

BOOK REVIEWS

Reed, S. J. B. *Electron Microprobe Analysis and Scanning Electron Microscopy in Geology*. Cambridge University Press, 1996, xiv + 201 pp. ISBN 0 521 48350 6 (paperback) £17.95 (US\$29.95), hardback ISBN 0 521 48280 1 £50.00 (US\$80.00).

This is an excellent book with an unusually extended scope that is highly recommended for all involved in electron microprobe and scanning electron microscope analysis. The book contains ten chapters encompassing: (1) An introduction to micro-beam techniques, including a brief summary of non-electron excited techniques, including PIXE, XRF, ion and laser microprobe methods (6 pp); (2) Theoretical aspects of electron excitation and X-ray production (14 pp); (3) Design details of electron-optical instrumentation (22 pp); (4) The design and operation of ED and WD X-ray spectrometers (22 pp); (5) The performance and capabilities of the scanning electron microscope with particular emphasis on recording topographic and compositional images, a chapter that is particularly well illustrated with black and white photomicrographs (31 pp); (6) Element mapping (15 pp); (7) Qualitative X-ray analysis and the interpretation of X-ray spectra (17 pp); (8) Quantitative X-ray analysis, including matrix correction procedures, light element analysis and a useful discussion of special cases including tilted and thin specimens, broad-beam and whole rock analysis, and the analysis of particles and fluid inclusions (32 pp); (9) Accuracy of X-ray analysis and factors such as surface roughness, porosity, beam damage, edge effects, the Fe valence problem that affect the interpretation of results (15 pp); (10) Specimen preparation (15 pp) and references cited (11 pp).

Given the wide experience and extensive knowledge of the author, it goes without saying that this work is authoritative. However, there are several noteworthy features of this book. One is the way the treatment of the electron microprobe and scanning electron microscope are integrated, the second is the way in which theoretical aspects of instrumentation is integrated with practical applications. A third is the clarity of the text, illustrated by many line diagrams, spectral scans, black and white photomicrographs and a smaller number of colour plates. And finally

the price of the paperback edition offers very good value for money. This book is aimed at geological postgraduate and postdoctoral researchers, those working in industrial laboratories as well as a basic text for those attending SEM and EMPA courses. As well as being highly recommended to all these users, established researchers will find value in the integrated approach followed in this book. In summary, a hit that is heading for the best seller list for this category of publication. P.J. POTTS

Dickin, A. P. *Radiogenic Isotope Geology*. Cambridge, New York and Melbourne (Cambridge University Press), 1995. xvi + 452 pp. Price £65.00 (Hardback). ISBN 0 521 43151 4.

The aim of this book is "to concisely review the field of radiogenic isotope geology in order to give readers an overview of the subject and to allow them to critically assess the past and future literature". The approach is historical in that the literature reviewed deals with original concepts and new analytical strategies, covers 'classical' contributions, and includes numerous case histories some of which have involved alternative and contradictory data interpretations.

Chapter 1 (14 pages) briefly introduces nucleosynthesis, radioactive decay mechanisms, and the basic decay equations while the second chapter (24 pp) covers chemical and physical techniques (specialized analytical strategies are also included in later chapters) and also has a clear discussion of the statistical approach to assessing 'errorochrons' versus isochrons. Chapters 3 (30 pp), 4 (35 pp) and 5 (29 pp) deal successively with Rb-Sr, Sm-Nd, and Pb-isotope dating, with fairly predictable early sections being followed by particularly useful treatments of crustal and seawater evolution. Chapters 6 and 7 deal with the applications of Sr, Nd, and Pb isotopes in studying the geochemistry and petrogenesis of oceanic volcanics (40 pp) and continental crust (29 pp); the latter contains a useful discussion on magma-crustal interactions but, surprisingly, the basic mixing equation is not given. The extension of such isotope 'tracer' work by application of Re-Os isotope studies is covered in Chapter 8 (22 pp) while