

Book news

1. Recent publication

● *Iron and steel works of the world*. Worcester Park (England), Metal Bulletin PLC, 1987. 9th edition, 728 pp. £94.75 by air mail.

This directory includes data on major iron and steel producers and the world's re-rollers, tube makers, iron-powder producers, strip coaters, and cold-rolled section makers. The information includes head office address, management, capital, number of employees, ownership, annual capacity, works details, products, sales outlets and agents, and subsidiaries. To reflect the growing importance of China as a world steel producer, more detailed information on the modernization and rapid growth of that country's iron and steel works is included. There is also a buyers' guide that lists companies by name and by country under a broad range of product headings in which they are active.

2. Canadian publications

The following are available from Printing and Publishing, Supply and Services Canada, Hull, Quebec K1A 0S9, Canada.

● Mining and mineral processing operations in Canada, 1987. *Mineral Bulletin* MR 216. \$15. (Obtainable from Printing and Publishing, Supply and Services Canada, Hull, Quebec, K1A 0S9 Canada.)

This report is a compilation of information relating to mines and processing facilities in Canada at 1st January, 1987. Its two major sections, 'Metal and Industrial Mineral Mines and Processing Plants in Canada' and 'Metallurgical Works in Canada, Nonferrous and Precious Metals', provide such data as the name of the operators, the location of the mine or plant, and its capacity, processes, products, and other details of special interest.

● Peat producers in Canada, 1986 directory, by M. Prud'homme. *MRI* 87/7.

This report provides information regarding the 70 peat producers who were commercially active in Canada during 1986. It contains details on producers such as addresses and bog location, type of peat, packaging of peat products, domestic and foreign market destinations, and inter-company affiliations.

● Canadian mines: Perspective from 1986. Reserves, production capability, exploration, development. *Mineral Bulletin* MR 215. \$9.95.

This report presents a perspective of the Canadian mineral supply system based on data available during 1986. Its purpose is to draw attention to the question of whether resources are being prepared for production at rates sufficient to maintain Canada's position as a major supplier of mineral commodities. Eight metals are examined: copper, nickel, lead, zinc, molybdenum, silver, gold, and iron, together with one non-metal, asbestos.

3. Mintek publications

The following publications are available from the Council for Mineral Technology, Private Bag X3015, Randburg, 2125 South Africa. The reports are free of charge to South African destinations and US\$25 each to overseas destinations.

Report M313

The testing of abrasion resistance in pipeline materials, by D.P. Enright. Nov. 1987. 36 pp.

The test programme on wear in the pipelines transporting diamond-bearing heavy-mineral concentrate at De Beers' Finsch Mine, Lime Acres, Cape Province, has been in progress for 3 years. From the start of the test to 24th March, 1986, 24 different materials were received for testing and, of these, 12 types have had at least one spool tested to the end-point.

The initial use of mild-steel test spools on all the sites on the 4E2-63 line yielded much useful information. The plotting of pipe-wall thickness as a function of hours in service showed that the pipe wear is linear with time and is site-dependent. The consistent wear rates also indicate that the heavy-mineral concentrate being pumped does not undergo any significant degradation.

The results are expressed in terms of running hours in service and a life ratio, which is the ratio of the service life of the material tested to the service life of a thick-walled mild-steel spool at an equivalent test site.

The most abrasion-resistant and cost-effective materials tested so far are two types of locally produced high-chromium white cast iron.

The characteristics of the heavy-mineral concentrate, the methods of measurement employed, the service lives of the spools, and the performance of the materials tested are described in detail in appendices.

● Report M328

The installation and commissioning of a Hilger Monospek D500 scanning monochromator, by A.E. Watson. Sep. 1987. 11 pp.

An account is given of the installation, commissioning, and testing of a Hilger 'Monospek' D500 scanning monochromator as an extra measuring channel on a Hilger E1000 direct-reading spectrometer equipped with a 5 kW inductively coupled plasma (ICP) source.

The instrument was used successfully for the measurement of interference-free lines instead of those on the direct reader that suffered interference, and for the determination of the rare-earth elements in mineral samples.

The monochromator is considered to be a very useful addition to the instrumentation in the Emission Spectroscopy Section, conferring a flexibility in the choice of lines that was not formerly possible.

Report M331

The design and operation of hot-air dryers for the drying of granular activated carbon. Nov. 1987. 30 pp.

The thermal regeneration of activated carbon involves both the removal of water and the regeneration of car-

bon at high temperature. A significant amount of energy can be saved by the pre-drying of the carbon prior to the regeneration step.

The design and operation of both pilot-scale and industrial-scale hot-air dryers is discussed. A procedure for the selection of a dryer and blower combination is suggested, and a computer program that performs this function is described. Details of the theoretical and practical energy required for hot-air drying are given.

The results of the investigation indicate that a saving in energy of up to 23 per cent can be gained by the use of a pre-drying step prior to the regeneration step.

Report M338

Ore microscopy, image analysis, and the extractive metallurgy of sulphide minerals—an overview. Nov. 1987. 14 pp.

The quantitative microscopic investigation and image analysis of plane sections of specimens of ores, mineral aggregates, calcines, and particle mounts of mineral-dressing products play an important and often vital role in the field of extractive metallurgy. This report includes a brief discussion of the practical aspects of this topic, and a comprehensive summary of those aspects of the extractive metallurgy of sulphides that can be examined by quantitative microscopy and image analysis.

In microscopy the exposed polished surface represents a very small 'sample' of the total population, and does not give a 'true' representation of the sample but the images of two-dimensional random profiles of the individuals in the sample. Constant cognisance should therefore be taken of the theoretical aspects of sampling and stereology. True random sections are essential, and the segregation of particles during preparation and relief due to polishing can give rise to gross errors.

Microscopic observations are interpretive, and therefore not necessarily objective. Another difficulty arises from the fact that the accuracy of certain stereological measurements is affected by the resolution.

In the extractive metallurgy of sulphides, image analysis and microscopic observations and measurements relate mainly to three topics. These are the volume proportions of minerals, size and size distribution, and liberation characteristics. Other aspects that can be examined include the behaviour of minerals during comminution, reaction rates, shapes, and the preferred associations of minerals.

Report M339

The determination, by flow-injection analysis, of sulphate in solutions containing chromium(III) and iron(III). Nov. 1987. 11 pp.

A flow injection system is described for the turbidimetric determination of sulphate in solutions containing chromium(III) and iron(III) by a method of additions. The sample stream is merged with the carrier stream (0,005 M hydrochloric acid), and barium chloride solution is injected into the combined streams to form a barium sulphate suspension. One loop of the two-position injection valve is used to introduce the barium chloride, the injections of which are alternated with injections of ethylene-diaminetetra-acetic acid (EDTA) from the second loop of the injection valve. The EDTA removes

any residual barium sulphate precipitate.

The range of determination is 0,05 to 0,20 g/l, with a relative standard deviation of 0,058 at a concentration of 0,1 g/l. The sample throughput is 4 per hour. Sulphate can be determined in chromium(III) or iron(III) solutions, in which the chromium or iron is present at concentrations of 10 g/l or less, containing minor amounts (100 mg/l or less) of titanium(IV), aluminium(III), calcium(II), magnesium(II), cobalt(II), manganese(II), and vanadium(IV).

● **Report M222D**

The simultaneous determination of common anions by ion chromatography, by A. Cameron and C. Pohlandt. Oct. 1985, reissued May 1987. 10 pp.

This report describes a working method as used at Mintek. It is based on published work and on application notes issued by a manufacturer of chromatographic equipment.

Fluoride, chloride, nitrite, bromide, phosphate, nitrate, and sulphate in water or effluents are determined, individually or simultaneously, by suppressed ion chromatography. For the simultaneous determination of the anions in the milligram-per-litre range, the time per analysis is less than 8 minutes. The precision of the method is good, as indicated by the relative standard deviations, which were found to be 0,003 for nitrite, phosphate, and bromide; 0,010 for fluoride; 0,009 for chloride; 0,016 for nitrate; and 0,008 for sulphate. The procedure is much faster and more accurate than classical methods of determination. Preparation of the sample requires only a dilution step.

● **Report M227D**

The spectrophotometric determination of silica in metallurgical-grade fluorspar, by M. Solomons. Nov. 1985, reissued Jun. 1987. 9 pp.

A spectrophotometric method, based on a previously published Mintek report, is described for the determination of macro-amounts of silica in fluorspar-type materials. After the sample has been dissolved by fusion and treatment with acid, ammonium molybdate is added in the presence of tartaric acid to form a yellow silicomolybdate complex, which is measured spectrophotometrically. The precision (relative standard deviation) of the method is 0,012 in the silica concentration range 4 to 13 per cent, and the accuracy is better than 98 per cent.

Ten determinations can be carried out in 8 hours.

● **Report M229D**

The determination of metallic iron in prerduced iron ores, by R. Lownsborough. Dec. 1985, reissued Jun. 1987. 7 pp.

A method is described for the determination of metallic iron, which includes all oxygen-free forms of iron. The method was adapted from methods published by the International Organization for Standardization and British Steel Corporation.

The metallic iron is dissolved by a bromine-methanol solution, and after the bromine and methanol have been eliminated, the iron is reduced with stannous chloride and titrated with potassium dichromate solution.

The relative standard deviation of the method is 0,002

at a metallic-iron concentration of 88 per cent, and ten determinations can be carried out in 12 hours.

● **Report M252D**

The spectrophotometric determination of bismuth in sulphide materials, by M. Solomons. Mar. 1986, reissued Jun. 1987. 13 pp.

Two extraction-spectrophotometric methods for the determination of low concentrations of bismuth in sulphide materials containing copper, lead, and zinc were examined. The more advantageous aspects of the methods were combined to give a single efficient method for the determination of bismuth in sulphide materials. This involves the initial extraction-separation of bismuth from up to 300 mg of copper, lead, or zinc with diethyldithiocarbamate followed by extraction into benzene as the complex of bismuth and tri-*n*-octylamine, which is measured spectrophotometrically at 380 nm. The lower limit of determination is 3 µg of bismuth per gram in a 0,5 g sample, and the relative standard deviation at a bismuth concentration of 47 µg/g in a zinc concentrate was found to be 0,020.

● **Special Publication no. 12**

Platinum in South Africa, by A.M. Edwards and M.H. Silk. 1987. 64 pp. Illustrated in colour. R30 (South Africa), US\$30 (other countries).

This publication describes the development of the South African platinum-mining industry from its earliest stage to the position of eminence it now occupies. The progress of the industry occurred in four broad phases. The first phase covers the boom in production that followed the discovery of platinum in South Africa in 1923, and the rapid development of a large number of operations. The boom ended with the onset of the Great Depression and gave way to the second phase, which lasted from 1931 to 1968 and featured the emergence of Rustenburg Platinum Mines as the only significant producer in South Africa. The second phase culminated in a strong revival of platinum prices and a marked expan-

sion in production. The third phase, from 1968 to 1986, was distinguished by the emergence of new producers in competition with Rustenburg, and by an expansion of South Africa's total output of platinum on a scale far exceeding anything that had gone before. Over-production caused the market to collapse in 1971 but the industry began to recover shortly afterwards, and South Africa's output amounted to more than 80 per cent of the world's total by 1980. The fourth phase, which has just begun, has already seen the emergence of several newcomers to the platinum-mining scene, and an expansion of existing producers.

The publication closes with a look into the future based on the lessons of the past. It is concluded that the future is bright for South African platinum producers and will be even brighter if more research is carried out, especially into new and expanded uses for the platinum-group metals.

4. Journals of interest

● *Industrial Minerals*. London, Metal Bulletin Journals Ltd. This monthly magazine is a source of reference to students of geology, mining, engineering, economic geography, geophysics, mining geology, earth sciences, mineralogy, exploration geology, industrial mineralogy, mineral exploitation, and geochemistry. Each issue illustrates the theory of the textbook in the context of today's business environment by reporting on all aspects of the non-metallic minerals industry from extraction to consumption. In addition to regular sections covering mineral notes, world of minerals, freights, and prices, more detailed accounts are given of selected topics such as European glass, fluorspar, and transportation of minerals.

● *Tin and its uses* no. 154, Nov. 1987. (Available from the International Tin Research Institute, Kingston Lane, Uxbridge, Middlesex, UB8 3PJ England.) This issue contains articles on a doped tin (IV) electrode, bronze casting, organotin polysiloxanes, pewter, and tin packaging.