

BOOK REVIEW

Book Review: *Minerals: Their Constitution and Origin, Second Edition*. (2016) By Hans-Rudolf Wenk and Andrey Bulakh. Cambridge University Press. ISBN: 978-1-1075-1404-1, 640 p. \$64.99 Paperback.

We live in a veritable golden age of mineralogy texts. There are a number of high-quality, authoritative, and comprehensive offerings that are easily employed in the college classroom and serving also as useful references for professionals and amateurs alike. These texts hold relevance despite (or in addition to) several robust and excellent online mineral encyclopedias. Wenk and Bulakh's excellent book *Minerals: Their Constitution and Origin (second edition)* is an example of the quality found in a modern treatment of this classic subject. Furthermore, the systematic mineralogy chapters, largely organized by mineral-forming environments, provide a unique take that merits its inclusion in any mineralogy library.

Although comparable in stature to other current texts, the work is unique in its construct. The authors, Hans-Rudolf Wenk of the University of California, U.S.A., and Andrey Bulakh of St. Petersburg State University, Russia, are experienced educators and researchers in this field of study, and they bear the full measure of expertise to the subject. Moreover, they employ a succinct tone that efficiently covers the ambitious topic list within the text. The lively style was adopted from the book's initial template, which is a straightforward classroom text by Andrey Bulakh. In its second edition, *Minerals: Their Constitution and Origin* preserves a classroom-oriented perspective, principally through its direct manner and abundant figures. Each chapter is constructed much like a well-crafted lecture slide set amplified by a detailed explanation.

This was true for the first edition, but this new version has been thoughtfully reorganized and updated. The authors expanded several of the chapter introductions, while preserving the direct and informative style and illustrations of the first edition. They also added to their introduction of crystal chemistry, thus bolstering the general content of the text.

Minerals are colorful, lustrous items, but mineralogy texts generally do not include extensive color reproduction in print. This book largely follows suit; the bulk of the figures (536 in-chapter captioned diagrams) are in black and white and grayscale. Fortunately, the figures are excellent selections for each chapter; the authors provide outstanding original diagrams and charts, and they redrafted or reproduced notable figures from definitive studies and texts. These grayscale images are reproduced with strong contrast

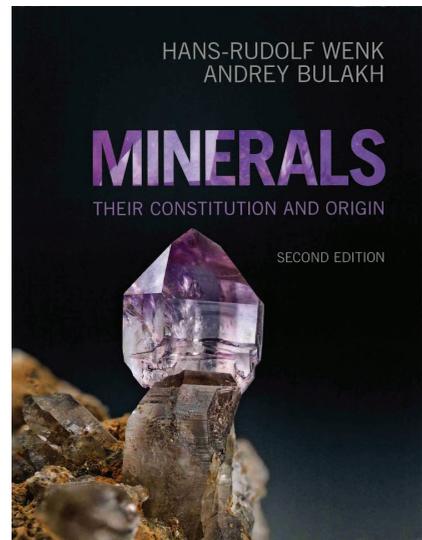
and sharp lines. Although many are compact, each is legibly annotated.

However, the book also contains a large section (32 pages) of high-quality color images. The bulk of these are excellent photos of mineral specimens, with numerous photomicrographs of minerals in thin section, and a page of optical interference and

dispersion figures. Again, each figure is compact, but are of the size typically employed in scientific journals, so details are adequately visible. My sole complaint is that the color plates subdivide a chapter, leaving a single page of chapter 21 stranded on the far side of the color plates; this a small price to pay for color imagery.

For those wishing to adopt figures into their own lecture or laboratory visuals, the online resources (<http://cambridge.org/wenk>) include the in-chapter grayscale diagrams as both Microsoft PowerPoint slides and JPEG image files. Additionally, the authors provide Acrobat PDF slides sets on several of the chapter topics; these incorporate some of the color figures. The online resources also contain a Microsoft Word format laboratory exercise book that emphasizes optical mineralogy.

Although the book provides comprehensive coverage of mineralogy, it stands apart from other texts in its interdisciplinary organization and focus that unites mineralogy, petrology, and geochemistry. Like other treatments, roughly half of the text is dedicated to the underpinnings of mineral science: history, inorganic chemistry, crystallography, properties, and analytical techniques, including optical mineralogy with the polarizing light microscope. This is followed by a brief exploration of thermodynamics and phase diagrams. Traditionally in texts, such global background is then followed by systematic mineralogy organized by chemical classification, typically listing examples



in order of grouping, with an emphasis on mineral properties. This book instead organizes mineral groups by mineral-forming environments, starting first with perhaps the most commonly encountered system silica and feldspar as components in granite and pegmatites. It next covers the nature of native elements, using their relatively rare occurrence as contrast to the commonality of the minerals in the previous chapter. Not all subsequent chapters are focused on mineral-forming settings; the oxides chapter holds a more traditional focus on the importance of ions in oxide lattices. But most of the other mineral groups are used to also introduce geologic processes. The sheet silicate and chain silicates chapters, for example, respectively provide a substantial introduction to soil formation and mafic igneous and skarn petrology. Although mineral nature and genesis is the focus, chapters do contain a discussion about group composition and structure, as well as a brief table of properties (including optical properties) for common minerals, that is a handy starting point for identification.

The book concludes with chapters on applied mineralogy: ore deposits, crystallization in materials sciences, gemology, cement fabrication, and the nature of minerals in the solar system and Earth. In sum, it provides a substantial overview of the nature of minerals in geological processes. This emphasis on mineral-forming settings and application makes the book useful for other

coursework, providing a bridge to petrology and economic deposits. Furthermore, it suitably covers information imparted to a rigorous Earth materials course.

The value of the book is truly stunning when considering the cost. Cambridge University Press is to be commended once again for offering such a high-quality publication (and online resources) at such a reasonable price. This is impressive in a time of seemingly upwardly spiraling textbook costs.

In summary, *Minerals: Their Constitution and Origin (second edition)* by Wenk and Bulakh is an excellent treatment of classical mineralogy with a novel emphasis on mineral-forming environments. Its organization, straightforward tone, and copious figures, including color imagery, should be welcomed by students. Additional online resources permit extensive incorporation by lecturers should they desire these resources. Both make it a worthy candidate for adoption into coursework. Additionally, this is an excellent and affordable resource for professional mineralogists and amateur mineral enthusiasts who seek a comprehensive and modern overview of classical mineralogy with an emphasis on mineral genesis.

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