

BOOK REVIEWS

Criddle, A. J. and Stanley, C. J. (Eds.) *Quantitative Data File for Ore Minerals* (Third Edition). London (Chapman & Hall), 1993. i-lxiv + 635 pp. Price £75.00

The 'Quantitative Data File for Ore Minerals' was first published in 1978 under the inspirational editorship of the late Norman Henry. This latest edition of the 'QDF' extends and develops the concept of a comprehensive database of quantitative optical data for ore (opaque) minerals and is a very worthy successor. Like both previous editions, it has been produced under the auspices of the Commission on Ore Mineralogy (COM) of the International Mineralogical Association and, like the second edition, it has also been produced with the support of the Natural History Museum, London.

The bulk of the text, which is in a large (A4) format, consists of single page entries for almost all known opaque minerals (some 505 species are included). The top half of the page uses a tabular (or 'file card') format to present the reflectance data at the four COM recommended wavelengths and at every 20 nm between 400 and 700 nm. In addition to this, quantitative colour values (expressed in terms of x , y , $Y\%$ and λ_d and $P_e\%$) are given and, wherever possible, data on Vickers Hardness. Supplementary information, in addition to mineral name, symmetry and provenance, includes reference to X-ray data in the Powder Diffraction File and data on the chemical composition of the actual sample measured, standard used in reflectance measurement, and method used to polish the sample. A very welcome innovation in this new edition is the use of the bottom half of the page to present plots of the spectral reflectance data, thereby conveying an immediate impression of the dispersion and (where appropriate) bireflectance characteristics of the mineral.

The front matter of the book comprises background and introductory notes with a selected bibliography and three 'keys' to the full page entries for the individual minerals (which, incidentally, appear alphabetically by mineral name). The first key lists all mineral entries in ascending order of reflectance at 546 nm and includes the reflectance values at the other three COM recommended wavelengths (470, 589, 650 nm), together with the mineral formula and the

page number of the detailed entry. The second key lists all mineral entries using the quantitative colour values with minerals given in ascending order of luminance ($Y\%$). The third key employs air and oil immersion reflectance data, listed in ascending order starting at 440 nm.

This is a splendid volume, based on meticulously assembled data (much of it new), and is well produced and presented. It belongs in the libraries of all institutions and individuals with a serious interest in ore minerals. D. J. VAUGHAN

Maurice, Y. T. (Ed.) *Proceedings of the Eighth Quadrennial IAGOD symposium*. Stuttgart (E. Schweizerbart'sche Verlagsbuchhandlung) 1993. xi + 894 pp. Price DM 340.00

This volume is a singular reminder of the vast variety and global distribution of ore deposits and the enthusiasm and activity of the large international research community that studies them. Yvon T. Maurice has assembled 77 papers from the Eight Quadrennial meeting of the International Association on the Genesis of Ore Deposits held at Ottawa in August, 1990, into an impressive volume of grass roots ore deposits research.

The papers are collected under the following themes (most of which correspond to IAGOD Commissions or working groups): Tectonics of Ore Deposits (4 papers); Paragenesis (8); Ore-forming fluids in inclusions (5); Fluorite and barite deposits (4); Skarn deposits (3); Tin and tungsten deposits and rare metal granitoids (10); Ore deposits in mafic and ultramafic rocks (4); Ores and metamorphism (3); Metallogeny of the Bohemian Massif (2); Hydrothermal activity, Juan de Fuca Ridge (1); Genetic relationship of ores in sedimentary rocks (4); Manganese (1); Genesis of vein and lode gold deposits (8); Distribution and metallogenesis of metallogenic provinces (8); Precious metal deposits in supergene environments (1); General (11).

The majority of the articles in this volume relate to specific deposits or districts. The following selection gives a flavour of the variety of subject matter covered: Bayan Obo rare earth deposit, Inner Mongolia (Chao *et al.*); Magmont-West mine, Viburnum Trend (Hagni); fluid inclusions Colombian emerald deposits (Giuliani

et al.); Ore-forming fluids Nigerian mineral belts (Akande and Kinnaird); oxygen and hydrogen isotope study of skarn-type magnetite deposit, Shinyemi mine, Korea (Mariko and Yang); tungsten-bearing gresien veins, Akchatau deposit, Kazakhstan (Zharikov *et al.*); East Kemptville Sn-(Zn-Cu-Ag), Nova Scotia (Kontak); vein gold deposits, Liaoxi uplift, China (Baoqin *et al.*); Hutti gold deposit, India (Pathan and Riyaz Ulla); fluid, chemical and structural evolution of gold-quartz veins, Patchway Mine, Zimbabwe (Herrington *et al.*); Arkhangelsk diamond province (Sinitsyn).

The number of papers on general techniques is rather small although there are useful articles on ICP-AES for fluid inclusion analysis (Rankin *et al.*), temperature-chloride mixing diagrams (Shibue) and computer aids to ore-mineral identification (Laudon and Hagni). In addition there are papers on the behaviour of pyrite in metamorphism (Craig and Vokes), coupled diffusion in the system ZnS-CuInS₂ (Bente *et al.*) and fluid transport of ore metals in mantle rocks (Ryabchikov).

There are notable (and, it turns out, deliberate) omissions from this volume. Papers given in special sessions on 'Metalliferous Black Shales and Ore Deposits' and 'Precambrian Ore Deposits and Tectonics' have been or are to be published elsewhere. If you were looking for papers on mineral deposit modelling presented at the concurrent IGUS/Unesco Deposit Modelling Program meeting then you would be disappointed, these papers being published separately by the Geological Association of Canada. Nevertheless, there are some articles primarily addressing modelling; these include: geochemistry of formation of five element (Ag-Ni-Co-As-Bi) veins (Kissin); metallogenic concepts to aid exploration for giant Olympic Dam-type deposits (Gandhi and Bell); cyclicity in the formation of mercury deposits (Maslennikov).

Perhaps the most valuable collective feature of the volume is the large number of papers on deposits rarely described in western journals. In particular there are 20 papers describing deposit in the old Soviet Union and China with a further 20 papers on deposits in other Asian countries (notably India), South America, Africa and Eastern Europe.

The quality of presentation of the volume is excellent and the editorial team are to be commended on the final product. The text is enhanced by 448 figures and 117 tables, a contents list and a list of contributors but no index.

As a collection of studies of the ore geology of specific districts or deposits, this volume meets its purpose admirably. At well over £100, this is not a

volume for most peoples' personal collection, however, I would recommend this book as useful reference for libraries requiring such information on a wide variety (both in type and location) of deposits.

D. A. POLYA

Gray, P. J. (Ed.) *Sulphide Deposits - their Origin and Processing*. London (Institution of Mining and Metallurgy), 1990. x + 310 pp., 4 maps. Price £53.00.

Sulphide deposits are hosts to a a major proportion of the world's base and precious metal resources, yet their multi-element content and complex form pose a major challenge to efficient exploitation. There is still a tremendous gap in our understanding of the underlying principles governing the processing of sulphide ores, and this volume aims to record some of the recent progress in this field.

This volume contains 21 papers on the subject of sulphide deposits, but despite the title, the majority focus on the treatment of ores and the extraction of metals, rather than their origin. It is split into three sections: 'Geology, petrology and mineralogy' (5 papers), 'Ore processing and mineralogy' (7 papers), and 'Concentrate processing and tailings disposal' (9 papers). As with all volumes of this nature, the coverage is uneven, although there are also some useful review papers (e.g. 'Compositional and textural variations in major iron and base-metal sulphide minerals'; 'Principles and practice of sulphide mineral flotation'; 'Acid mine drainage from sulphide ore deposits'). The quality of the presentation, although on the whole adequate, is variable, with several disparate styles and layouts.

The value of this volume lies in its descriptions of individual case histories, detailing methods adopted for the recovery of metals from specific sulphide deposits. As such it represents a useful indication of how far metallurgists have progressed in their quest for efficient and reliable techniques for exploiting sulphide deposits.

D. H. M. ALDERTON

Salje, E. K. H. *Phase Transitions in Ferroelastic and co-elastic Crystals: an introduction for mineralogists, materials scientists and physicists*. Cambridge 1993. xiv + 282 pp. Price (paperback) £19.95.

This edition of Professor Salje's previous book with the same title and publisher (1990) has been dedicated specifically to students. A review of the