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Platinum Group Metals Technology in Ekaterinburg

Research and development undertaken at the Ekaterinburg Non-ferrous Metals Processing Plant in Russia into metallurgical aspects of the platinum group metals (pgms) is described in a recent issue of the Russian journal *Tsvetnye Metally* (1), translated into English.

With over 80 years' experience, the plant is a leader in platinum (Pt) jewellery production which forms, together with jewellery alloys, a large part of the Pt output at the plant. Casting and moldings are done in an inert atmosphere or under vacuum and jewellery soldering alloys for Pt alloys are being developed. A volatile oxide-forming component is added to a jewellery alloy to counter gas absorption.

Dispersion hardened alloys for glass production, particularly glass fibre production, have been developed. The protection of pgm equipment and reduction of metal loss during fabrication has been achieved by plasma technology, in a 'PM-plasmoceramic' system. This has been adopted by several industries. Sputtered coatings on the outer surface of equipment result in less metal use and metal loss.

The brittle fracture of Pt alloys caused by various molten metals and elements, such as iron, manganese, calcium and silicon, has been investigated. Iridium (Ir) research is a speciality at Ekaterinburg, so a short item from V. A. Dmitriev, N. I. Timofeyev and A. V. Ermakov on brittle fracture in Ir and Ir alloys and the effects of molten additions is of note. Ir only fails by brittle fracture under tensile stress (2). Ir crucibles used in reprocessing lead-zinc 'cakes' containing high concentrations of gold and silver at > 1300°C have operated for a few hundred hours without failure.

Other technologies with improved results are: knitted gauze catalysts and catchment gauzes for ammonia oxidation, Pd alloy powders for capacitors, and new materials for dental alloys. Au-Cu-Pd alloy phase diagrams have also been investigated.

The plant at Ekaterinburg recycles pgms waste. Their rhodium refining scheme is very flexible. There are new processes for osmium (Os) recovery and separation, and a method for the production of high purity Os powder uses gaseous phase extraction at up to 2000°C. A sample from a placer deposit from the Inagli field, Yakutia, contained 0.89% Os, 71.55% Pt, etc. Iron, nickel and copper were the major impurities. The recovery of up to 95% Os in a full processing cycle of placer Pt, and 100% recovery from the gaseous phase is claimed.

References

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Noble and Rare Metals Conference

The 4th international conference on noble and rare metals (NRM-2003) will be held in Donetsk, Ukraine, on 22nd to 26th September, 2003. Geology, extraction, recovery and secondary refining, alloys and alloy properties, and industrial uses will be covered.

Information can be obtained from Professor V. A. Goltsov of Donetsk National Technical University, Ukraine; E-mail: goltsov@physics.dgtu.donetsk.ua; and from the internet at: http://dgtu.donetsk.ua/NRMworld/files/eng/.