Applications of the Platinum Metals

A REPORT FROM THE JOINT CHINESE SOCIETY OF METALS AND THE METALS SOCIETY INTERNATIONAL CONFERENCE

An international conference on the production and the applications of the less common metals was held at Hangzhou during November 1982, the conference being jointly sponsored and organised by the Chinese Society of Metals and The Metals Society, London.

The introductory lecture, given by Sun Hongru, Vice-President of the Chinese Metals Society, considered the resources and production of the less common metals in China, while of the 48 papers presented eight were concerned with the platinum metals. World resources, production and applications of the platinum metals, in particular the changing pattern of industrial users, were reviewed by Dr. C. D. Desforges of Engelhard Industries who predicted that a major requirement for platinum in the 1990s will develop as fuel cells become widely adopted. This application may repeat the success that platinum has had in pollution control catalysts for the automobile industry.

In a paper presented by Li Jin-Yang and his colleagues at the Guanzhou Research Institute for Non-Ferrous Metals the development and use of a titanium-ruthenium oxide anode for the production of electrolytic silver to be used as a catalyst in formaldehyde production was described. Studies on catalysts containing platinum group metals were reported by F. J. Berry of the University of Birmingham; in particular, the use of Mössbauer spectroscopy to examine solid catalysts under realistic gaseous environments was illustrated by its application to the study of supported ruthenium, iron-palladium and tin-platinum catalyst systems.

The use of ruthenium as an alternative to cobalt as the matrix of cemented carbide tool materials was described by Professor M. B. Waldron of the University of Surrey. Nickel, picked up as an impurity during ball milling, was found to improve the sintering behaviour of ruthenium-titanium carbide alloys and subsequently was incorporated in industrial alloys made on a pilot production scale. The addition of platinum group metals to nickel-based alloys to produce materials with enhanced corrosion resistance was reported by Dr. C. W. Corti, who described the results of recent work carried out at the Johnson Matthey Group Research Centre to develop improved alloys for gas turbines.

Dispersion Strengthened Materials

A major industrial use for platinum in bulk form is for high temperature structural applications in the glass industry. The use of small amounts of yttrium oxide dispersions to provide improved high temperature strength was described by Desforges, the work carried out at the Engelhard laboratory having led to the development of a platinum material, known as ODS platinum, with similar properties to those of ZGS platinum produced commercially by Johnson Matthey.

Dispersion-strengthened platinum materials for high temperature use were also considered by A. E. Heywood of Johnson Matthey Metals, who described the range of ZGS materials that have become commercially available progressively since the early 1970s. Non-wetting ZGS alloys containing gold and a lighter weight ZGS sandwich material with a palladium centre are now finding significant application. Looking to the future, the need for even stronger materials for the glass fibre industry has become apparent and Heywood concluded by alluding to the current development of "ZGS-3" platinum and rhodium-platinum materials which should fulfil these predicted needs.

The papers presented at the conference illustrated the diverse use of the platinum metals, and will be published by The Metals Society later in the year. C.W.C.