

OTHER PLATINUM GROUP METALS

RHODIUM

Demand for rhodium, net of recycling, rose by 19 per cent to 740,000 oz in 2004. Overall use of rhodium in autocatalysts grew strongly in Europe and Asia as average loading levels increased ahead of tighter emissions legislation. In addition, some auto makers are understood to have added to their strategic stocks of metal during the year. Purchases of rhodium by the glass industry also increased markedly last year, reflecting the rapid expansion of LCD glass manufacturing capacity in Asia.

Autocatalyst

Auto industry purchases of rhodium jumped to 773,000 oz in 2004, an increase of 17 per cent on the previous year. However, the year-on-year comparison may be somewhat misleading as it appears likely that a proportion of the surplus for rhodium recorded in 2003 (see table below) was purchased by auto companies on forward contracts.

In 2004, Japanese autocatalyst purchases of rhodium surged by 33 per cent to 229,000 oz. This figure encompassed a build-up of inventories of metal by the Japanese auto industry, a consequence of what, during the first half of the year at least, were relatively low rhodium prices.

The actual use of rhodium in autocatalysts climbed in reaction to tightening limits on vehicle NOx emissions. Rhodium is highly effective at catalysing the conversion of NOx to nitrogen and in many instances average rhodium loading levels were increased to enable auto makers to meet the stricter limits.

Similarly in Europe, an overall increase in average rhodium autocatalyst loading levels was driven by the introduction of new vehicle models that comply with Euro IV emissions standards. These reduce allowable NOx emission limits by up to 50 per cent for gasoline light duty

vehicles. Purchases of rhodium increased by 8 per cent to 202,000 oz in 2004 as a result.

In North America, purchases of metal by automakers rose to 225,000 oz, an annual increase of 12.5 per cent. In contrast to Japan, however, the rise was largely due to the fact that less metal was drawn down from auto company inventories than the year before, and so more rhodium was purchased in the market.

Demand for rhodium in the Rest of the World increased by 17 per cent in 2004 due to the combination of higher light vehicle output and tightening emissions limits, primarily in Asia.

The recycling of rhodium from scrapped autocatalysts advanced by almost 14 per cent to 141,000 oz in 2004, with the greatest increase in volume terms coming in North America. This, in turn, was a result of changing ratios of pgm used in catalysts some 10 to 12 years previously. Recovery of rhodium in Europe and the Rest of the World also grew due to increased catalyst collection rates, although the volumes of metal recycled in these regions lag well behind North America.

Other

Purchases of rhodium for use in chemical, glass and other applications jumped by more than 28 per cent in 2004 to 108,000 oz, primarily due to a surge in purchases of metal by the glass manufacturing industry.

After a relatively subdued 2003, purchases of rhodium by glass manufacturers jumped to 46,000 oz last year, an increase of 20,000 oz. The increase in demand was primarily a result of the rapid expansion of glass manufacturing capacity in Asia (particularly for LCD glass production), which led to strong demand for rhodium-platinum equipment.

Demand for rhodium from the chemicals industry edged up to 41,000 oz in 2004. The modest improvement was related to the construction of new capacity for the manufacture of acetic acid in Asia and growth in demand from the oxo-alcohols sector in North America. Consumption of rhodium in platinum alloys for use in nitric acid gauze slipped slightly lower due to plant closures in the USA.

Use of rhodium in thermocouple wire and other electrical applications was largely stable in 2004, whereas demand for rhodium plating salts from the

Rhodium Supply and Demand '000 oz		
	2003	2004
Supply		
South Africa	544	587
Russia	140	105
North America	26	18
Others	14	16
Total Supply	724	726
Demand		
Autocatalyst: gross	660	773
recovery	(124)	(141)
Chemical	39	41
Electrical	6	6
Glass	26	46
Other	13	15
Total Demand	620	740
Movements in Stocks	104	(14)



Chinese jewellery industry increased. Virtually all white gold and palladium jewellery manufactured in China is rhodium-plated, as is the majority of platinum, although this application remains a small market in volume terms for rhodium.

RUTHENIUM & IRIIDIUM

Demand for ruthenium climbed by 9 per cent in 2004 to 674,000 oz. Use of the metal in chemical applications fell but this was outweighed by a strong increase in purchases by the electronics industry. Demand for iridium also increased by a little over 9 per cent last year, rising to 116,000 oz, although in contrast to ruthenium the increase was driven by greater consumption of iridium-based catalysts.

After a very substantial rise in demand for ruthenium in chemical process catalysts in 2003, purchases of metal last year fell by 14 per cent to 123,000 oz. The year-on-year changes in demand reflect the considerable impact that catalyst orders for new chemical

manufacturing plants can have on the consumption of minor metals.

The use of ruthenium in the electrochemicals industry also slipped lower in 2004, sliding to 96,000 oz as the global trend to convert chlor-alkali plants using older diaphragm technology to modern membrane production continued. The diaphragm

process utilises only ruthenium-coated anodes whereas membrane plants employ ruthenium-iridium anodes with a lower overall ruthenium content.

Demand for ruthenium from the electronics industry, however, increased substantially last year, climbing to 388,000 oz. Strong growth in sales of both industrial and consumer electronics drove a marked rise in purchases of ruthenium pastes from producers of resistor components. At the same time, rising shipments of hard disks led to a notable increase in orders for ruthenium sputtering targets from hard disk manufacturers – the addition of ruthenium to the magnetic alloy significantly increases the amount of data that can be stored per disk.

Use of ruthenium in other applications slipped lower in 2004 due to reduced demand for an alloy used in

corrosion-resistant piping, which has applications in geothermal power plants and parts of the petroleum refining industry.

The most significant increase in demand for iridium came from the chemicals industry, consumption of the metal in iridium-based process catalysts rising by 5,000 oz to 25,000 oz.

The production of acetic acid continued to be the main source of growth in this sector. Electrochemical demand for iridium also improved, use of the metal by chlor-alkali manufacturers increasing to 26,000 oz.

Total electronics demand for iridium expanded to 30,000 oz in 2004. Good demand from the mobile phone and medical imaging industries for components manufactured from high-purity crystals led to increased orders for the iridium crucibles in which these crystals are grown.

Purchases of iridium for use in other applications remained stable overall at 35,000 oz. Increased consumption of the metal in the manufacture of high performance spark plugs was offset by small declines in demand from other sectors such as jewellery alloys and cathodic protection.

	2003	2004
Chemical	20	25
Electrochemical	23	26
Electronics	28	30
Other	35	35
Total	106	116



	2003	2004
Chemical	143	123
Electrochemical	120	96
Electronics	277	388
Other	77	67
Total	617	674



OTHER PGM SUPPLIES

Supplies of rhodium increased only marginally in 2004 to 726,000 oz. South African shipments of metal expanded by 8 per cent to 587,000 oz, rising in line with higher platinum production. However, sales from North America fell and substantially less rhodium was shipped from Russia compared with the year before. Russian mine production of rhodium is believed to have been stable in 2004 so the fall in exports infers a reduction in sales from state stocks.

With demand exceeding mine supply, availability of rhodium was tight for much of the year. This was reflected in the price, which climbed from \$500 in January to over \$1,500 in August, before easing a little to end the year at \$1,330.

Supplies of ruthenium and iridium, predominantly from South Africa, were again more than sufficient to meet industrial demand. However, the involvement of speculators pushed the prices of both metals up substantially during the first quarter of the year.