

OTHER PLATINUM GROUP METALS

RHODIUM

Net demand for rhodium is forecast to fall by 3.9 per cent to 808,000 oz in 2007. The weight of metal used in the autocatalyst sector will decline for the first time since 2002, under the pressure of high prices and limited growth in automobile production in many regions. Rhodium use in the glass sector is likely to fall. However, rhodium supplies will also decrease in 2007 with lower shipments from Russia and weaker production in South Africa. The rhodium market should therefore be close to balance, with a deficit of only 4,000 oz.

Autocatalyst

Global light duty vehicle production is predicted to rise from 66.1 million units in 2006 to 70.0 million this year,

Rhodium Supply and Demand '000 oz			
		2006	2007
Supply			
South Africa		690	695
Russia		95	70
North America		20	20
Others		19	19
Total Supply		824	804
Demand			
Autocatalyst:	gross	867	861
	recovery	(169)	(179)
Chemical		48	55
Electrical		9	10
Glass		65	38
Other		21	23
Total Demand		841	808
Movements in Stocks		(17)	(4)

with most growth in Asia. However, despite this, gross autocatalyst rhodium demand is forecast to fall 6,000 oz, to a total of 861,000 oz. This represents 87 per cent of gross demand for rhodium from all applications. Rhodium use in the North American market will be stable at 289,000 oz in 2007. So far, high oil prices have had relatively little effect on the purchasing habits of consumers. As a result, output of large-engined light trucks and SUVs has held up well and average catalyst size and rhodium content have changed little. Rhodium demand in Japan is expected to fall to 243,000 oz in 2007, principally because purchases of rhodium for inventory are expected to decline. While Japanese automotive sales are set to decrease by several per cent, a greater proportion of production will be for export to other countries. These vehicles tend to have higher-loaded catalysts than those used in the domestic market, roughly balancing the impact of the decline in vehicle output on rhodium use.

In response to high rhodium prices, some European

companies have taken the opportunity of a lull between rounds of emissions legislation to work on thrifting (or reduction) of metal loadings, with a strong focus on minimising rhodium usage in gasoline or three-way catalysts. The effect of this process is a drop in average rhodium loadings at some companies but not the elimination of rhodium from any gasoline catalysts.

In Europe, the market share of diesel vehicles continues to expand. Their catalysts use little if any rhodium, so the increase in their production further lowers the average rhodium content of each new car. European rhodium purchases should fall as a result, dipping 15,000 oz lower to 150,000 oz in 2007. Demand for rhodium in the Rest of the World region will rise due to an expansion in vehicle production.

Rhodium recovery from spent autocatalysts remains important in helping to balance supply and demand. Rhodium volumes will rise 10,000 oz this year to 179,000 oz. This reflects the rising rhodium content in scrapped autocatalysts and a recycling industry which is continually increasing in efficiency. The weight of rhodium reclaimed will rise in every region.

Other Demand

The glass industry is still expanding its production capacity for LCD glass as the battle for market share continues. However, the rate of expansion is lower than in 2006. This construction of fewer furnaces means that rhodium purchases for this sector will fall, particularly in Japan and the Rest of the World region. Elsewhere in the glass sector, the high rhodium price has encouraged the use of lower rhodium content alloys where possible. Net glass sector demand will fall by more than 40 per cent to a 2007 total of 38,000 oz.

Rhodium demand will grow to 55,000 oz in the chemical sector. The market for oxo-alcohols, plasticisers and many other chemicals is healthy and should boost demand. However, the significant construction of new capacity for acetic acid in 2006 was not repeated in 2007. All other applications of rhodium should contribute 33,000 oz of demand this year.

Supplies

Rhodium supplies are expected to drop by 2.4 per cent to 804,000 oz in 2007. While South African supplies had

been expected to rise strongly, interruptions to mining arising from accidents and strikes, amongst other issues, curtailed output. Supplies from this country will grow by only 5,000 oz to 695,000 oz.

Output of pgm from Norilsk is expected to be similar to last year and at present we do not expect that last year's shipments of rhodium from stocks will be repeated. The interruption to Russian exports due to regulatory problems in early 2007 should not affect the level of Russian supplies for the whole year. These should be higher in the second half of the year than the first, at 70,000 oz in total.

RUTHENIUM & IRIDIUM

Demand

Demand for ruthenium is expected to rise by 4.1 per cent to a new peak of 1.34 million ounces in 2007. Purchases by the electronics industry will grow again, even though price sensitivity is apparent in some applications. Iridium demand will fall by 9,000 oz to 123,000 oz.

Net purchases of ruthenium by the electronics industry for all applications are forecast to rise by 18 per cent to 1.03 million ounces this year. Ruthenium is an essential material in the manufacture of a new type of hard disks which use perpendicular magnetic recording, or PMR. These first took significant market share last year. 2007 has seen continued growth with almost 40 per cent of production now being PMR technology, compared to 15 per cent in 2006.

However, while PMR technology has proved successful, its introduction has been delayed at some companies which have been able to extend the commercial life of older linear magnetic recording technology. Hard disk manufacturers have also worked

Ruthenium Demand by Application '000 oz		
	2006	2007
Chemical	223	103
Electrochemical	138	144
Electrical	876	1,034
Other	54	63
Total Demand	1,291	1,344

to minimise ruthenium content and these two factors have limited the rate of increase of ruthenium demand. Nevertheless, it will still increase by more than half compared to 2006.

Equally importantly, global refining capacity to process scrap material from this industry has increased this year. The backlog

of metal waiting to be refined and remanufactured into sputtering targets has declined and recycled material will supply a greater proportion of demand for ruthenium in hard disks this year.

The high ruthenium price will have a negative impact on demand in some other sectors. As ruthenium has traditionally been one of the cheapest platinum group metals, its cost has often been included in product prices rather than being priced separately. Some industries have therefore been exposed to price movements and have been forced either to change their pricing model or reduce their use of ruthenium. This is not possible in every sector but one example is the thrifting of the ruthenium paste used in the manufacture of flat screen plasma display panels, where consumption could fall by 80 per cent.

In the chemical sector, ruthenium demand will fall by over half to 103,000 oz. Ruthenium is used as a catalyst in a number of chemical processes. The construction of a single new world-scale facility typically requires a catalyst charge of tens of thousands of ounces. A fall in the number of factories built in 2007 will therefore cut demand from this segment. Demand for electrochemical and other uses of ruthenium should grow to 207,000 oz.

After rising last year, iridium demand is likely to fall back in 2007. Iridium's price has been less volatile than that of the other pgms. Applications such as spark plugs will take more of this metal at a forecast 19,000 oz for the year. However, purchases of iridium for chemical end-uses will fall.

Iridium Demand by Application '000 oz		
	2006	2007
Chemical	34	24
Electrochemical	34	34
Electrical	28	28
Other	36	37
Total Demand	132	123

Supplies

Supplies of ruthenium and iridium are both forecast to fall slightly in 2007. The average concentration of these metals in the ore mined in South Africa is rising as new mines are developed. However, the challenges faced by the South African mining sector this year will hold the level of supplies back. Ruthenium supplies both last year and this have been above the level of production with the result that we expect only a modest deficit in 2007. The iridium market will be in surplus on the same timescale.