Publications

New Journals

The following three journals may be of interest to readers:

Fuel Processing Technology, an international journal devoted to all aspects of the processing of coal, oil shale, tar sands, and peat; volume 2, 1979, is now available in 4 issues at a subscription of $U.S. 69,00 (Dfl. 155,00) from Elsevier Scientific Publishing Company, P.O. Box 211, 1000 AE Amsterdam, The Netherlands.

Process Economics International, an international quarterly magazine on economics in the process industries; sample copies and further details are available from Process Economics International, Parnell House, 25 Wilton Road, London SW1V 1NH, England.

Speculations in Science and Technology, a journal published five times a year, containing speculative papers (general, detailed, and/or interdisciplinary) in the physical, medical, mathematical, biological, and engineering sciences; the annual subscription is SFrs. 60, which should be sent to Elsevier Sequoia S.A., P.O. Box 851, 1001 Lausanne 1, Switzerland.

NIM reports

The following reports are available free of charge from the National Institute for Metallurgy, Private Bag X3015, Randburg, 2125 South Africa.

Report no. 2016

Analysis of the NIMROC reference samples for major elements.

The results are given for all the determinations made by the co-operating laboratories of major elements in the six NIMROC rock samples prepared by the National Institute for Metallurgy in 1966. Relevant statistical data are given for the sets of results for each major constituent, and recommended values of all constituents except Al_2O_3, Na_2O, K_2O, and CO_2 in the dunite, Fe_2O_3, MgO, and CO_2 in the granite, Fe_2O_3 and CO_2 in the norite, and CO_2 in the pyroxenite.

This report and that on trace and minor elements issued in 1978 complete the revision of the recommended values. It is suggested that analysts should concentrate rather on those constituents for which the results have shown such a wide scatter that they can be of no use for reference purposes, than on those for which the values are fairly well established.

Report no. 2018

Supergene alteration of sulphide ores. II. The effect on the floatability of chalcopyrite, galena, and sphalerite.

Studies of the interrelation between supergene alteration, grade, and floatability of chalcopyrite, galena, and sphalerite show that, in addition to grade, the degree of supergene alteration is a major factor determining the floatability of these sulphides. Two domains of alteration are recognized. Incipient alteration below the water table increases the floatability of all three relevant sulphides. However, advanced alteration close to, or above, the water table has a pronounced degradational effect on the floatability of these sulphides. Although the true nature of the advanced alteration is not known, the amount of soluble magnesium in the ore is shown to be a probable indicator of the extent of this alteration. Further studies on the phenomenon of advanced alteration are justified

Report no. 2013

List of unrestricted NIM publications issued from 1966 to 1979.

This publication lists the 714 unrestricted reports, 294 papers, 19 patents, and 5 other technical publications that were issued as publications of the National Institute for Metallurgy from 1966 (the year of its inception) to 1st April, 1979. For ease of reference, these publications are also classified under the research programmes that gave rise to them.

Also included are details of the 2 periodicals issued by NIM and a list of the current miscellaneous publications of the Institute, which include the annual report, and brochures and leaflets of various kinds.

Report no. 2014

The determination by spark-source mass spectrometry, of chlorine and phosphorus in high-purity tungstic oxide.

Samples of tungstic oxide are spiked with a solution of sodium dihydrogen phosphate for the determination of phosphorus, and with sodium chloride for the determination of chlorine. The spiked samples are mixed with high-purity silver powder to form electrodes. The concentrations of chlorine and phosphorus are determined by extrapolation from calibration graphs. The precision (relative standard deviation) of the method is estimated to be 0,2.

Report no. 2017

Vanadium-bearing titaniferous iron ores from the Rooiwater, Usushwana, Mambula, Kaffirskraal, and Trompsburg Igneous Complexes.

The mineralogy and chemistry of some vanadium-bearing titaniferous iron ores from a number of smaller South African basic intrusions are reported, and an assessment is given of the potential of these ores for use as raw materials in the production of iron, high-titania slag, and vanadium pentoxide. The ores from each complex can be distinguished readily on the basis of their chemical composition and textural relations.

The Rooiwater Complex represents the most promising area. It contains two layers of titaniferous magnetite, each approximately 8 m thick, in the eastern part, the lowest seam being chemically similar to the economically important main layer of titaniferous magnetite in the Bushveld Complex. The Rooiwater ores have been metamorphosed, which has resulted in extensive recrystallization and the development of abundant coarse-grained ilmenite. The ores are silicate-poor and consist largely of multi-phase titaniferous-magnetite

grains containing modified ilmenite and pleonaste micro-intergrowths. The coarse grain size of these ores favours beneficiation, and they can be partially treated to yield ilmenite concentrates and low-titania magnetite fractions in which the content of vanadium pentoxide is higher than that in the original ores.

The Mambula ores are silicate-rich and would require extensive beneficiation. They are rather low grade and the reserves appear to be limited.

The Kaffirskraal ores consist of multi-phase grains of titaniferous magnetite containing crystallographically oriented ilmenite, ulvospinel, and pleonaste micro-intergrowths. Minor coarser-grained ilmenite is also present. The Usushwana ores are texturally similar but contain abundant lamellar ilmenite in place of the ulvospinel. The primary features are well preserved in the Kaffirskraal ores, which have not been metamorphosed. The Usushwana ores have been slightly metamorphosed, resulting in the extensive replacement of the titaniferous magnetites by sphene and chlorite aggregates. The ores from these two complexes cannot be beneficiated by conventional ore-dressing techniques, and would require direct metallurgical treatment for the recovery of iron, titania, and vanadium pentoxide. The smallness of these deposits detracts from their economic potential.

Report no. 2022

The determination of thallium and indium in sulphide concentrates.

The separation, concentration, and determination of indium and thallium in sulphide concentrates is described. After the sample has been dissolved, the hydroxides of indium and thallium are precipitated and separated from those elements that form soluble amines with ammonia. The precipitate is dissolved, and the indium and thallium are separated by ion-exchange or liquid-liquid extraction techniques. Indium and thallium are then determined.

Report no. 2023

Atomic-absorption spectrophotometry with hydride generation: an improved technique.

An account is given of the work undertaken on the improvement of the analytical technique involving atomic-absorption spectrophotometry and hydride generation.

A new type of reaction vessel was designed and manufactured, and an electrically heated quartz atomization tube was used instead of the air-entrained hydrogen flame of the former method.

The new method is 25 per cent more sensitive than the old, and the relative standard deviation is 0,015 at the concentration level of 0,1 mg per litre of sample, as against 0,032 for that of the conventional method.

Proceedings

The following volumes of proceedings are now available:

Proceedings of the Eleventh Commonwealth Mining and Metallurgical Congress, Hong Kong, 1978. London, Institution of Mining and Metallurgy, 1979. 800 pp. £35,00 or $U.S.77,00.

Water in mining and underground work. Granada (Spain), 1979. 3 vol. 1550 pp. 5,500 pts (approximately $U.S.80). These are the proceedings of the World Congress of Water in Mining and Underground Work (SIAMOS), which was held in Granada from 18th to 22nd September, 1978. Orders should be addressed to the Work Group of Hydrogeology, Sciences Faculty, Apartado de Correos 556, Granada, Spain.

Readers are asked to complete and return the questionnaire that is enclosed in this issue. The information requested is urgently required for the Audit Bureau of Circulation.

Company Affiliates

The following members have been admitted to the Institute as Company Affiliates.

AECI Limited.
Airco Engineering (Pty.) Limited.
Amalgamated Collieries of S.A. Ltd.
Apex Mines Limited.
Associated Manganese Mines of S.A. Ltd.
Blackwood Hodge (S.A.) (Pty.) Ltd.
Blyvooruitzicht Gold Mining Co. Ltd.
Boart International Limited.
Bracken Mines Ltd.
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Consolidated Murchison (Tvl.) Goldfields & Development Co. Ltd.
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Free State Saaiplaas Gold Mining Co. Limited.
Gardner-Denver Company Africa (Pty.) Ltd.
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O'Okiep Copper Co. Ltd.
Palabora Mining Co. Ltd.
Photometric Sorters.
President Steyn Gold Mining Co. Ltd.
Pretoria Portland Cement Co. Ltd.
Prieska Copper Mines (Pty.) Limited.
Rand Mines Limited.
The Randfontein Estates Gold Mining Company Witwatersrand Ltd.
Rooiberg Minerals Development Co. Ltd.
The Robbins Co. (Africa) (Pty.) Ltd.
Rustenburg Platinum Mines Ltd. — Union Section.
Rustenburg Platinum Mines Ltd. — Rustenburg Section.
Shaft Sinkers (Pty.) Ltd.
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Tsumeb Corporation Limited.
Union Corporation Limited.
Vaal-Reefs Exploration & Mining Co. Ltd.
Venterspost Gold Mining Co. Ltd.
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Welkom Gold Mining Co. Ltd.
West Driefontein Gold Mining Co. Ltd.
Western Areas Gold Mining Co. Ltd.
Western Deep Levels Ltd.
Western Holdings Limited.
Winkelhaak Mines Limited.