
BOOK REVIEWS

KLEIN, C. & PHILPOTTS, A. 2013. *Earth Materials: Introduction to Mineralogy and Petrology*. Cambridge University Press. Price £40.00. ISBN: 9780521145213 (PB)
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Not long ago, the core disciplines of mineralogy and petrology featured prominently in university-level Earth science curricula, with individual modules in a range of subdisciplines including crystallography, systematic mineralogy, optical mineralogy and igneous and metamorphic petrology, to name just a few. Over the past decade or so however, the higher education landscape has changed considerably; in many degree programs, basic aspects of these subjects are now squeezed into single-semester entry-level courses in mineralogy and petrology, or Earth materials as they are often called. If you are an instructor of such a course, the textbook by Cornelis Klein and Anthony Philpotts is a perfect companion.

Prepared especially with beginning undergraduate students in mind, the book provides a balanced introduction to mineralogy and petrology. It commences with a brief introductory chapter about the Earth, its origin, internal structure, composition and the processes of plate tectonics which provides a framework for the formation and occurrence of the materials that constitute our planet. Minerals and rocks, the materials of the solid Earth, are defined and introduced broadly in the following chapter, which precedes a more thorough treatment of fundamental mineralogical principles including mineral identification at hand specimen level, quantitative characterization of minerals using X-ray powder diffraction and electron beam techniques, crystal structures, crystallography and optical mineralogy. The main body of the text is organized into three broad sections focusing on the petrology of igneous, sedimentary and metamorphic rocks. For each rock type, an initial chapter presents a systematic description of the most important rock-forming minerals. This is followed by chapters that address the formation of each rock type, as well as rock classification, occurrence and, where appropriate, its plate tectonic significance. The book concludes with some applied aspects of mineralogy and petrology in chapters dealing with economically important minerals, Earth material resources and the human health aspects associated with Earth materials. The latter includes a brief overview of natural hazards associated with volcanic eruptions, tsunamis and meteorite impacts.

Written and illustrated by two highly experienced and renowned textbook authors, the main strengths of the book lie in the beautiful full-colour illustrations and photographs of mineral and rock specimens, distributed throughout 533 pages of clearly and compellingly written text. Each chapter is preceded by a broad outline of the rationale, indicative content and suggested objectives for student learning. A summary of key points and a set of review questions for students to revise and check their knowledge and understanding of the subject matter conclude each chapter. Occasional box sections that provide complementary subject information, suggestions for further reading and a comprehensive glossary of terms that are highlighted clearly in the text also help students to learn about Earth materials.

Additional useful resources such as 3D visualizations of crystal structures, which can be viewed with CrystalViewer, are available online. For teaching purposes, instructors will find a wealth of resources on the publisher's website, including all figures from the book in electronic form, selected PowerPoint slides and answers for the review questions. The authors' approach to describing minerals according to the principal rock type they mainly occur in contrasts with most mineralogy texts. However, while some might prefer a more traditional system for grouping minerals, which remains independent of the lithologies in which they are commonly found, the approach chosen here has the advantage of providing a close link between mineralogy and petrology and a context for the occurrence of minerals. This is more than adequate for most modern Earth science curricula, as well as related disciplines such as environmental and engineering science.

Personally I feel that the text would have benefited from a somewhat more complete listing of optical properties for mineral identification using a polarizing microscope, which would have complemented the rather nice introductory chapter on optical mineralogy. This is just a trivial point, however. At a price of c. £40 for the paperback version, *Earth Materials: Introduction to Mineralogy and Petrology* is a very attractive learning and teaching resource, which I have readily adopted as core reading for my course.

Ralf Gertisser
School of Physical and Geographical Sciences, Keele
University, Keele, Staffordshire, ST5 5BG, United
Kingdom. Tel: +44 (0)1782 733181.
Email: r.gertisser@keele.ac.uk