



Other Platinum Group Metals

Rhodium

Demand for rhodium is forecast to rise by 9 per cent to 680,000 oz in 2004 (net of metal recovered from recycled autocatalysts). Much of the growth will result from greater use of the metal in catalytic converters in response to tightening vehicle emissions standards worldwide. In addition, the construction of several new glass furnaces in Asia is driving strong demand for production equipment manufactured from rhodium-platinum alloys.

Autocatalyst

Auto manufacturers are forecast to purchase 725,000 oz of rhodium this year, 50,000 oz more than in 2003. The growth will accrue through a combination of less use of metal from stocks by US auto companies, an increase in average catalyst loading levels in many regions in response to tighter emissions legislation, and higher light vehicle production.

The majority of the growth in purchases of rhodium will be seen in North America: US auto makers are expected to use significantly less rhodium from inventories in 2004 than the year before, and so will purchase more of their metal requirements from the market. In addition, average catalyst rhodium levels are rising in the USA in response to the introduction of the federal Tier 2 emissions standards. These require very substantial cuts in NOx emissions and rhodium is highly effective in catalysing the chemical reduction of NOx to nitrogen.

Meanwhile, North American vehicle output continues to move in favour of light trucks, which because of their larger engines, tend to use greater total amounts of pgm in their catalyst systems than passenger cars.

In Europe too, average catalyst loadings of rhodium are expected to rise in response to the latest round of emissions legislation, Euro IV. The effect of this on rhodium demand in 2004, however, will be offset by a fall in gasoline car production.

Purchases of rhodium by Japanese auto manufacturers are projected to increase modestly this year – the result of a combination of higher light vehicle production, and tighter emissions standards in the key Japanese export markets of the USA and Europe. The same factors will result in a small rise in rhodium demand in the Rest of the World.

Recovery of rhodium from recycled autocatalysts is

forecast to climb by 12 per cent to 140,000 oz in 2004. As with the other pgm, the greatest increase in volume terms will be seen in the USA, up by 10,000 oz to 90,000 oz, whereas the fastest rate of growth will occur in Europe, up by 25 per cent to 25,000 oz. In both regions the growth is attributable to higher catalyst collection rates and changes in the mix of vehicle models, and therefore catalysts, that are scrapped.

Other Demand

Demand for rhodium from the glass industry will rise strongly in 2004, jumping by a forecast 17,000 oz to 40,000 oz. Rhodium is a key component of platinum alloys used in glass production equipment. With substantial new manufacturing capacity for LCD glass coming on stream in Asia this year, orders for products made from rhodium-platinum alloys have surged. In North America, however, the closure of the final three television glass furnaces in the country will result in the sale of rhodium in quantities that will outweigh new purchases.

Total demand for rhodium-based catalysts from the global bulk chemicals industry is not expected to change much this year. Some growth will result from increased oxo-alcohol production capacity but rhodium's share of the acetic acid catalyst market will fall due to the conversion of a number of plants from rhodium-based technology to a manufacturing process that uses a ruthenium-iridium catalyst. Demand for rhodium from the nitric acid sector is also projected to be flat; although orders for catalyst gauze have been robust during 2004 to date, the industry has been moving away from traditional 90 per cent platinum, 10 per cent rhodium alloys towards lower-cost alloys comprising 90 per cent platinum, 5 per cent palladium and 5 per cent rhodium.

Ruthenium & Iridium

Demand for ruthenium from end users is forecast to fall back to 599,000 oz in 2004, down from 614,000 oz in 2003. Less ruthenium will be required by the chlor-alkali industry than the year before, and consumption of the metal in catalyst applications will also fall. The drop in demand from chemical applications will be partly offset by growth in demand for ruthenium in electronic components. Purchases of iridium are forecast to rise by 5 per cent to 106,000 oz in 2004, with use of the metal in chemical catalyst applications

Rhodium Supply and Demand '000 oz		
	2003	2004
Supply		
South Africa	545	565
Russia	140	80
North America	30	30
Others	15	15
Total Supply	730	690
Demand		
Autocatalyst: gross	675	725
recovery	(125)	(140)
Chemical	37	37
Electrical	6	7
Glass	23	40
Other	10	11
Total Demand	626	680
Movements in Stocks	104	10





Other PGM

expected to grow. Speculative interest has helped to support the price of both metals during the year to date.

The electronics industry remains the largest consumer of ruthenium by a large margin. Demand for the metal from manufacturers of components such as resistors and varistors is forecast to climb by almost 10 per cent to 272,000 oz in 2004. Most of the growth will come from Asia, where manufacturing capacity for the production of flat chip resistors has grown rapidly in recent years, particularly in China. An upturn in sales of mobile phones and other electronic goods, plus the increasing complexity of automobile electronics, will drive strong demand for resistor components this year.

Demand for ruthenium from manufacturers of hard disks is also expected to rise rapidly in 2004, although the total volume of metal consumed in this application remains small.

Consumption of ruthenium in hybrid integrated circuits is not expected to increase this year. Although shipments of HIC are rising, the effect of this on ruthenium demand will be countered by a reduction in the average number of resistors per component.

After an exceptionally strong year in 2003, demand for ruthenium from the chemical process catalyst sector will fall in 2004, dropping by 16 per cent to 118,000 oz. Ruthenium is a component of the catalyst used in the Cativa® acetic acid manufacturing process and has several other speciality chemical catalyst applications. With less new capacity being constructed across a range of processes this year, ruthenium demand will contract.

Electrochemical demand for ruthenium is projected to slip by 22 per cent to 94,000 oz in 2004. Purchases of metal by chlor-alkali manufacturers in North America will drop, following the completion of a major anode recoating programme last year. In Europe, where a large number of chlor-alkali plants are still based on mercury cell technology, manufacturers are steadily switching capacity to the more environmentally acceptable membrane process. In membrane-based facilities iridium replaces a proportion of the ruthenium in the anode coating. As plants convert to the new technology, the volume of ruthenium required for anode coatings is falling and demand for iridium is slowly rising.

Demand for iridium crucibles, which are used to grow high purity crystals for industrial applications, is forecast to be flat in 2004. Orders for crucibles from the electronics industry have improved but demand from the medical sector has fallen compared with 2003, which was a particularly strong year.

The use of high performance spark plugs with iridium electrodes in cars is growing. Use of the spark plugs is currently greatest in Japan, where the two main manufacturers are located, but this remains a relatively minor application.

In common with the other pgm, speculators have taken an increased interest in ruthenium and iridium during 2004. This was particularly evident during the fund driven rally in commodities as a whole in February and March. The price of both metals climbed strongly at that time, despite there being no obvious shortage of metal available.

Ruthenium Demand by Application '000 oz		
	2003	2004
Chemical	141	118
Electrochemical	120	94
Electronics	248	272
Other	105	115
Total	614	599



Supplies

Rhodium

In 2004 rhodium supplies are expected to fall by 30,000 oz to 700,000 oz; although shipments from South Africa are set to rise, Russian sales of rhodium from stocks are set to be significantly lower than in 2003. South African supplies of rhodium are forecast to increase by 4 per cent to 565,000 oz this year, lagging behind the expansion of platinum output due to an increase in the volume of metal held in process pipelines. In Russia, Norilsk Nickel is expected to sell its full production of rhodium but shipments from central stocks are likely to fall well short of the large

volume of metal exported in 2003. Total supplies from Russia, therefore, are projected to slip to 80,000 oz.

Ruthenium & Iridium

Both the ruthenium and iridium markets remain amply supplied with metal. Output from South Africa is rising on the back of expanding platinum production and recent movements in the price of both metals have had more to do with speculative interest than any fundamental changes in the supply-demand balance.

Iridium Demand by Application '000 oz		
	2003	2004
Chemical	20	24
Electrochemical	23	24
Electronics	29	29
Other	28	29
Total	100	106

