

the longest, interest is held through the somewhat didactic style.

There have been few reviews of *REE* in metamorphic rocks, so the one here by R. I. Grauch (with its good reference list) is especially welcome. The data on the residence and mobility of *REE* in metamorphic rocks are critically discussed and it is also made clear that at present these elements have only a very limited use in elucidating the details of closed-system metamorphism. Two chapters—the first by S. M. McLennan on sedimentary rocks, the second by D. G. Brookins on aqueous geochemistry—deal with the topics of weathering, diagenesis, provenance studies, complexing and Eh-pH diagrams, among others. There is some overlap in these two chapters which is a pity when space in a book such as this is at a premium. L. A. Haskin uses the magma ocean model to introduce the reader to *REE* patterns of lunar materials and how they fit into the ideas on rock genesis. His treatment of the subject is fresh and he writes with obvious enthusiasm. A chapter on compositional and phase relations among *REE* minerals by D. M. Burt is more unusual, dealing as it does with exchange vectors of element substitution. The approach seems to be a particularly good one for the complex exchanges that can occur in some of the mineral groups. The book ends with a chapter on economic geology by A. N. Mariano. It covers the relevant minerals and a classification, with brief descriptions, of *REE* deposits in carbonatites.

The editors have managed to gather together a good group of authors and the volume is recommended. The point is made that *REE* geochemistry cannot be taken in isolation when studying rocks or minerals, but nonetheless students will find the chapters on partitioning (Ch. 3), upper-mantle rocks (Ch. 5) and lunar materials (Ch. 9) especially helpful and in a broader context than just the *REE*. Researchers and specialists will be thankful for the other chapters as well. The only significant criticism on editorial control is that more effort should have been made to avoid duplication of material—some of which has been mentioned here.

The topics that are included are generally covered well. It is in the newer areas of *REE* geochemistry that the book is disappointingly thin. For example, there is virtually no discussion on the hydrothermal transport and deposition of *REE* in such systems as skarns or pegmatites and the interpretative uses to which the *REE* data can be put. Carbonatites are treated only from an economic viewpoint and alkaline igneous rocks not at all, although both are important as *REE*

hosts. Despite these and other omissions, the book acts as a good introduction to the subject and will undoubtedly be purchased by many. Its use would probably have been even greater if a subject index had been provided.

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Anthony, J. W., Bideaux, R. A., Bladh, K. W., and Nichols, M. C. *Handbook of Mineralogy: Volume I; Elements, Sulfides, Sulfosalts*. Tucson, Arizona (Mineral Data Publishing), 1990. viii + 588 pp. Price \$82.50 + \$5.00 shipping and handling.

As the name implies, this (bulky) volume is a compilation of data on minerals aiming, in the words of the authors, to 'gather in convenient form the data crucial to identification of all mineral species and to provide definition of each species'. To this end, one page is devoted to each of 588 mineral species belonging to the families of elements (including alloys and intermetallics), sulphides (including other chalcogenides) and sulphosalts (including sulphoxides and sulphalides). The minerals are listed alphabetically by name and the format of presentation is consistent throughout. With the name is given an idealized chemical formula and then information listed under the following headings: crystal data, physical properties, optical properties, cell data, X-ray powder pattern (up to seven most intense lines), chemistry (analyses with calculated formula), polymorphism and series (noted as appropriate), occurrence, association (i.e. associated minerals), distribution (most important localities), name (significance and origin), type material (i.e. Museum holdings of type material) and references (i.e. citations used to define the data summary for the species). This is intended to be the first volume of a five volume series, future volumes dealing with silica and silicates (Vol. II); halides, hydroxides, oxides (Vol. III); arsenates, phosphates, uranates, vanadates (Vol. IV); borates, carbonates and sulfates (Vol. V).

The compilation of so large a body of data is a formidable task, and the authors are to be congratulated on embarking on such a project. The data contained in this first volume will be of considerable value to researchers and professional mineralogists. It certainly is not a text to put before students or those with a more casual interest in mineralogy (it contains no drawings, illustrations or tables and very little explanation of the data presented). To the extent that no comparable modern compilation exists, it is a valuable addition to the literature. However, in a

number of respects it falls short of what the professional would ideally hope for in a detailed and precise compilation. For example, the sources of data on many of the properties are not explicitly stated and the references given, although the most important references in many cases, are not directly linked to the properties. A case in point is the citation of data on optical properties of opaque minerals, apparently derived from a data base held at the University of Missouri-Rolla and itself derived from other sources. The analytical and optical data are not

therefore linked in the way that, for example, the data in the COM Quantitative Data File (Criddle and Stanley, editors) are linked. This makes it difficult or impossible for the reader to trace original sources and hence be entirely satisfied that the data presented are the most reliable. Given improvements in this respect in the four volumes yet to be published, this series appears set to become an important source for professional mineralogists and to provide essential reference volumes for the major science libraries.

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