

andesites and the related rocks of volcanic arcs uses a tectonic classification for this rock series since the broad chemical calc-alkaline classification is not favoured by the authors. The basis for the use of a high-alumina basalt type in this section is not clear especially in view of an earlier reference to 'noise of parameters such as  $Al_2O_3$ ', and the chapter as a whole reflects the great uncertainties over the petrogenesis of this rock association.

The last chapter attempts to draw together the first and second parts of the book in an assessment of the current understanding of mantle-magma relations discussing the possible origins of the igneous rock associations described. While again emphasizing the evidence provided by trace-element geochemistry and including relevant high *PT* experimental studies, it avoids taking controversial standpoints in petrogenetic theory.

The book presents a comprehensive review of the current status of igneous petrology and its approach, particularly the geochemical bias and thermodynamic treatment, makes it unique among texts of its kind. It presents both qualitative and sufficient quantitative data to be useful for research, while avoiding the pitfalls of overclassification. For these reasons, we consider this as undoubtedly the best book for advanced students of the subject yet published.

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USDOWSKI (H.-E.). *Fraktionierung der Spurenelemente bei der Kristallisation*. Berlin, Heidelberg, and New York (Springer-Verlag), 1975. viii + 104 pp., 42 figs. Price DM 29.80 (\$12.90).

In this student text, the author has developed his lecture course into a sound classical introduction to the principles of trace-element behaviour. Approximately the first half of the book is devoted to the derivation of thermodynamic principles (Henry's Law, Nernst Distribution and its variants, Rayleigh fractionation, temperature, pressure, and composition dependence of distribution coefficients). Henry's Law is introduced, as usual, by considering the solubility of gases in liquids. Although this may, perhaps, introduce conceptual difficulties when the same principle is immediately applied to solid and liquid solutions of solid solutes, it allows a clear illustration of the composition-dependence of Henry's Law constants. English-speaking readers may find some of the symbols confusing—e.g. *f* for activity coefficient and of course *g* for weight.

In the second part examples are given of the application of trace-element distributions to problems in igneous, metamorphic, and sedimentary geochemistry, and also to industrial and laboratory processes. This section of the book is somewhat disappointing in that many of the examples are from older literature, and the selection of examples is small (the book contains only twenty-nine references). With a wider selection of more modern references one feels that the book would have been more stimulating.

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