section on X-ray diffraction. Cell dimensions of ion-exchanged feldspars published in tables in the first edition have been omitted. The new data by Goldsmith and Jenkins (1985) on equilibrium order in high and low albites are published here but the equivalent data on microcline appeared just after the publication of this volume and so are not included.

The chapters on light optics introduces new data, e.g. charts of extinction angle variations in high- and low-temperature plagioclases as a function of An content and curves showing variations in 2V and ordering with composition for the alkali feldspars. However, the authors do not elaborate on the use of these data and the reader is recommended to consult the original papers.

The chapter on chemical properties of the feldspars occupies about the same number of pages as the first edition, but it contains many new data. In the introduction to this chapter J. V. Smith tells us that it is impractical to copy the many thousands of analyses which have been published since 1973, so that the tables of data have been omitted and we are referred to the original publications. This section has a large number of completely new diagrams in which are plotted the percentages of various oxides against feldspar components for both alkali and plagioclase feldspars. Fe₂O₃ and MgO are plotted against Or and Ab contents for (a) terrestrial volcanics and (b) plutonic and metamorphic rocks; FeO and MgO are used in the case of (c) meteorites and (d) fine-grained lunar rocks. Other elements considered in some detail are Ti, Li, Rb, Sr, Ba, and Pb. Diagrams showing ratios of elements against feldspar components such as Ca/Ba, Ba/Sr and Rb/Sr have not been produced in this edition.

The longest chapter is chapter 17 and it is about the same length as in the first edition but there is very little repetition of the contents, and we

are advised to consult the first edition for earlier information of zoning, crystal morphology and habit. The main reason for the large amount of new data in this sphere is due in large measure to the impetus of the Apollo project. There is no doubt but that the experimental study of growth of feldspars and rock-forming minerals in general received a great stimulus because of the textures found in the lunar rocks, and experiments designed to try to explain the significance of these textures have been rewarding. The finding of lamellar intergrowth of two feldspars in laboratory experiments was perhaps necessary before some petrographers could believe that this texture could be produced by some process other than exsolution.

The penultimate chapter on 'Intimate feldspar intergrowths' has been updated considerably because of the increasing use of electron microscopy in studying perthites. It is surprising that there is not much new data on antiperthites available yet.

I was asked recently to name a few text books which could be used as models of the English language in its written form in my special subject. The criteria for inclusion in this list of books were:

- (1) the text should be influential
- (2) the text should be frequently used as a prescribed text in educational establishment
- (3) the text should be fairly typical of the kind of language used in the particular field of study—in this case mineralogy.

I had no hesitation whatever in recommending that this book should be included in the list.

J. V. Smith has a fairly distinctive style of writing and he has never been afraid of expressing his opinions on the basis of the information available to him. W. L. Brown has been closely involved with J. V. Smith for many years and he has adopted a not dissimilar style of writing, so that it would be difficult to detect which author had written each chapter if we had not been told. This results in a book which is of a very high standard throughout and the authors are to be congratulated on the final result.

It is not the fault of the authors that the cost of the book is going to put it out of the reach of many individual research workers and he or she must hope that the library copy will not be missing from the shelf because everybody interested in feldspars will have to consult this work from time to time. As this review is in press the number of cards in J. V. Smith's filing system must be increasing steadily. From references in chapter 19 to chapters 23–25 we have some inkling of what is in store in volume 2 which is currently being

written by J. V. Smith, W. L. Brown and I. Parsons. We look forward to this next volume and have no doubt that it will maintain the high standards set by volume 1: in addition to being completely authoritative, it is a very readable monograph.

W. S. MACKENZIE

Hyde, B. G. and Andersson, S. *Inorganic Crystal Structures*. Chichester, New York and Toronto (John Wiley and Sons), 1989. xviii + 430 pp. Price £41.55.

This is a very valuable monograph that covers many members of that subgroup of inorganic crystal structures that can be related to simple polyhedra, especially tetrahedra and octahedra. Approximately 1000 chemical compositions are listed in the formula index, and just under 200 minerals in the subject index. The monograph is very comprehensive in the types of condensed materials in which A. D. Wadsley and his associates rightly made their reputations. The authors have fitted together a wide range of metals, insulators and semiconductors into their comprehensive theoretical schemes. Indeed there are approximately 420 figures (most of which are schematic projections), about 190 tables (most of which record crystallographic data), and about 530 references (mostly to the primary crystal-structure papers). Of course, the old chestnuts are present, but many new structural relationships are presented, including ones involving complex structures. The monograph is a mine of information that one can plumb for many happy days. Some readers may need a magnifying glass to read information that goes below the desirable limit of 1 mm: indeed, most of the figures would benefit from a larger scale and a more generous size of page. I shall be indebted to Drs Hyde and Andersson for being able to spot new structures that will provide suitable questions for the final examination in a course in crystallography. The proof-reading is excellent, and only a few errors were spotted: e.g. three not four systems in Figure 3, dachiardite not dachiderite in the Subject Index and on p. 408.

Having admired so much in this monograph, it seems churlish to carp. First, coordination polyhedra are very useful for the description of many structures, but other representations (sphere packings, bond linkages, nets) are better in my opinion for many inorganic structures. The present monograph is a bit claustrophobic. Second, not all the classic literature is listed; e.g. Pearson's magnificent handbook on metals and alloys is not listed except for the trivial mention on p. 215.