PLATINUM-GROUP METALS

(Platinum, palladium, rhodium, ruthenium, iridium, osmium)
(Data in kilograms unless otherwise noted)

Domestic Production and Use: The Stillwater and East Boulder Mines in south-central Montana are the only primary platinum-group metals (PGMs) mines in the United States and were owned by one company. Small quantities of PGMs were also recovered as byproducts of copper refining by companies in Texas and Utah. Catalysts for air-pollution abatement continued to be the leading demand sector for PGMs. Catalysts were also used in other air-pollution-abatement processes to remove organic vapors, odors, and carbon monoxide. Chemical uses include catalysts for organic synthesis, production of nitric acid, and fabrication of laboratory equipment. Platinum alloys, in cast or wrought form, are commonly used for jewelry. Platinum, palladium, and a variety of complex gold-silver-copper alloys are used as dental restorative materials.

Salient Statistics—United States:	2002	2003	2004	2005	2006[e]
Mine production[1]:					
Platinum	4,390	4,170	4,040	3,920	4,000
Palladium	14,800	14,000	13,700	13,300	13,600
Imports for consumption:					
Platinum	84,700	88,500	86,400	106,000	170,000
Palladium	117,000	105,000	127,000	139,000	140,000
Rhodium	8,630	12,000	13,200	13,600	17,000
Ruthenium	9,890	15,900	18,800	23,200	30,000
Iridium	2,100	2,200	3,230	3,000	2,500
Osmium	36	53	75	39	80
Exports:					
Platinum	27,800	22,200	20,000	20,700	35,000
Palladium	42,700	22,300	31,500	27,000	40,000
Rhodium	349	479	311	615	400
Other PGMs	94	145	1,086	1,080	3,000
Price,[2] dollars per troy ounce:					
Platinum	542.56	694.44	848.76	899.51	1,200.00
Palladium	339.68	203.00	232.93	203.54	330.00
Rhodium	838.88	530.28	983.24	2,059.73	4,300.00
Ruthenium	66.33	35.43	64.22	74.41	150.00
Iridium	294.62	93.02	185.33	169.51	350.00
Employment, mine, number[1]	1,580	1,540	1,580	1,620	1,600
Net import reliance as a percentage of apparent consumption[e]					
Platinum	91	91	92	93	95
Palladium	82	82	83	84	82

Recycling: An estimated 10,400 kilograms of PGMs was recovered from new and old scrap in 2006.

Import Sources (2002-05): Platinum: South Africa, 41%; United Kingdom, 16%; Germany, 11%; Canada, 8%; and other, 24%. Palladium: Russia, 37%; South Africa, 25%; United Kingdom, 14%; Belgium, 5%; and other, 19%.

Tariff: All unwrought and semimanufactured forms of PGMs can be imported duty free.

Depletion Allowance: 22% (Domestic), 14% (Foreign).

Government Stockpile:

Stockpile Status—9-30-06[3]

Material	Uncommitted inventory	Committed inventory	Authorized for disposal	Disposal plan FY 2006	Disposals FY 2006
Platinum	261	—	[4]3,110	388	—
Palladium	—	—	[4]778	756	—
Iridium	123	—	[4]186	254	159

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PLATINUM-GROUP METALS

Events, Trends, and Issues: The desire for an alternative fuel for automobiles has led to a large global public and private effort to develop fuel cell technology. Platinum is the catalyst used by fuel cells to convert hydrogen and oxygen to electricity. Palladium will also likely play a role in the fuel cell. An increase in diesel car sales in Europe can be expected to cause a strong increase in use of platinum in the region in 2006 and beyond. The tightening of emissions regulations in China, Europe, Japan, and other parts of the world is also expected to lead to higher average platinum loadings on catalysts, especially on light-duty diesel vehicles, as particulate matter emissions become more closely controlled. In the United States, thrifting is continuing at most manufacturers and is likely to lead to a reduction in the use of platinum in autocatalysts. The price differential of almost $900 per troy ounce between platinum and palladium has led to the assumption that automobile manufacturers will change PGMs ratios on gasoline-engine vehicles in favor of palladium. The sales of platinum jewelry are expected to drop worldwide as the price continues to be high and white gold and palladium are substituted for platinum.

In 2006, a wildfire caused a small disruption in production at the Stillwater and East Boulder Mines.

World Mine Production, Reserves, and Reserve Base:

	Mine production				PGMs	
	Platinum		Palladium		Reserves[5]	Reserve base[5]
	2005	2006[e]	2005	2006[e]		
United States	3,920	4,000	13,300	13,600	900,000	2,000,000
Canada	6,400	6,700	13,000	13,700	310,000	390,000
Colombia	1,080	1,000	NA	NA	[6]NA	[6]NA
Russia	30,000	32,000	97,400	97,000	6,200,000	6,600,000
South Africa	169,000	172,000	84,900	87,000	63,000,000	70,000,000
Other countries	7,000	7,600	9,900	10,200	800,000	850,000
World total (rounded)	217,000	223,000	219,000	222,000	71,000,000	80,000,000

World Resources: World resources of PGMs in mineral concentrations that can be mined economically are estimated to total more than 100 million kilograms. The largest reserves are in the Bushveld Complex in South Africa.

Substitutes: Some motor vehicle manufacturers have substituted palladium for the more expensive platinum in catalytic converters. Until recently, only platinum could be used in diesel catalytic converters; however, new technologies allow palladium to be used. For most other end uses, PGMs can be substituted for other PGMs, with some losses in efficiency. In addition, electronic parts manufacturers are reducing the average palladium content of the conductive pastes used to form the electrodes of multilayer ceramic capacitors by substituting base metals or silver-palladium pastes that contain significantly less palladium.

[e]Estimated. NA Not available. — Zero.
[1]Estimates from published sources.
[2]Engelhard Corporation unfabricated metal.
[3]See Appendix B for definitions.
[4]Actual quantity will be limited to remaining monetary sales authority or inventory.
[5]See Appendix C for definitions.
[6]Included with "Other countries."