

in the cell using platinum black on a platinum grid as the catalyst. Another approach is the isotope battery, in which the heat generated by the radioactive isotope plutonium 238 is converted to electrical energy using a thermopile.

It is hoped that, by new methods of powering pacemakers, patients will be able to have trouble-free pacing for a period of at least five years. After discharge from hospital

following an implantation the patient can lead a normal life, returning to hospital for checks from time to time to make sure that all is well with the system. Thousands of people who would otherwise be totally incapacitated are working and enjoying life again thanks to cardiac pacemakers for which the platinum and 10 per cent iridium-platinum electrode materials were supplied by Johnson Matthey Metals Limited.

Analytical Chemistry of the Platinum Metals

PROCEEDINGS OF THE SOUTH AFRICAN SYMPOSIUM

Techniques for the analysis of the platinum group metals and their alloys and compounds are receiving greater attention as the number of their applications increases and as the circle of consumers, refiners and producers widens. This was recognised by the holding in February of last year of a special symposium on "Analytical Chemistry of the Platinum-group Metals" at the National Institute for Metallurgy, Johannesburg. The symposium was attended by many of the most prominent workers in this fascinating field of modern inorganic chemistry. Fifteen of the 21 papers presented there have now been published in the *Journal of the South African Chemical Institute* (1972, 25, (3), 155-319).

As an introduction J. T. Moelwyn-Hughes (University of the Witwatersrand) gives a general survey of the chemistry of platinum metals and indicated studies which should lead to improved analytical schemes.

G. H. Faye and P. E. Moloughney (Canadian Department of Energy, Mines and Resources) described techniques for the separation and collection of precious metals using tin and showed that it is an efficient collector for all eight precious metals. R. V. D. Robért et al. (National Institute for Metallurgy) showed that nickel sulphide has several advantages over lead as a collector, except in the case of gold. A comparison of fire assay, aqua regia leach and high temperature chlorination treatments of ores and concentrates was made by I. Palmer et al. (N.I.M.) showing their general agreement, except that recovery of platinum from an ore was markedly greater by the leach methods.

Chromatographic separations of the non-volatile platinum metals on cellulose columns were shown by C. Pohlandt et al. (N.I.M.)

to be relatively simple and rapid. F. von S. Toerien et al. (S.A.A.E.B.) indicated a possible series of separations of some noble metals from base metals by ion exchange.

The interferences which may be encountered in atomic absorption methods were discussed by R. G. Mallett et al. (N.I.M.) together with methods to overcome them. The graphite rod furnace technique was shown by B. D. Guerin (N.I.M.) to be useful for very low levels of the noble metals (except osmium) and the technique of pressure dissolution prior to atomic absorption was shown by D. C. G. Pearton et al. (N.I.M.) to be very effective.

J. Turkstra et al. (National Nuclear Research Centre) showed that neutron activation methods they used were not too successful on ores and flotation concentrates. A spectrographic method used by R. A. Snodgrass (South West Africa Co. Ltd.) for determining platinum group metals in gold-bearing ores encountered difficulties because of the heterogeneous distribution of the osmiridium. K. Dixon and T. W. Steele (N.I.M.) found that a spectrographic technique for determining noble metals in solution using the rotating disc method had adequate sensitivity and precision when base metals were absent.

A new method presented by P. W. Gerrard and W. Westwood (Johnson Matthey & Co. Ltd.) was concerned with the application of membrane filtration and X-ray fluorescence examination of the thin layer on the filter. B. G. Russell et al. (N.I.M.) described X-ray fluorescence analysis of ore, nickel sulphide mattes, ion exchange resins, and matte leach residues. Methods for the determination of osmium and ruthenium were reviewed by G. H. Faye. w. w.