BOOK REVIEWS

Anthony, J. W., Bideaux, R. A., Bladh, K. W. and Nichols, M. C. *Handbook of Mineralogy: Volume II: Silica and Silicates.* Tucson (Mineral Data Publishing), 1995 (ISBN 0-9622-0971-6). xvi + 904 pp. Price $135.00 (+ $7.50 shipping and handling). Available from P.O.Box 37072, Tucson, Arizon 85740, USA.

This second volume in the proposed five-volume series is bound in two parts, each of 460 pages, and gives critical data on 904 silicates and silica minerals, all the silicate mineral species known and described as of 31 August, 1994. As in the previous volume on *Elements, Sulfides, Sulfosalts* (*Mineral. Mag.*, **55**, 146.) each species is given a one-page description, which includes the name and idealized chemical formula, crystal system, point group, habit, twinning, cleavage, fracture, tenacity, hardness (both Mohs and VHN) and density. The optical properties listed include colour, lustre, optic sign, refractive indices, pleochroism, etc., and the unit cell data given are the space group, cell dimensions, cell contents and the seven strongest lines of the XRD powder pattern. Up to three chemical analyses are quoted, together with empirical formulae and polytypes, and there is a brief statement on the type of geological occurrence, associated minerals and a few prominent localities. Finally the source of the name and up to eight references are listed.

This work is thus an extremely comprehensive data source. The authors plan a complete coverage of the mineral kingdom in five volumes, and this compilation on the silicates alone represents an immense project. At first glance, a reader may be surprised at the one-species-to-a-page approach: e.g. on facing pages we get orthoclase and orthoericsso-nite, or phlogopite and phosinaite, i.e. the common silicates get no more and no less coverage than relatively rare species. This is not a text to read, but rather an extremely valuable compilation of the fundamental data and sufficient references to allow further investigation. With the number of species covered, division into two separately bound parts was clearly sensible, but having checked on a particular species one is always finding that the related species one wants to look up is in the other part.

My one serious criticsm is that there is no index. At first sight, since the work is arranged alpabetically from abswurmbachite to zussmanite, this might not seem neccessary but one needs to know that it is no good looking for tourmaline or garnet — one must look up the individual species such as elbaite or grossular, though hydrogrossular is mentioned only under hibschite, and while schorlomite has an entry melanite does not. It seems a pity that melilite is not covered, åkermanite and gehlenite being dealt with, but not the commoner intermediate member of the series.

In this format, there is, of course, no room for diagrams or illustrations, but as an auxiliary aid a diagrammatic classification of the amphiboles is included at the beginning of Part 1, in an attempt to clarify the 'labyrinthine' nomenclature of this complex group.

This volume covers some 900 silicate species, whereas less than 300 were described in the sixth edition of *Dana's System* (published in 1892 with later appendices up to 1915), so this outstanding compilation will be widely welcomed. The typography is clear, the data are up-to-date and there appear to be almost no errors. The authors are to be congratulated on getting their teeth into what must surely be the largest of their projected five volumes. When this series is complete (and a promise is made to keep all volumes in print until the fifth and last has appeared), it will surely be an indispensable work for all mineralogists to have available. The price is very reasonable for the size and for the standard of the production and this should help to make it available in all earth science libraries and on the personal shelves of working mineralogists. It is a data set or reference work rather than a text, but the authors have chosen a worthwhile way of producing an authoritative modern version which could well replace Dana's great work. R. A. HOWIE

Parsons, I., Ed. *Feldspars and Their Reactions.* Dordrecht, Boston and London (Kluwer Academic Publishers), 1994. xxx + 650 pp. Price Dfl 390, £145, $223. ISBN 0 7923 2722 5.

This is the fourth of the NATO-sponsored volumes on feldspars, being the proceedings of the Advanced Study Institute held in Edinburgh in 1993. It consists of 15 invited chapters by authorities in their individual fields. Unlike the three previous proceedings, which were largely concerned with intracrystalline reactions, this volume also deals at length with reactions between feldspars and between feldspars

and other phases (including melts, solutions and gases).

The first two chapters (Ribbe, and Blashi and Blashi) are concerned with aspects of crystal structure, site occupancy and cell parameters and their determination, while Chapter 3 (Salje) details the information that can be gained from vibrational spectroscopy about phase transitions and the degree of Al/Si order. A considerable portion of this chapter is devoted to the theoretical background of the technique.

Chapter 4 (Koepke and Behrens) describes new experiments on the partial melting of plagioclase, while Chapter 5 (Nekvasil) is a review of the equilbrium between ternary feldspars and melts. A possible subsolidus phase diagram for the plagioclases is presented in Chapter 6 (Carpenter) and the lines of investigation that have led to it are described in detail. Phase transitions at high pressure are the subject of Chapter 7 (Angel).

After a review of recent work on oscillatory zoning in plagioclase (Pearce), there are three chapters concerned with diffusion of oxygen, strontium and other cations (Giletti) and argon (Foland) in feldspars and on the role of hydrogen in promoting reactions (Graham and Elphick). The next two chapters delve into petrology: the first on the important role that feldspars play in igneous rocks (Brown and Parsons) and the second on the evolution of feldspars in granite pegmatites (Černý).

In the penultimate chapter, the various techniques that can be used to investigate the surfaces of minerals (both internal and external) are described briefly (Smith). As little work has yet been carried out on feldspars, many of the examples are from related structures such as clays and zeolites. Finally, there is a chapter that deals with the weathering of feldspars, both in nature and in the laboratory (Blum).

Overall, considering that this book is multi-authored and that it must have been produced to a tight time-scale, the standard of writing and editing is very high. There is some overlap in content, most notably in Chapters 9 and 10, but generally the cross-referencing from one chapter to another is good, although there is reference to a non-existent chapter on p. 522! It would have been easier to read the book if a standard set of symbols had been used, e.g. in the chapters that deal with thermodynamics. Most contributions are suitably illustrated (the exception being Chapter 14, which has only four figures), but the standard of reproduction of the diagrams is variable. One, on p. 166, is missing its caption and there is a discrepancy concerning temperature and pressure between the caption and the diagram in Fig. 2 on p. 200. Each chapter has its own reference list and there is an extensive subject index at the back of the book. There are few typographical errors.

Because of its comprehensive coverage and the fact that it contains summaries of the latest research, this book will be essential reading for the hardened 'feldspathologist', whether a mineralogist, petrographer or geochemist, and for anyone entering the fascinating and enigmatic world of feldspars for the first time. It is expensive for individuals, but it should be widely recommended for library purchase.

P. E. CHAMPNESS

Smellie, J. L., ed. *Volcanism Associated with Extension at Consuming Plate Margins* London (Geological Society: Special Publication No 81), 1994. Price £60.00 ($100.00) [Price to members £29.00 ($48.00)]. vi + 293 pp., 28 maps.

This thematic volume explores the relationship between extension and coeval magmatism at consuming plate margins. As the editor points out in his introduction, "nothing in the plate tectonic paradigm... leads the observer to expect extension to be the dominant tectonic regime at consuming margins". A rational observer might well expect the dominant forces within the over-riding plate to be compressive. Within the last ten to fifteen years, however, theoretical modelling and field evidence both point towards the conclusion that subduction zones do not lock and that sub-horizontal extension perpendicular to the arc is commonplace within arc systems, and may even be the normal mode of behaviour within such systems.

The 14 papers included within this volume present the evidence for extension at consuming plate margins. The first paper, by Hamilton, is a review of the relationships between subduction, extension and magmatism. Of the remainder of the papers, seven present data from oceanic arc systems and six from continental margin arcs. Most of the papers deal with the circum-Pacific system and the majority of these deal with magmatic arc systems which are still active, or within which magmatism is as recent as the Pliocene. Field structural data, seismic data, logs of sedimentary and volcano-sedimentary sequences and geochemical data sets are variously used to constrain the structural and magmatic evolution of these systems. The combined data set provides conclusive proof that extensional stresses are commonplace in modern arc systems, and likely to have been so in ancient ones as well. The obvious value of the assembled data is that, if modern arc systems are indeed analogies of pre-Tertiary arc systems, then it should be clear exactly what sedimentary, volcanic and geochemical criteria should be required to demonstrate the prevalence or otherwise of extensional stresses in arcs from further back in the geological record.