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BOOK REVIEW

MINERALS: THEIR CONSTITUTION AND ORIGIN by Hans-Rudolf Wenk and Andrei G. Bulakh. Cambridge University Press, Cambridge, U.K., 2004. 646 pp., 526 ill + 16 plates. U.S. $70.00 paperback.

This unusually titled book is a collaboration between two highly accomplished mineralogists who have introduced to the textbook market a new style of book. The book provides an alternative to other texts as it emphasizes concepts and integrates geological processes and applications with the systematic descriptions of mineral groups. As a teacher I have been attempting to change mineralogical instruction from the traditional sequence of crystal chemistry, symmetry, crystallography, followed by a systematic survey of minerals from native elements to tectosilicates. Students tend to find the latter part dry and without geological context, and therefore boring. This textbook supports my efforts to add broader context to mineralogical instruction, context that builds links to other courses and underscores the importance and relevance of mineralogy in the geological sciences.

The book is divided into five parts, each comprising multiple chapters. The parts are: I. Structural features of minerals; II. Physical investigation of minerals; III. Variety of minerals and mineral-forming processes; IV. A systematic look at mineral groups; V. Applied mineralogy. While this organization is somewhat typical for mineralogical texts, in detail the presentation of topics in the book deviates from a conventional organizational approach. For example, in the section describing silica group minerals and the feldspars (Chapter 19) a discussion on the origin of granites and pegmatites naturally follows. While this adds geological context, mineralogical context is lost as the remaining text on tectosilicates is found in another chapter (Chapter 29). In this chapter, the feldspathoids are afforded only about half a page of text.

The book is intended both for undergraduate and graduate level study for students in all fields of geology, materials science, and the environmental sciences. It is a highly ambitious writer that attempts to satisfy such a varied readership. While this is a very accessible and broadly focused book of general interest, some important content is missing or is ever so brief. Optical mineralogy remains an important component in geological education yet this book gives that subject a brief treatment (Chapters 9 and 10, Appendices 3 and 4). The Michel–Lévy chart of Plate I is small (12 cm long) and the colors are dull. Important for students doing petrography are systematic lists of minerals and their optical properties and this is missing from the book. If an introductory mineralogy course incorporates optical mineralogy, as is done at many universities, then this text cannot stand alone and should most likely be supplemented by an optical text. Other topics I expected to see included because of their importance in reviving mineralogical research in the past decade include single-crystal X-ray diffraction, laser ablation ICP-MS analysis, and at least some mention of geochronology and geothermobarometry. These topics would well serve a graduate student readership.

As is common with many first editions, there are a number of typographical mistakes and other errors throughout the text. These are minor in nature such as spelling albitE in Figure 19.23a, and citing that famous 1992 textbook incorrectly on p. 264 as Deer, Zussman, and Howie. There are some errors of fact although minor (stating that zircon occurs in all igneous rocks, p. 435; stating that chromite is the only ore mineral for Cr, p. 420). And like my students, I do find it annoying when mineral formulae are written differently in different places for no apparent reason, such as clinochlore on p. 461, $Mg_3(OH)_6Mg_2Al(OH)_2Si_3AlO_{10}$, and then as $Mg_5AlSi_3AlO_{10}(OH)_8$ on p. 465.

Unlike many textbooks, this book is richly illustrated. Numerous photographs, not just the ninety-nine color photos in the Plates, have been provided by well-known specimen photographers such as Olaf Medenbach, University of Bochum. Half-tone images are sharp and clear and this is vital, for example, for students trying to visualize depth in two-dimensional representations of crystal structures. For lecture room use, the book's modular structure allows the instructor to leave out sections of the book without interrupting the flow of instruction. Interesting historical notes or technical details are included in "boxes" outside of the flow of the text. The authors point students to relevant sites on the web and to additional readings in short bibliographies at the end of each chapter. Chapter endings include a list of focusing questions ("Test your knowledge") and a box highlighting the important terms or concepts covered in the preceding text.

To truly serve as a guide and reference for the next generation of mineralogy students I suggest that the next edition contain an expanded optical mineralogy and petrography section, and that the reference list be updated (62% of the references are 20 or more years old). Nevertheless, this book is easy to read and is wonderfully illustrated and I applaud the authors and publisher for integrating geological concepts and information into the systematic description of minerals. These are clear strengths of this book and I hope that its publication signals a change in the style of textbook we see in the future.

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