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Book news

1. Recent publications

- Canadian minerals yearbook 1986. Review and outlook. *Mineral Report* 35. Available from Printing and Publishing, Supply and Services Canada, Hull, Quebec K1A 0S9, Canada. \$44.70.

This centennial edition reports on the activity of the mineral industry over the past year, identifies the principal economic events of 1986, and indicates the major trends in the Canadian economy. The 55 commodity chapters feature economic developments, uses, prices, exports, and production and consumption figures specific to each commodity. They also provide a forecast of the industry's future position.

- Canadian mineral deposits not being mined in 1986. *Mineral Bulletin* MR213. (Printing and Publishing Supply and Services Canada, Hull, Quebec, K1A 0S9 Canada.) \$15.

This bulletin gives an inventory of some 1700 Canadian mineral deposits for which tonnages and grades have been estimated and that were not expected to be in production by the end of 1986. The emphasis is placed on exploration for precious-metal deposits, since the bulletin is intended as a handy reference for potential mineral producers and explorationists.

- *The 1987 Sigma catalogue*. St. Louis (USA), Sigma Chemical Co., 1986. 1736 pp.

This catalogue of biochemical and organic compounds for research and diagnostic clinical reagents that are available from Sigma lists the following: products grouped in chemical or application categories, alphabetical list of compounds, tissue culture reagents, equipment and books, standards and controls, chromatography supplies, research kits and reagents, diagnostic kits and reagents, and new items.

- *Der Maschinenschaden*. Munchen (Germany), Koningstrasse 28. This journal of risk technology, which deals with cost and damage-avoidance matters, concludes its 59th year with no. 6/86. Authors competent in various fields deal with cost and damage avoidance by condition monitoring, the rehabilitation of television equipment after smoke damage, the relationship between modern technology and risk protection, and aspects of fire-protection and motor-vehicle technology. Three short contributions deal with relevant specialist meetings and standards, and the issue is completed with a damage report, a literature review with more than thirty titles, and the annual index.

- Metallurgical works in Canada primary iron and steel 1987. *Mineral Bulletin* MR 214. Available from the above address at \$6.60 per copy.

This report lists in detail the facilities, productive capacities, products and other data of companies that comprised the primary iron-and-steel industry in Canada at 1st January, 1987. There are also separate sections pertaining to the steel pipe and tube industry, as well as the iron-powder and ferrite industry.

- *Annual report 1986*. Uxbridge, International Tin Research Institute, 1987.

The report gives full details of the wide-ranging research projects of the Institute, and of its activities in the fields of information and publicity. The new address of the Institute is Kingston Lane, Uxbridge, Middlesex UB8 3PJ, England.

- Canadian iron ore industry statistics, 1986, by B.W. Boyd and A. Cadieux. *Publication* MRI 87/6. Micro-media Limited (Document Delivery, 165 Hôtel de Ville, Place du Portage 2, Hull, Quebec J8X 3X2, Canada).

This report is a continuation of the Canadian Iron Ore Industry Statistics series that was developed for the *Mineral Information Bulletin* published from 1955 to 1970. The statistical data, when used in conjunction with the Iron Ore chapter of the *Canadian Minerals Yearbook*, presents a comprehensive review of the iron-ore industry for 1986.

- *Tin and its uses* no. 153. Uxbridge (England), International Tin Research Institute, 1987. This issue includes articles on can-making, titanium-tin alloy, copper-nickel-tin spinoidal alloys, a new moulding technology, bronze casting, and modern pewter.

2. New journal

Pergamon are producing a new journal, entitled *Minerals Engineering*, which they describe as 'an international journal devoted to innovation and developments in mineral processing and extractive metallurgy'. The Editor-in-Chief is Barry A. Wills, of the Camborne School of Mines, Pool, Redruth, Cornwall TR15 3 SE, UK.

The purpose of the Journal is to provide for the rapid publication of topical papers featuring practical developments in the allied fields of mineral processing and extractive metallurgy. Its wide-ranging coverage of research

and practical (operating) topics will include physical separation methods, such as comminution, flotation concentration, and dewatering, chemical methods such as pyro-, hydro- and electro-metallurgy, analytical techniques, and mineralogical aspects of processing. All aspects of the processing of ferrous and non-ferrous metals, non-metallic minerals, and coal will be authoritatively featured. Papers accepted will be those of strong practical content dealing with research and development in these fields, and short technical notes will be especially favoured. Reviews of specific subject areas and papers describing developments in operating processing plants are also actively sought.

The Editorial Board welcome the submission of suitable articles for editorial consideration. Authors are encouraged to submit papers on computer disks using word-processing packages compatible with IBM. Prompt publication is one of the Journal's primary objectives. It is expected that articles will be published within 5 to 6 months of acceptance.

The Regional Editor for Africa is

Professor C.T. O'Connor
Department of Chemical Engineering
University of Cape Town
Rondebosch
7700.

3. Mintek publications

The following are available from the Council for Mineral Technology, Private Bag X3015, Randburg, 2025 South Africa. The reports are free to South African destinations and R25 per copy to overseas destinations.

● Report M298

The effect of flocculant additions to the leaching solution on the kinetics of the oxidative dissolution of sphalerite, by F.K. Crundwell.

The kinetics of the oxidative dissolution of three zinc sulphide (sphalerite) concentrates from different sources were studied.

It was observed that the dissolution of the concentrate from Gamsberg continued beyond 90 per cent conversion in 2 hours at 80°C. Under similar conditions, the concentrates from Black Mountain and Rosh Pinah failed to exceed a conversion of 40 per cent. This behaviour is considered to be a consequence of the formation of lead jarosite on the surface of these sphalerites.

The kinetics of dissolution of the Gamsberg concentrate are successfully described by an electrochemical mechanism in which the charge transfer from the solid to the oxidant is rate-limiting. The rate of reaction is proportional to the sum of the concentrations of the $\text{Fe}^{3+}_{(\text{aq})}$ and FeHSO_4^+ complexes, with a reaction order of 0,5. The addition of iron(II) to the solution had an indirect effect on the reaction rate by decreasing the concentrations of the electro-active ions. The addition of zinc sulphate did not affect the reaction rate.

The addition of flocculant to the leaching solution resulted in diminished rates of reaction for all the concentrates owing to organic adsorption on the sphalerite, which impedes charge transfer.

● Report M304

The smelting of ilmenite in a d.c. transferred-arc plasma furnace with a molten-anode configuration, by A.D. Brent. Jul. 1987. 17 pp.

The reduction of ilmenite to yield a high-grade titania slag and a pig iron byproduct in a d.c. transferred-arc plasma furnace was investigated. The aim was the production of a slag suitable for use as feedstock for the fluidized-bed production of titanium tetrachloride. Small-scale (50 kW) batch tests were conducted on three different ilmenite concentrates with widely differing chemical compositions and geological histories. The effects of the particle size of the reducing agent, the carbon stoichiometry, and the reaction time were examined. The influence of these parameters on the grade of the slag, the recoveries of titanium and iron, and the efficiency of the reducing agent are discussed.

The use of magnesia crucibles to contain the melt was found to result in an unacceptable level of magnesia contamination in the slag. This problem was overcome by the use of graphite crucibles and by control of the thermal balance of the furnace so as to maintain a protective 'freeze lining' on the inner walls of the crucible. This freeze lining ensured that the graphite crucible and titania slag did not react chemically. The electrical and physical characteristics of the d.c. transferred-arc plasma furnace were found to be well suited to the smelting of ilmenite. Stable furnace operation was observed during the processing of all three ilmenite concentrates, and slags containing more than 80 per cent titanium dioxide (by mass) were readily obtained.

It is recommended that further work in this area should be conducted on a larger scale and on a continuous basis. The possible use of a d.c. transferred-arc plasma furnace for the processing of pre-reduced ilmenite should also be studied, since this method could result in a considerable saving of electrical energy over existing industrial practices, which do not employ pre-reduction.

● Report M312

The reactions of some thiol collectors at noble-metal and pyrite electrodes, by D.R. Groot. Jul. 1987. 21 pp.

A number of techniques were used in a study of the electrochemical reactions of three thiol collectors (diethyldithiophosphate, mercaptobenzothiazole, and Reagent Z200) on noble-metal and pyrite surfaces. These included electrochemical, impedance, contact-angle, and infrared spectroscopic studies. Based on the results, models for the reactions of these collectors are proposed so that predictions can be made about the effects of the conditions in flotation circuits on recoveries.

● Report M321

The determination of molybdenum, arsenic, and uranium in activated carbon by X-ray-fluorescence spectrometry, by A.M.E. Balaes and G.J. Wall. Aug. 1987. 10 pp.

A rapid, accurate, precise, and cost-effective method is described for the determination of uranium, molybdenum, and arsenic in activated carbon. Preparation of the sample is minimal, involving only fine grinding of the carbon, the addition of a diluent and a wax-polystyrene

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