

# Mineral Industry Surveys

**For information, contact:**

Ruth F. Schulte, PGM Commodity Specialist  
National Minerals Information Center  
Telephone: (703) 648-4963  
Email: [rschulte@usgs.gov](mailto:rschulte@usgs.gov)

Christine Pisut (Data)  
Telephone: (703) 648-7942  
Email:

**Internet:** <https://www.usgs.gov/centers/national-minerals-information-center/mineral-industry-surveys>

## PLATINUM-GROUP METALS IN DECEMBER 2022

Imports for consumption of platinum-group metals (PGMs), including waste and scrap, were 17,800 kilograms (kg) in December 2022, essentially unchanged compared with imports in November 2022, and a decrease of 58% compared with imports in December 2021 (table 1). The leading import sources for PGMs into the United States in December 2022 were, in descending order of quantity, South Africa, Russia, and the United Kingdom (tables 3, 4).

In December 2022, exports of palladium decreased by 43%, by 40% for platinum, by 38% for PGM scrap, and by 4% for rhodium compared with those in November 2022. The leading destinations for PGM exports were, in descending order of quantity, Japan, Canada, and Germany (tables 1, 5).

The Engelhard average December 2022 prices increased by 17% for iridium and slightly for platinum compared with the average prices in November 2022. Prices decreased by 7% for rhodium, by 6% for palladium, and slightly for ruthenium. Compared with average prices in December 2021, the December 2022 average price increased by 8% for platinum, by 6% for iridium, and slightly for palladium whereas prices decreased by 14% for ruthenium and by 11% for rhodium (fig. 1; tables 1, 2).

for the hydrogen tanks (Stafford, 2022). Toyota Motor Manufacturing (UK) Ltd. received funding from the Advanced Propulsion Center, a non-profit organization that works with the government of the United Kingdom. The project will be the development of a hydrogen powered prototype, the Toyota Hilux, using second generation fuel cell technology (Toyota Motor Europe, 2022).

### Reference Cited

- Stafford, Eric, 2022, BMW expands into hydrogen power with fuel-cell SUV based on the X5: Car and Driver, December 2. (Accessed February 13, 2023, at <https://www.caranddriver.com/news/a42134550/bmw-ix5-suv-hydrogen-fuel-cell-limited-production-start/>.)
- Tharisa plc, 2022, Commencement of construction ceremony Karo Platinum: Paphos, Republic of Cyprus, Tharisa plc press release, December 7. (Accessed February 13, 2023, at <https://www.karomining.com/pdf/investors/sens-rms-karo-construction-commencement-and-pv-mou-7-dec-22.pdf>.)
- Toyota Motor Europe, 2022, Development starts on prototype hydrogen fuel cell Hilux: Brussels, Belgium, Toyota Motor Europe news release, December 2. (Accessed February 13, 2023, at <https://www.toyota-europe.com/news/2022/hydrogen-fuel-cell-hilux>.)

### Industry News

Tharisa plc (Republic of Cyprus) held a commencement ceremony for the start of construction at the Karo Platinum Project site in Zimbabwe. The Karo Platinum Project, located within the Great Dyke deposit, hosts PGMs and chromite ore. Karo Mining Holdings owns 85% of the Karo Platinum Project; the government of Zimbabwe owns the remaining 15%. Tharisa plc is a 70% stakeholder in Karo Mining Holdings and production was expected to be delivered during the third quarter of 2024 (Tharisa plc, 2022).

Developments in the green hydrogen energy sector also advanced in December. Power produced from hydrogen requires proton exchange electrolyzers, which use platinum and iridium as catalysts. The BMW Group (Germany) began limited production of the iX5 sport utility vehicle, which is powered by hydrogen fuel cells. Small regional testing was anticipated to commence in the spring of 2023. The vehicle design was based on the X5 model with modifications to the floor to allow space

*List services and web feed subscribers are the first to receive notification of USGS minerals information publications and data releases. For information on how to subscribe, go to <https://www.usgs.gov/centers/national-minerals-information-center/minerals-information-publication-list-services>.*

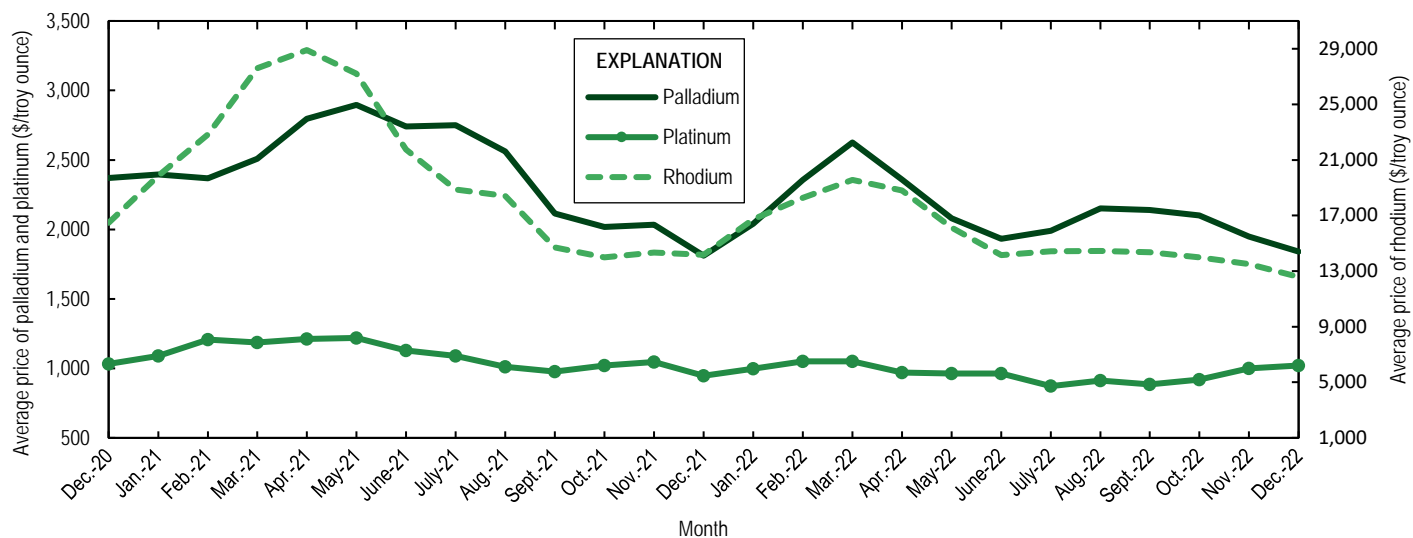


Figure 1. Engelhard unfabricated average monthly prices for palladium, platinum, and rhodium in dollars per troy ounce from December 2020 through December 2022. Source: S&P Global Platts Metals Week.

TABLE 1  
U.S. SALIENT PLATINUM-GROUP METALS STATISTICS<sup>1</sup>

(Kilograms metal content, unless otherwise specified)

	2021	2022			
	January– December	October	November	December	January– December
Mine production: <sup>2</sup>					
Palladium	13,700	682	682	682	9,620
Platinum	4,020	208	208	208	2,880
Total	17,700	890	890	890	12,500
Imports for consumption: <sup>3</sup>					
Palladium	72,600	6,980	6,510	5,790	65,200
Platinum	67,900	8,970	5,620	7,170	64,200
Iridium	2,310	91	132	165	1,610
Osmium	1	1	--	--	1
Rhodium	16,500	979	956	1,120	13,200
Ruthenium	18,000	430	453	1,590	13,300
Waste and scrap <sup>4</sup>	185,000	2,920	4,300	2,010	44,700
Total	362,000	20,400	18,000	17,800	202,000
Exports: <sup>3</sup>					
Palladium	43,900	4,200	3,320	1,880	42,200
Platinum	29,400	1,050	910	548	23,200
Iridium, osmium, ruthenium	2,180	38	18	28	905
Rhodium	1,350	25	54	52	677
Waste and scrap <sup>4</sup>	37,800	1,680	3,360	2,100	35,000
Total	114,000	7,000	7,670	4,610	102,000
Price, average (dollars per troy ounce): <sup>5</sup>					
Palladium	2,419.18	2,100.43	1,948.30	1,839.65	2,133.81
Platinum	1,094.31	919.76	1,000.50	1,021.10	966.54
Iridium	5,158.40	4,190.48	3,812.50	4,478.95	4,581.93
Rhodium	20,254.10	13,990.48	13,507.50	12,582.50	15,585.00
Ruthenium	576.12	548.81	525.00	512.50	577.02

-- Zero.

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Annual data are based on publicly available annual reports. Monthly and year-to-date data are estimated based on publicly reported quarterly data.

<sup>3</sup>Source: U.S. Census Bureau.

<sup>4</sup>Includes waste and scrap for all platinum-group elements. Previously included within platinum.

<sup>5</sup>Source: S&P Global Platts Metals Week.

TABLE 2  
PLATINUM-GROUP METALS PRICES<sup>1</sup>

(Dollars per troy ounce)

	Palladium	Platinum	Iridium	Rhodium	Ruthenium
2021:					
Low:					
Price	1,584.00	915.00	3,000.00	12,000.00	280.00
Date	Dec. 15	Dec. 14 and 15	Jan. <sup>2</sup>	Sep. 15 and 16	Jan. <sup>2</sup>
High:					
Price	3,020.00	1,298.00	6,400.00	30,000.00	825.00
Date	May 4	Feb. 19	Apr.–May <sup>2</sup>	Mar. 22	May 21 and 24
Price, average	2,419.18	1,094.31	5,158.40	20,254.10	576.12
2022:					
October:					
Low:					
Price	1,860.00	880.00	4,000.00	13,700.00	525.00
Date	Oct. 31	Oct. 13	Oct. <sup>2</sup>	Oct. <sup>2</sup>	Oct. 31
High:					
Price	2,333.00	959.00	4,250.00	14,200.00	550.00
Date	Oct. 4	Oct. 27	Oct. <sup>2</sup>	Oct. 18 and 19	Oct. <sup>2</sup>
Price, average	2,100.43	919.76	4,190.48	13,990.48	548.81
November:					
Low:					
Price	1,825.00	935.00	3,750.00	13,200.00	525.00
Date	Nov. 3	Nov. 3	Nov. <sup>2</sup>	Nov. 17	Nov. <sup>2</sup>
High:					
Price	2,110.00	1,050.00	4,000.00	14,100.00	525.00
Date	Nov. 15	Nov. 11	Nov. 1 and 2	Nov. 1	Nov. <sup>2</sup>
Price, average	1,948.30	1,000.50	3,812.50	13,507.50	525.00
December:					
Low:					
Price	1,690.00	993.00	3,750.00	12,250.00	475.00
Date	Dec. 20	Dec. 22	Dec. <sup>2</sup>	Dec. <sup>2</sup>	Dec. 21
High:					
Price	1,970.00	1,085.00	4,800.00	13,300.00	525.00
Date	Dec. 13	Dec. 30	Dec. <sup>2</sup>	Dec. 1	Dec. <sup>2</sup>
Price, average	1,839.65	1,021.10	4,478.95	12,582.50	512.50
January–December:					
Low:					
Price	1,690.00	834.00	3,750.00	12,250.00	475.00
Date	Dec. 20	Jul. 14	Nov. <sup>2</sup> –Dec. <sup>2</sup>	Dec. <sup>2</sup>	Dec. 21
High:					
Price	3,050.00	1,155.00	5,000.00	20,250.00	625.00
Date	Mar. 8	Mar. 8	Mar.–Jul. <sup>2</sup>	Feb. <sup>2</sup>	Mar.–Jul. <sup>2</sup>
Price, average	2,133.81	966.54	4,581.93	15,585.00	577.02

<sup>1</sup>Quotes from Engelhard.

<sup>2</sup>Occurred multiple days in month(s) listed.

Source: S&P Global Platts Metals Week.

TABLE 3  
U.S. IMPORTS FOR CONSUMPTION OF PLATINUM METAL, BY COUNTRY OR LOCALITY<sup>1</sup>

(Kilograms metal content, unless otherwise specified)

Country or locality	Platinum grain and nuggets		Platinum sponge		Other unwrought platinum		Platinum, other		Platinum coins	
	Quantity	Value (thousands)	Quantity	Value (thousands)	Quantity	Value (thousands)	Quantity	Value (thousands)	Quantity	Value (thousands)
2021, January–December	590	\$20,800	44,700	\$1,600,000	5,400	\$247,000	15,800	\$662,000	1,400	\$49,200
2022:										
October	335	9,310	7,650	224,000	456	22,600	480	17,800	49	1,560
November	90	2,800	5,030	164,000	102	4,910	335	15,400	57	1,960
December:										
Australia	--	--	--	--	--	--	(2)	10	3	106
Austria	--	--	--	--	--	--	92	4,980	1	26
Belgium	--	--	599	19,200	--	--	--	--	--	--
Canada	21	695	--	--	1	14	43	1,420	6	218
China	--	--	--	--	--	--	(2)	3	--	--
Colombia	2	33	--	--	5	146	--	--	--	--
Costa Rica	--	--	--	--	--	--	96	4,850	--	--
Czechia	--	--	--	--	--	--	1	54	--	--
France	--	--	8	256	--	--	60	1,040	--	--
Germany	--	--	(2)	9	65	2,370	329	20,800	1	30
Ghana	--	--	--	--	--	--	--	--	(2)	4
Italy	--	--	329	10,700	--	--	--	--	--	--
Japan	--	--	500	16,200	--	--	10	374	--	--
Korea, Republic of	--	--	162	5,260	--	--	--	--	--	--
Mexico	--	--	--	--	--	--	3	99	--	--
Russia	--	--	200	6,360	--	--	--	--	--	--
Singapore	--	--	--	--	(2)	8	6	241	--	--
South Africa	--	--	2,900	90,000	2	53	--	--	--	--
Sweden	--	--	--	--	--	--	(2)	7	--	--
Switzerland	1	45	2	50	--	--	1,560	50,400	(2)	10
Taiwan	--	--	--	--	--	--	62	1,740	--	--
United Kingdom	--	--	60	1,980	1	25	41	1,310	2	56
Total	23	773	4,760	150,000	73	2,610	2,310	87,300	13	450
January–December	1,300	41,600	47,900	1,500,000	2,350	146,000	12,100	529,000	642	21,000

-- Zero.

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Less than ½ unit.

TABLE 4  
U.S. IMPORTS FOR CONSUMPTION OF PLATINUM-GROUP METALS, BY COUNTRY OR LOCALITY<sup>1</sup>

(Kilograms metal content, unless otherwise specified)

Country or locality	Palladium <sup>2</sup>		Iridium <sup>2</sup>		Osmium <sup>2</sup>		Rhodium <sup>2</sup>		Ruthenium <sup>2</sup>		Waste and scrap <sup>3</sup>	
	Quantity	Value (thousands)	Quantity	Value (thousands)	Quantity	Value (thousands)	Quantity	Value (thousands)	Quantity	Value (thousands)	Quantity	Value (thousands)
2021, January–December	72,600	\$5,390,000	2,310	\$286,000	1	\$17	16,500	\$9,850,000	18,000	\$247,000	185,000	\$2,380,000
2022:												
October	6,980	482,000	91	12,400	1	3	979	480,000	430	6,950	2,920	95,000
November	6,510	372,000	132	14,300	--	--	956	471,000	453	6,190	4,300	134,000
December: <sup>4</sup>												
Belgium	433	27,600	--	--	--	--	115	50,300	--	--	--	--
Bolivia	--	--	--	--	--	--	--	--	--	--	10	217
Brazil	--	--	--	--	--	--	--	--	--	--	35	3,550
Canada	346	21,900	--	--	--	--	--	--	--	--	174	13,200
Colombia	--	--	--	--	--	--	--	--	--	--	14	380
Ecuador	--	--	--	--	--	--	--	--	--	--	23	765
France	(5)	6	--	--	--	--	--	--	--	--	81	2,800
Germany	115	7,130	2	88	--	--	388	203,000	263	3,750	20	2,440
Italy	194	11,300	1	120	--	--	55	23,000	--	--	106	3,450
Japan	290	15,900	26	2,580	--	--	--	--	68	898	3	103
Korea, Republic of	188	11,500	--	--	--	--	24	9,480	--	--	--	--
Malaysia	--	--	--	--	--	--	--	--	--	--	14	810
Mexico	16	574	--	--	--	--	1	246	--	--	374	14,100
Paraguay	--	--	--	--	--	--	--	--	--	--	10	325
Poland	--	--	--	--	--	--	--	--	--	--	172	5,530
Russia	2,710	164,000	--	--	--	--	50	21,400	--	--	--	--
South Africa	1,480	86,500	119	12,400	--	--	487	217,000	324	4,630	21	669
Switzerland	13	824	--	--	--	--	--	--	--	--	--	--
United Arab Emirates	--	--	--	--	--	--	--	--	--	--	241	14,000
United Kingdom	2	117	17	2,740	--	--	2	1,010	935	14,300	668	20,000
Other	(5)	4	--	--	--	--	--	--	--	--	40	3,410
Total	5,790	347,000	165	17,900	--	--	1,120	525,000	1,590	23,600	2,010	85,800
January–December	65,200	4,370,000	1,610	195,000	1	3	13,200	6,780,000	13,300	226,000	44,700	1,360,000

-- Zero.

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Unwrought and other forms.

<sup>3</sup>Includes waste and scrap for all platinum-group elements.

<sup>4</sup>The 20 countries and (or) localities with the greatest total platinum-group metal imports are listed. All others are included in the "Other" category.

<sup>5</sup>Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 5  
U.S. EXPORTS OF PLATINUM-GROUP METALS, BY COUNTRY OR LOCALITY<sup>1</sup>

(Kilograms metal content, unless otherwise specified)

Country or locality	Palladium <sup>2</sup>		Platinum <sup>2</sup>		Iridium, osmium and ruthenium <sup>2,3</sup>		Rhodium <sup>2</sup>		Waste and scrap <sup>4</sup>	
	Quantity	Value (thousands)	Quantity	Value (thousands)	Quantity	Value (thousands)	Quantity	Value (thousands)	Quantity	Value (thousands)
2021, January–December	43,900	\$3,370,000	29,400	\$1,110,000	2,180	\$57,400	1,350	\$809,000	37,800	\$3,370,000
2022:										
October	4,200	285,000	1,050	49,600	38	3,310	25	11,600	1,680	173,000
November	3,320	212,000	910	46,500	18	2,240	54	26,400	3,360	167,000
December: <sup>5</sup>										
Australia	2	98	9	613	4	409	--	--	--	--
Belgium	--	--	--	--	--	--	--	--	427	13,700
Brazil	70	4,320	--	--	--	--	--	--	--	--
Canada	876	53,100	7	258	--	--	(6)	41	211	6,340
China	1	97	29	1,000	(6)	14	--	--	--	--
Costa Rica	4	254	33	1,880	--	--	--	--	--	--
France	10	666	3	167	(6)	43	--	--	--	--
Germany	40	2,340	210	8,220	(6)	8	(6)	6	312	91,400
Hong Kong	5	333	21	691	20	3,020	22	11,600	--	--
Ireland	2	111	21	755	--	--	--	--	--	--
Italy	--	--	1	31	(6)	8	--	--	26	2,520
Japan	458	27,700	11	3,380	(6)	17	--	--	959	35,300
Korea, Republic of	5	300	31	1,050	(6)	6	30	12,100	(6)	3
Mexico	6	459	20	665	(6)	19	--	--	--	--
Singapore	1	96	23	3,170	--	--	--	--	--	--
South Africa	--	--	1	16	--	--	(6)	5	28	2,450
Switzerland	193	12,300	1	26	--	--	--	--	59	2,050
Taiwan	106	7,170	3	109	1	108	--	--	--	--
United Arab Emirates	--	--	(6)	11	--	--	--	--	61	1,840
United Kingdom	84	5,370	111	3,440	(6)	65	--	--	13	920
Other	22	1,410	14	869	2	280	(6)	22	--	--
Total	1,880	116,000	548	26,400	28	4,000	52	23,800	2,100	157,000
January–December	42,200	2,770,000	23,200	885,000	905	36,500	677	355,000	35,000	2,990,000

-- Zero.

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Unwrought and other forms.

<sup>3</sup>Gross weight.

<sup>4</sup>Includes waste and scrap for all platinum-group elements. Previously categorized as "Platinum waste and scrap."

<sup>5</sup>The 20 countries and (or) localities with the greatest total platinum-group metal exports are listed. All others are included in the "Other" category.

<sup>6</sup>Less than ½ unit.

Source: U.S. Census Bureau.