

Sulfur storage on platinum catalysts was compared on ceria, zirconia and mixed ceria-zirconia supports by P. Bazin, O. Saur and J. C. Lavalley from ISMRA-Université, and A. M. Le Govic and G. Blanchard of Rhône-Poulenc, France. The advantages of cerium-zirconium mixed oxides include higher oxygen storage capacity and better stability for the platinum, with the suggestion that better sulfate reduction could favour faster oxygen storage recovery.

In conclusion, CAPoC4 covered most of the

key areas that are important for meeting future exhaust emission standards. However, more papers on work to control diesel emissions would have better reflected its importance. The Proceedings of this Congress are expected to be published by Elsevier in their "Studies in Surface Science and Catalysis" series. The next CAPoC conference is planned to take place in 1999 and should cover progress made towards meeting the 2005 European Union emission standards, which will have been finalised by then.

Platinum 1997

Monday 19th May saw the launch of "Platinum 1997", the latest annual survey, published by Johnson Matthey, of the supply, demand and applications of the platinum group metals during 1996.

Supplies of platinum fell by 2 per cent to 4.9 million oz during 1996 due to lower Russian exports and a slight decline in production from South Africa. The price of platinum in 1996 averaged \$397.32, compared to \$424.22 in the previous year. This was closely tied to the price of gold, reaching a peak of \$433 in February and then falling throughout the year to a low of \$367 in mid December, despite a temporary recovery in early August due to a series of disputes in South African mines.

Demand for platinum rose by 40,000 oz to reach a record of 4.88 million oz in 1996. The use of platinum in autocatalysts fell by 30,000 oz to 1.82 million oz due to some manufacturers switching to palladium-based technology on gasoline cars. Stricter controls on emissions, however, resulted in an increase in platinum demand for diesel vehicles, as only platinum technology is suitable for the extremely high air:fuel ratios of diesel engines. The introduction of direct-injection gasoline engines, operating under similar lean conditions, is expected to boost the demand for platinum in the future, as may the future commercialisation of fuel cells, for both automotive and stationary applications. Industrial consumption of platinum rose by 95,000 oz to 1.12 million oz with demand rising

for platinum coated hard disks installed in personal computers and for speciality glasses used in television screens and computer monitors, which are produced using platinum-based equipment. There was also strong demand from the petroleum sector for platinum catalysts used in the production of cleaner diesel and unleaded petroleum and for the dewaxing of engine lubricating oils. Sales of platinum to China reached a record 200,000 oz, most being to the jewellery sector, but investment in China's industrial infrastructure also required significant amounts of metal.

Demand for palladium rose by 30,000 oz to 6.15 million oz. Much of this was to the auto sector; around 60 per cent of European gasoline cars sold last year were equipped with palladium-based catalysts, as were those produced by Ford in the U.S.A. There was also increased use of palladium starter catalysts needed to meet the hydrocarbon limits imposed by Low Emission Vehicle legislation in the U.S.A. This demand is forecast to rise as emissions legislation is tightened further. Demand for ruthenium and iridium was greatly increased, mainly due to the development of processes using ruthenium and iridium to produce ammonia and acetic acid, respectively.

Readers of *Platinum Metals Review* who would like to receive a free copy of "Platinum 1997" can do so by writing to Alison Cowley, Johnson Matthey PLC, 78 Hatton Garden, London EC1N 8JP; Fax: 0171-269-8389.