OTHER PLATINUM GROUP METALS

Demand for rhodium, principally from the automotive sector, rose to 856,000 oz in 2007 while supplies rose 2.5 per cent to 822,000 oz. Ruthenium demand fell to 1.14 million ounces despite the widespread adoption of new perpendicular magnetic recording technology by the hard disk industry. Iridium demand dropped to 119,000 oz.

RHODIUM

Net rhodium demand increased by 2.1 per cent in 2007, to a global total of 856,000 oz. Growth in automobile production in China and the Rest of the World region outweighed the effect of thrifting of rhodium in catalytic converter formulations. Net metal use by the glass sector fell, however, under the pressure of a high price. Rhodium supplies rose slightly to 822,000 oz in 2007. Overall, therefore, the rhodium market was in deficit – by 34,000 oz – for the fourth successive year.

Rhodium Supply and Demand
'000 oz

		2006	2007
Supply			
South Africa		666	696
Russia		100	90
North America		17	17
Others		19	19
Total Supply		**802**	**822**
Demand			
Autocatalyst:	gross	863	879
	recovery	(171)	(183)
Chemical		49	64
Electrical		9	9
Glass		65	64
Other		23	23
Total Demand		**838**	**856**
Movements in Stocks		**(36)**	**(34)**

JM

Autocatalyst Demand

Rhodium demand from the global automotive market grew by 1.9 per cent in 2007, driven by healthy manufacturing growth in China and much of Asia. The net effect was that gross rhodium autocatalyst demand increased once again to a new record of 879,000 oz.

Rhodium consumption in North America rose slightly despite a difficult year for its manufacturers. They bought 296,000 oz of this metal, or 10,000 oz more than in 2006, for use in autocatalysts, including increasing use in NOx traps. This was despite a drop in light duty vehicle production.

European purchases of rhodium dropped by 7.4 per cent to 150,000 oz. Continued growth in the market share of light duty diesel vehicles has eroded the market for three-way, or gasoline, catalysts, reducing the requirement for rhodium. The auto manufacturers also took the opportunity provided by a gap between bouts of new emissions legislation to thrift the rhodium content of their catalysts in response to high metal prices. This thrifting is expected to continue in 2008, driving rhodium usage lower in this market.

Japanese auto makers bought 241,000 oz of rhodium last year, 19,000 oz less than in 2006 with some metal used from inventory. While the domestic vehicle sales of the Japanese car makers were unexciting, manufacturing volumes were up, primarily due to growth in the main Asian export markets, supporting rhodium usage at levels close to those seen in 2006. Rhodium demand in China and the Rest of the World region was driven 21.5 per cent higher, to 192,000 oz, by rocketing production of light duty vehicles.

More rhodium was also reclaimed from end-of-life autocatalysts in 2007 than in 2006 (183,000 oz). Recovery rose in every region. The average rhodium content of a scrapped three-way, or gasoline, catalytic converter has risen during recent years. With a growing proportion of end-of-life vehicles being recycled too, rhodium recovery has increased. Overall, net rhodium demand from the autocatalyst sector was only 4,000 oz higher than in the previous year, at 696,000 oz.

Other Demand

Purchases of rhodium by the glass sector fell by 1.6 per cent to 64,000 oz despite strong growth in Asia. Manufacturers of LCD and other types of glass are still investing heavily in new furnaces to build their production capacity, outweighing the effect of closures of conventional cathode ray tube, or CRT, glass facilities. However, a high metal price has encouraged the industry to move to lower rhodium content alloys where possible, trimming demand a little.

Chemical sector rhodium demand rose to 64,000 oz in 2007 due to the construction of new facilities, including a small number of oxo-alcohol plants in Asia. Demand from electrical and other applications was static at 32,000 oz.

Supplies

Global rhodium supplies climbed 2.5 per cent to 822,000 oz last year. Russian shipments fell to 90,000 oz. While primary production remained unchanged, sales from State stocks were lower than in the previous year.

The interruption to Russian shipments in early 2007 due to the lack of appropriate export rules did not affect the total amount of metal shipped during the year.

South African supplies grew slightly. Safety problems, technical issues and a number of strikes did have an impact upon primary rhodium production. However, there was additional output from a number of expansion projects while some metal was also sold from refined stocks.

RUTHENIUM & IRIDIUM

Demand

Ruthenium demand fell by almost a third in 2007, from 2006's 1.69 million ounces to 1.14 million ounces. Gross metal purchases of ruthenium for the manufacture of perpendicular magnetic recording (PMR) hard disks rose in 2007. However, net consumption fell due to reductions in working stocks. Demand for iridium across its range of industrial uses dipped by 12,000 oz to 119,000 oz despite growth in demand for making spark plugs.

In the hard disk sector, perpendicular magnetic recording technology continued to capture market share from its longitudinal (LMR) predecessor. In fact, this proceeded more quickly than many had forecast. By the end of 2007, PMR had more than doubled its share of the hard disk market from the previous year, to greater than sixty per cent.

There have been substantial efforts from the hard disk manufacturers to reduce the amount of ruthenium per disk. Although this is already extremely small, thrifting efforts have been successful in decreasing it still further. Nonetheless, this was not enough to prevent rapid growth in gross ruthenium demand from this application due to the rise in the number of disks produced.

Ruthenium Demand by Application
'000 oz

	2006	2007
Chemical	223	101
Electrochemical	137	119
Electrical	1,272	857
Other	54	67
Total Demand	**1,686**	**1,144**

However, high volume recycling of the scrap produced in the manufacturing process started late in 2006. We have therefore adjusted our net demand figures for 2006 to account for this. Large amounts of scrap are produced in the manufacturing both of ruthenium sputtering targets and of the hard disks themselves. The pgm industry has invested substantial amounts to expand ruthenium refining capacity and high volumes of ruthenium were processed last year. With the rapid ramp-up of this industry, the amount of metal recovered grew strongly throughout 2007, ensuring that net demand fell some way below the 2006 figure.

Iridium Demand by Application
'000 oz

	2006	2007
Chemical	33	24
Electrochemical	34	34
Electrical	28	25
Other	36	36
Total Demand	**131**	**119**

Elsewhere, ruthenium use in chip resistors remained flat with component miniaturisation and growth in the electronics market balancing one another in their effect on metal consumption. The use of ruthenium paste in flat plasma display panels fell heavily as thrifted pastes were introduced and took market share.

Ruthenium use in the chemical sector fell from 223,000 oz to 101,000 oz in 2007. Ruthenium catalysts can be used in a range of processes from the manufacture of acetic acid to that of ammonia. Ruthenium remains an attractive catalytic material for many of these processes despite the price rises of 2006 and early 2007. However, there were fewer purchases for new plants than in the previous twelve months and demand therefore fell. Combined metal purchases for electrochemical and other applications slipped 5,000 oz lower to 186,000 oz.

Iridium demand slipped by 9.2 per cent to 119,000 oz with demand falling to 24,000 oz in the process catalyst sector. Although iridium is used in some acetic acid plants, the number of new chemical factories using iridium-based catalysts was lower in 2007 than in 2006. Iridium consumption in aerospace and automotive spark plugs pushed higher to 28,000 oz as auto makers looked to use higher-quality, longer-life precious metal-tipped plugs as standard in their products.

Supplies

Ruthenium supplies fell in 2007 due to the challenging environment for the South African mining industry which limited the amount of ore mined and processed there. Expansion of mining in the Eastern Bushveld, where the minor pgm content of the ore is typically higher, supported output and some ruthenium was sold from producer stocks. Sales of iridum fell too.