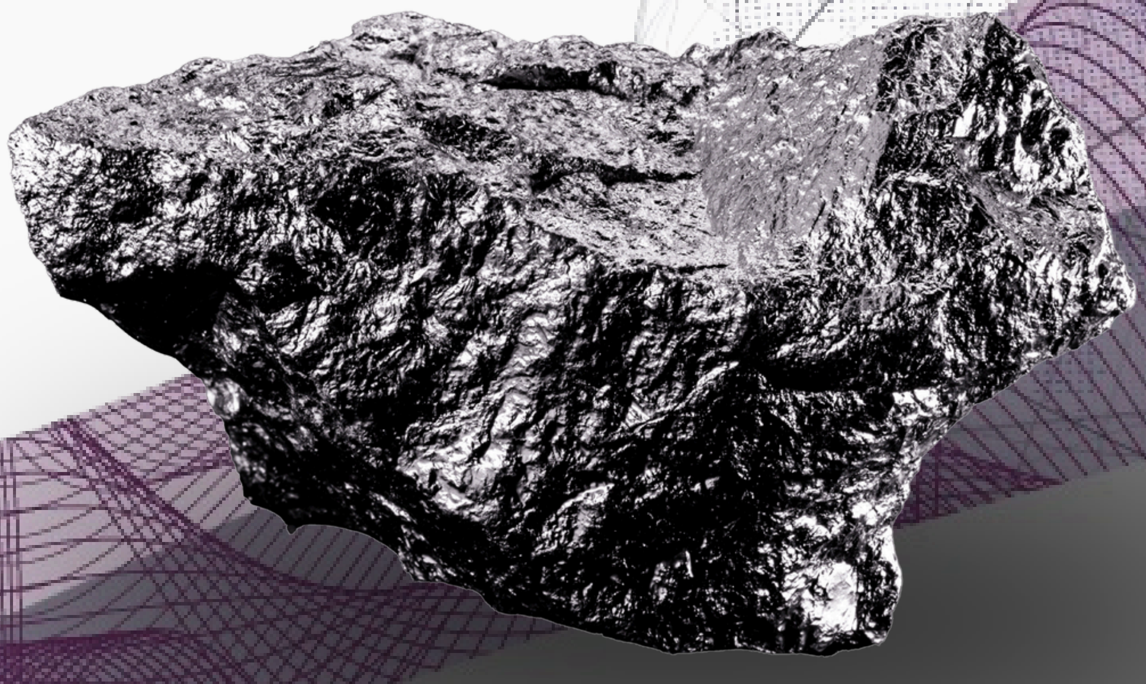
INTERNATIONAL PLATINUM GROUP METALS ASSOCIATION

PGM Fact Sheet Iridium

77

Ir

Iridium



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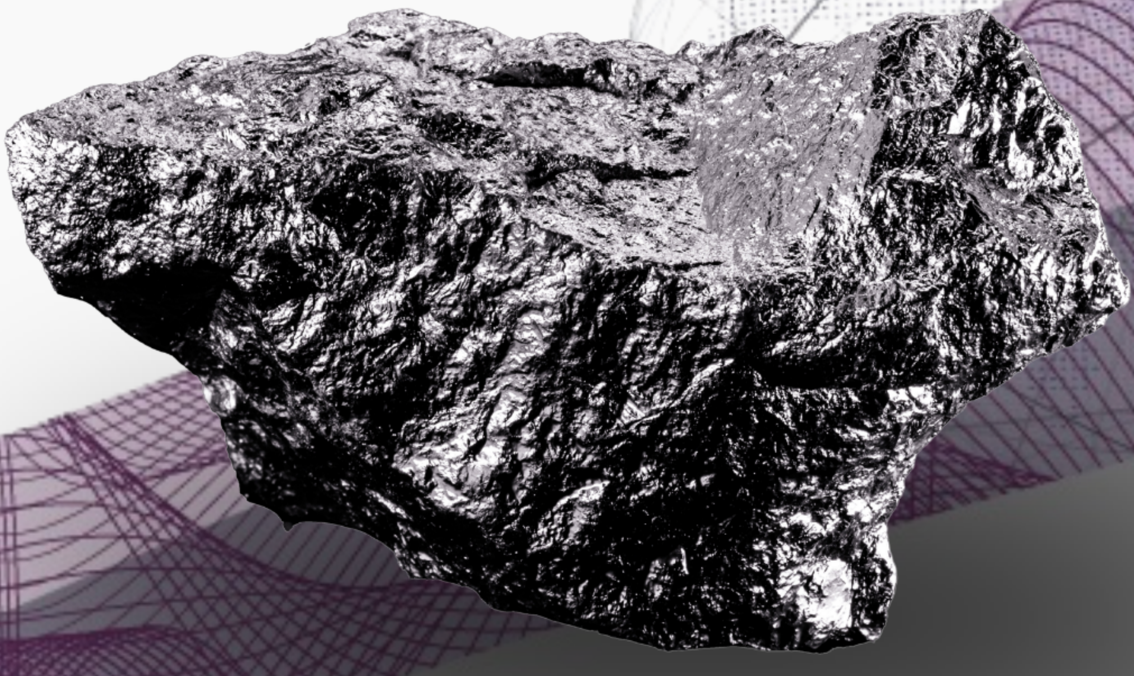

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PGM FACTSHEETS 2026 - IRIDIUM

Written by SFA (Oxford)

March 19, 2026

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OVERVIEW

Platinum group metals (PGMs), platinum, palladium, iridium, rhodium, ruthenium and osmium, share similar chemical properties and are classed as precious metals. Despite their low volumes, they are essential to a wide range of industrial applications. Iridium has become increasingly important in recent years because of its role in green hydrogen technologies, where it is used as a highly effective catalyst, often alongside ruthenium and platinum.

More broadly, PGMs support a wide range of technologies, from chemical processing and autocatalysts (catalytic converters) to emerging low-carbon applications. European companies continue to play a leading role in PGM-based processing and catalyst technologies, supported by a growing group of start-ups and spin-outs developing new materials for clean energy applications.

The current demand split between the five main PGMs is shown below. Palladium accounts for nearly half of total demand, followed by platinum at around 40%. Together, these two metals make up almost 90% of total demand by mass. Iridium accounts for only around 1% of demand, yet its importance is disproportionate to its volume because of its critical role in a small but fast-growing set of strategic applications.

Global PGM demand by metal: 2025
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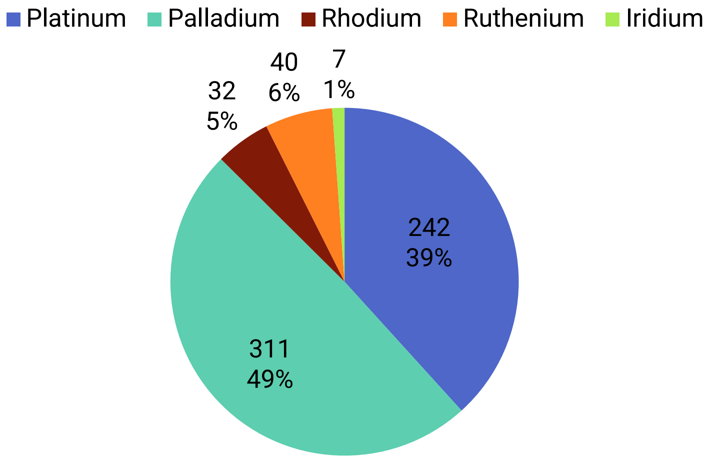

Source: Johnson Matthey (January 2026); demand excluding closed loop recycling and reuse

Global iridium demand by sector: 2025
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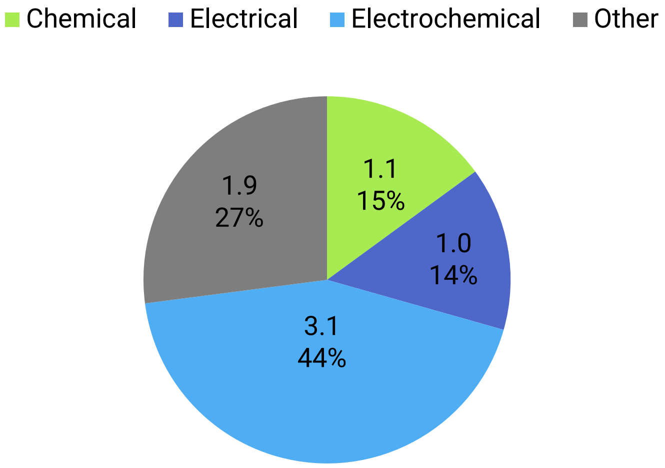

Source: Johnson Matthey (January 2026); demand excluding closed loop recycling and reuse

PGM mine production is highly concentrated in just a few countries. In general, PGMs are always produced together, as they occur together in nature. Platinum and palladium are considered the main metals, with the other PGMs (rhodium, ruthenium, iridium and osmium) considered by-products. Most PGM imports from primary sources are in concentrated form after a first refining stage.

Globally, platinum and palladium make up 86% of the PGM basket by mass of metal produced, while iridium makes up just 2% of production:

Global PGM primary supply by metal: 2025
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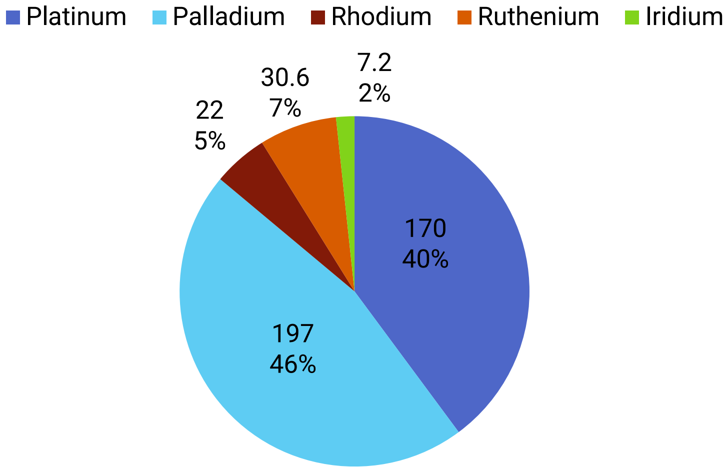


Source: Johnson Matthey (January 2026)

South Africa dominates PGM primary supply and is estimated to comprise >80% of iridium output. Other important regions for iridium production include Zimbabwe and Russia while there are minor amounts from North America. There is currently essentially no open-loop recycling of iridium globally.

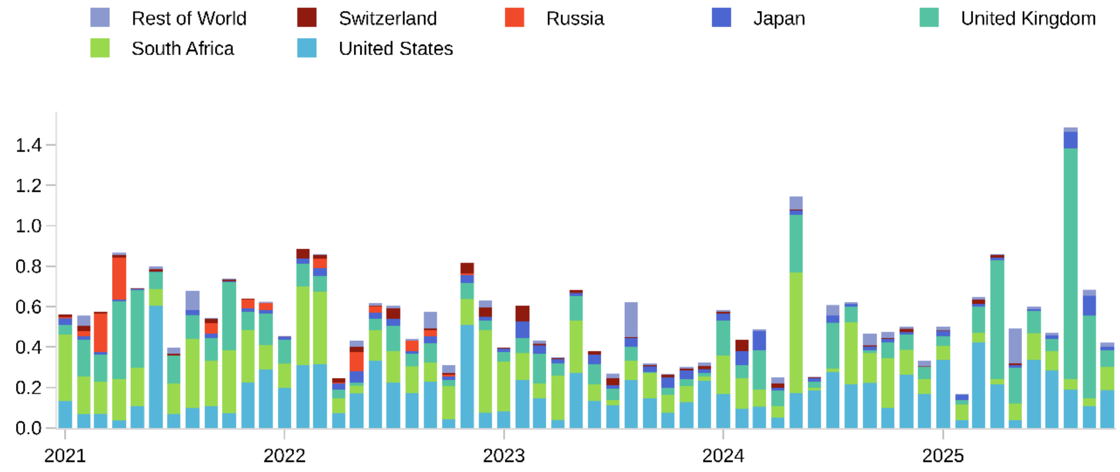
MARKET ANALYSIS, TRADE & PRICES

GLOBAL MARKET

In 2025, global primary iridium mine production is estimated at around 7 tonnes. The principal producing countries are South Africa, Russia and Zimbabwe, with other regions contributing very little supply. South Africa is by far the dominant producer accounting for 80% of global mine output. Essentially no iridium is recovered by mines in Europe.

EU TRADE

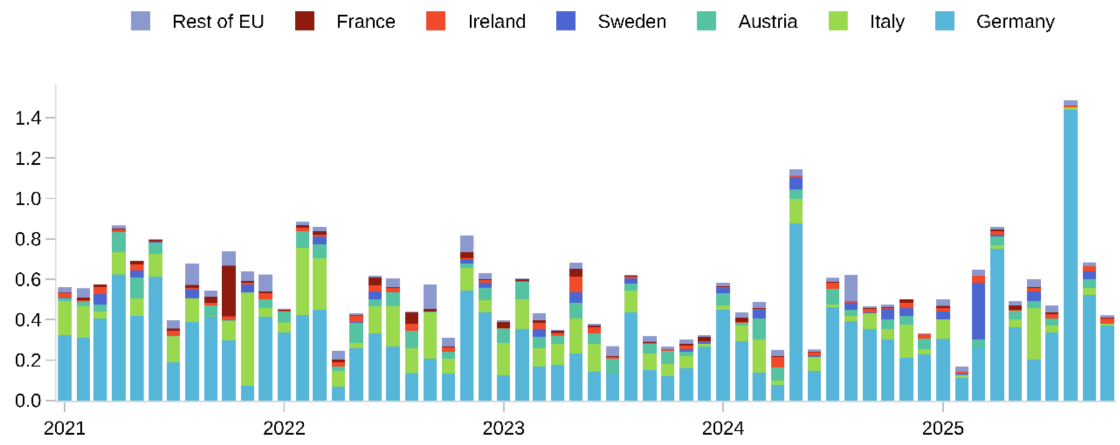
The EU imports and exports iridium and ruthenium in unwrought or powder-form (HS 711041) and semi manufactured form (HS 711049). South Africa, the UK and the U.S. are the largest sources for EU imports of iridium and ruthenium, with Germany and Italy being the largest recipients.



Iridium & Ruthenium: Largest exporters into the EU market
tonnes

Source: Eurostat. NB trade data does not distinguish between iridium and ruthenium

Iridium & Ruthenium: Largest importers into the EU market
tonnes



Source: Eurostat. NB trade data does not distinguish between iridium and ruthenium

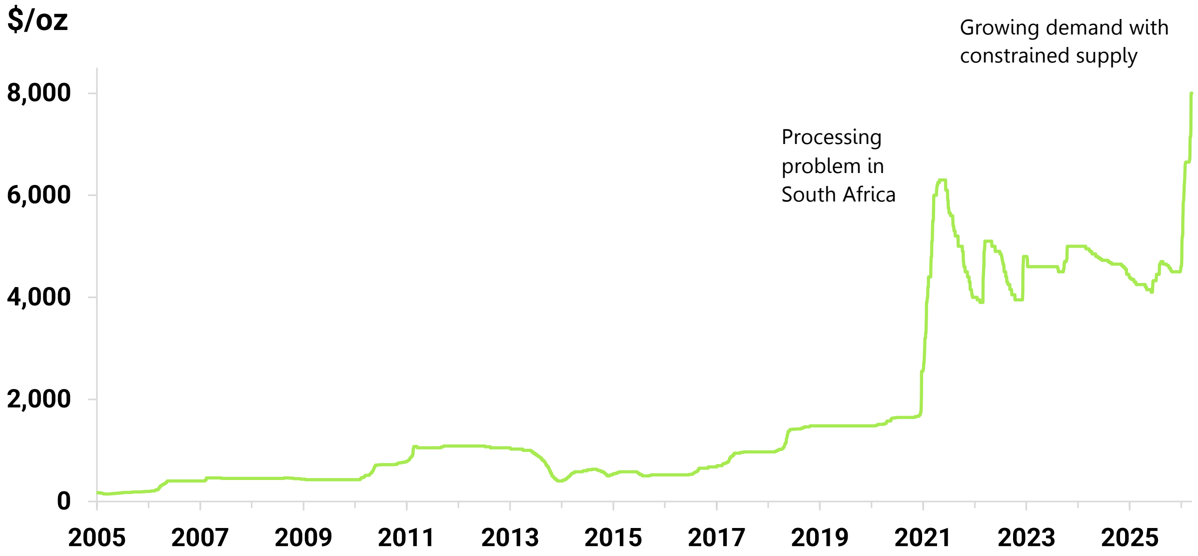
EU IMPORT RELIANCE

With virtually no primary supply and negligible open-loop recycling in the EU (see Recycling section on page 11), the region is reliant on imports of iridium to provide new metal for industrial uses.

PRICE & PRICE VOLATILITY

PGM prices are volatile with demand or supply shocks causing extremely sharp price movements.

Iridium price
$/oz



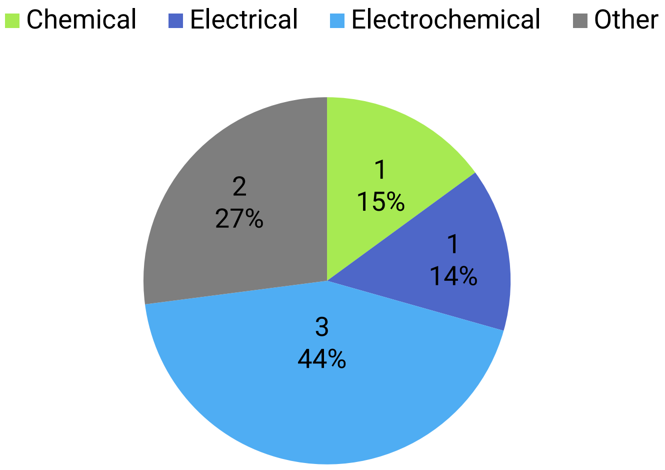
Source: Bloomberg Finance LP

DEMAND OUTLOOK

GLOBAL AND EUROPE END-USES

Iridium and ruthenium share many properties and so are frequently used together. Their synergy can increase performance, especially the industrially important combination of activity plus durability, even at low metal loadings. This reduces the risk of substitution to other metals and technologies, so supporting demand despite high prices.

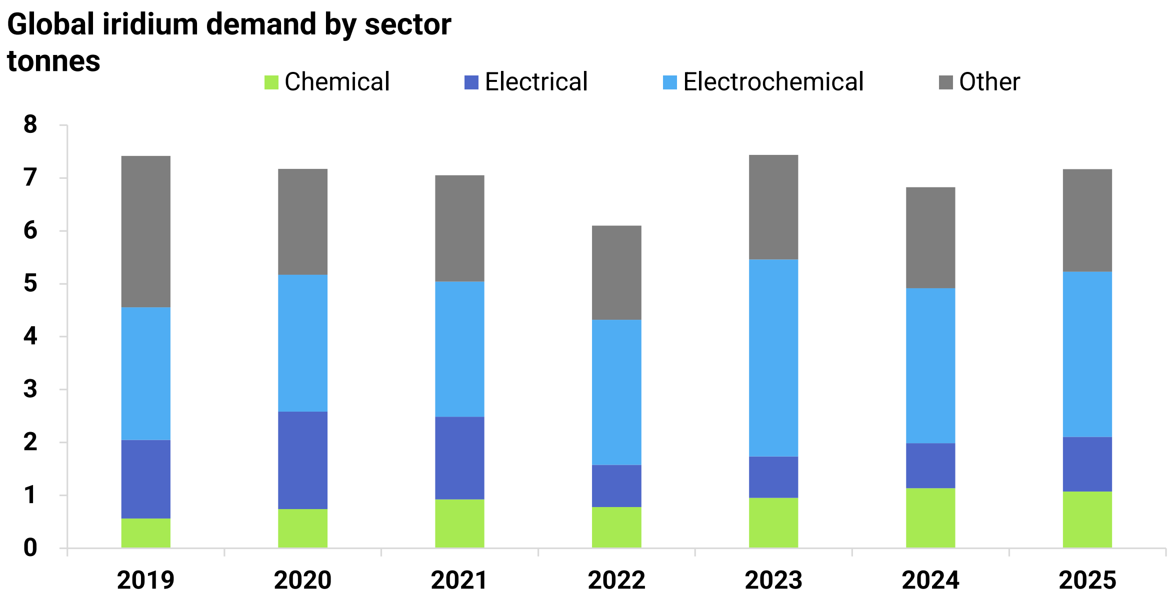
Global iridium demand by sector: 2025
tonnes



Source: Johnson Matthey (January 2026); demand excluding closed loop recycling and reuse

Iridium demand for primary supply has been approximately stable, around 7 tonnes (~230 koz) between 2019 and 2025. Additional demand comes from closed-loop recycling and reuse.

Almost half of this primarily-supplied iridium (~3 tonnes, 80-100 koz) is currently used in a diverse mix of electrochemical applications, where iridium oxide coatings (often along with ruthenium oxide) are used in electrodes for applications across water treatment, hydrogen production, electrowinning and in the chloralkali process. Iridium is also used in electroplating (copper foil production), an important application for key technologies (as defined by the European Union), such as batteries for electromobility and printed circuit boards for data and artificial intelligence applications.



Source: Johnson Matthey (January 2026)

APPLICATIONS & SUBSTITUTION POTENTIAL

Across all iridium applications, substitution potential is magnified by the small size of iridium primary supply; it remains an extremely geologically rare by-product metal.

ELECTROCHEMICAL

Current applications: Main uses include electrodes for chlorine production, water treatment, and electroplating for copper-foil production. The highest-profile growth use, though still at relatively low volumes of metal, is in PEM electrolyser anode catalysts and fuel cell technologies to produce green hydrogen. . Demand is expected to grow in the long term from a small base.

Substitution potential: In some processes that currently rely on iridium-coated electrodes, process operators can opt to recoat electrodes less frequently, reducing material costs but potentially increasing energy input costs. Alternative technologies, such as ultraviolet light can be used in some water purification applications. In electrolytic hydrogen production, thrifting to reduce the amount of iridium (and ruthenium) in the catalyst while maintaining (or even increasing) performance continues to be an important R&D focus.

CHEMICAL

Current applications: Iridium is widely used in process catalysts for manufacturing bulk chemicals, particularly acetic acid, and iridium complexes are also used across a range of homogeneous catalyses.

Substitution potential: Iridium benefited in acetic acid technology, where older rhodium-based methanol carbonylation (Monsanto Process) was displaced in major plants by an iridium-based catalyst system. Catalyst substitution is normally process-specific, qualification-intensive, and slow, as changing the catalyst metal can alter selectivity, by-products, water balance, and plant economics.

ELECTRICAL

Current applications: Iridium crucibles are widely used for growing synthetic crystals, often of oxide materials, for electronic/electrical applications. Iridium crucibles are often preferred over much cheaper base metals such as molybdenum or tungsten, as they withstand the high temperatures used to melt the materials and impart no contamination to the product, which is vital in electronic materials. All jet engine spark plugs and most of automotive spark plugs use Iridium tips, and they could represent a fairly significant source of open loop Iridium recycling if these spark plugs were massively recovered at the end of life (some spent auto spark plugs are being collected for recycling, but collection is difficult as there is no comparable collection system like with autokatalysts). As of today, a suitable collection system, like for autocatalysts (catalytic converters), has not yet been established, therefore initiatives are making only slow progress. Platinum-iridium electrical contacts and sparking points are other important markets, in addition to OLED display materials.

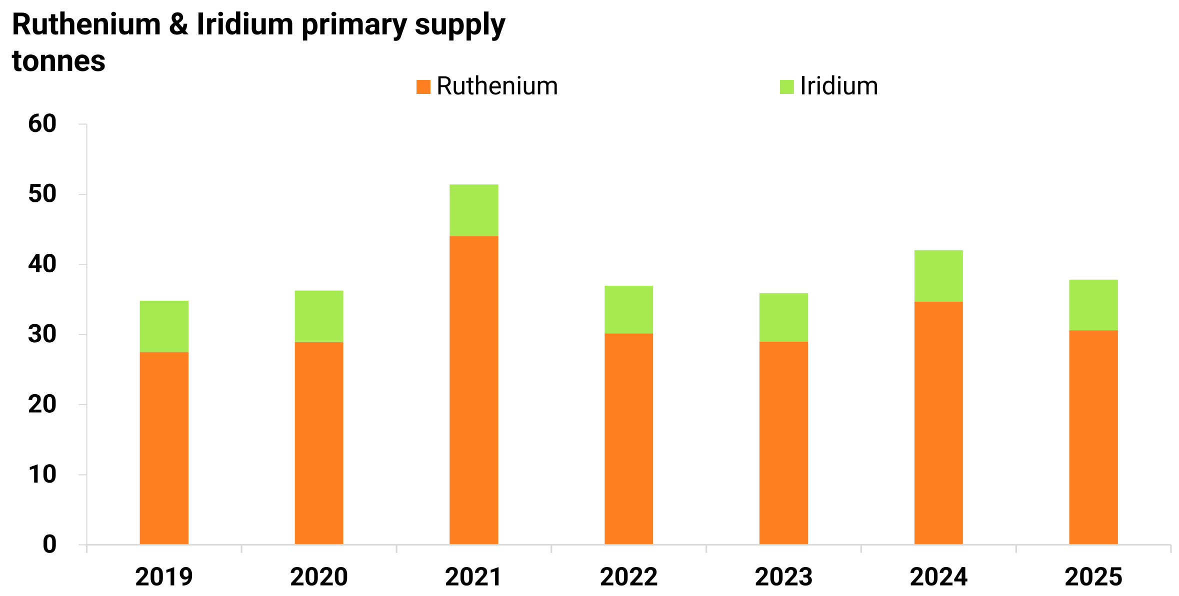
Substitution potential: Some electronics uses are harder to replace cleanly, because iridium brings a rare combination of high-temperature stability, corrosion resistance, and spark resistance. For OLEDs, alternative pathways have been investigated, but they usually require a complex platform redesign.

SUPPLY OUTLOOK

SUPPLY FROM PRIMARY MATERIALS

GLOBAL & EU MINE PRODUCTION

Iridium and ruthenium comprise the minor metals, and primary supply is reported here as global totals, dominated by South African output. Refined iridium output has been essentially stable, at around 7 tonnes between 2019 and 2025, though as a by-product of major PGM mining, iridium output depends on the pricing and demand for the overall PGM basket.



Source: Johnson Matthey (January 2026)

Global PGM mine supply is concentrated among a relatively small group of major producers. In South Africa, most PGM mines operate at depths ranging from less than 500 metres to around 2.2 kilometres. PGM-bearing ores in the country typically contain between 2 and 6 grams of PGMs per tonne. Depending on ore grade, between 10 and 40 tonnes of ore may be required to produce one troy ounce (31.10 g) of platinum.

Mined ores contain only low concentrations of iridium, so several stages of processing are required after extraction to upgrade and purify the metal. Refining is carried out mainly in producing countries, which are also the main exporting countries.

Underground mining is also used at the Norilsk-Talnakh operations in Russia and at several sites in Zimbabwe, Canada and the United States [IPA, 2015; Hagelüken, C., 2019], but these operations contain much lower concentrations of iridium than in South African orebodies.

PGM mining in Europe is very limited and makes essentially no contribution to primary iridium supply.

PGM production facilities are extensive and complex, with many steps from approval to fully operational. Brownfield restarts and shallower mechanised decline projects with existing infrastructure typically take from 8-18 months, mechanised shallow greenfield projects can take 3-4 years, while large deep level vertical shafts can take around 6–8 years.

PROCESSING

Concentration is usually carried out at or near the mine site. The resulting concentrate is then transported either to a central processing facility for conversion into metal or to a refining plant.

Since PGM concentrates are too low-grade to be refined directly, they must first undergo beneficiation. This typically involves both pyrometallurgical and hydrometallurgical processing and is generally undertaken near the mine. The exact route depends on the nature of the concentrate. For PGM-dominant ores, the process usually includes smelting at temperatures of at least 1,350°C, matte production and conversion, magnetic separation, and multi-stage leaching. For nickel ores, which are sulphide-rich, the metallurgical route is designed primarily around nickel production while maximising the recovery of PGMs through a more complex series of steps.

Subsequent smelting and refining may take place either on-site or at facilities near the mine. The concentrate is then sent to a precious metal refinery, where the individual PGMs are separated and purified through a series of hydrometallurgical steps. The PGM-bearing material is dissolved in hydrochloric acid, and the six PGMs are then refined to a high degree of purity through selective precipitation and other separation techniques, including solvent extraction, distillation and ion exchange. The final refined PGMs typically exceed 99.95% purity and may be produced in several forms, including ingots, grains and a fine powder known as sponge.

Once refined to sponge (or ingot), primary and secondary PGMs are indistinguishable and are traded and used as equivalents.

GEOLOGY, GLOBAL RESOURCES & RESERVES

GEOLOGY

PGMs are among the rarest elements on Earth, and iridium is one of the least abundant within this group. The combined abundance of PGMs, including platinum, palladium, osmium, iridium and ruthenium, is around 1.5 parts per billion (ppb) in the upper continental crust and 3.7 ppb in the bulk continental crust.

PGMs occur together in nature and are typically associated with nickel and copper. They are mainly found in base-metal sulphide minerals or in a wide range of PGM-bearing minerals, where they occur bonded to one another, to other metals in alloy form, or to elements such as sulphur, arsenic, antimony and tellurium. As a result, iridium is not mined as a standalone metal but is recovered together with the other PGMs from the same ore deposit, either as a by-product of platinum- or palladium-led operations or from nickel-copper sulphide deposits. Although iridium usually contributes only a small share of total revenue, it can still be economically important due to its high value and specialist applications.

Economically significant PGM enrichment occurs in only a limited range of geological settings. Mineable PGM deposits are geologically rare, and most PGM-bearing ores are very low grade. In the main commercial deposits in South Africa, Russia and Zimbabwe, ore grades typically range from 1 to 10 grams per tonne for combined PGMs and gold. Commercially significant PGM deposits are mainly hosted in mafic and ultramafic rocks, where PGMs have been concentrated through igneous processes.

Most global PGM resources and reserves are hosted in two main deposit classes: the PGM-dominant class and the nickel-copper sulphide class. In the PGM-dominant class, platinum is usually the principal economic product, with palladium and rhodium also contributing significantly. Iridium, by contrast, is generally a minor constituent by volume, but its supply is closely tied to the mineralogy and processing characteristics of these deposits.

Two PGM-dominant ore types account for most global production, the Merensky Reef type and the Chromitite reef type, both of which are best developed in South Africa's Bushveld Igneous Complex. The Bushveld Complex is a vast layered igneous complex that hosts two main PGE-rich horizons, the Merensky Reef and the UG2 Chromitite Reef. Both contain iridium together with platinum, palladium, rhodium and ruthenium, although the relative distribution of these metals differs significantly between the two.

The Merensky Reef consists of mafic to ultramafic layered intrusions that host platinum, palladium, rhodium, and other PGEs. Current mill-head grades are typically 4 to 7 grams per tonne of 6E, referring to the combined content of platinum, palladium, rhodium, ruthenium, iridium and gold, or 4 to 6 grams per tonne of 4E, which covers platinum, palladium, rhodium and gold. At the largest operating mines, the platinum-to-palladium ratio generally ranges from 2.0:1 to 2.5:1. Although the Merensky Reef is an important overall source of PGMs, it is less significant for iridium than UG2.

The UG2 Chromitite Reef has broadly similar geometry, but consists of thin, laterally continuous chromite layers. Typical mined grades are in the range of 2.5 to 4 grams per tonne of 4E, with a platinum-to-palladium ratio of around 2:1. Its particular significance lies in its substantially higher content of rhodium, ruthenium and iridium compared with the Merensky Reef. For this reason, UG2 is one of the most important ore bodies in the world for iridium supply.

The so-called minor PGMs, rhodium, ruthenium, iridium and osmium, are generally present in platinum-palladium ores only in very small amounts, rarely exceeding a few per cent of total PGM content. However, the proportion of iridium, along with ruthenium and rhodium, is much higher in UG2 ore than in the Merensky Reef and may exceed 20% [IPA Industrial expert, 2019]. As mining of UG2 has increased over recent decades, the potential availability of iridium has also expanded.

GLOBAL RESOURCES & RESERVES

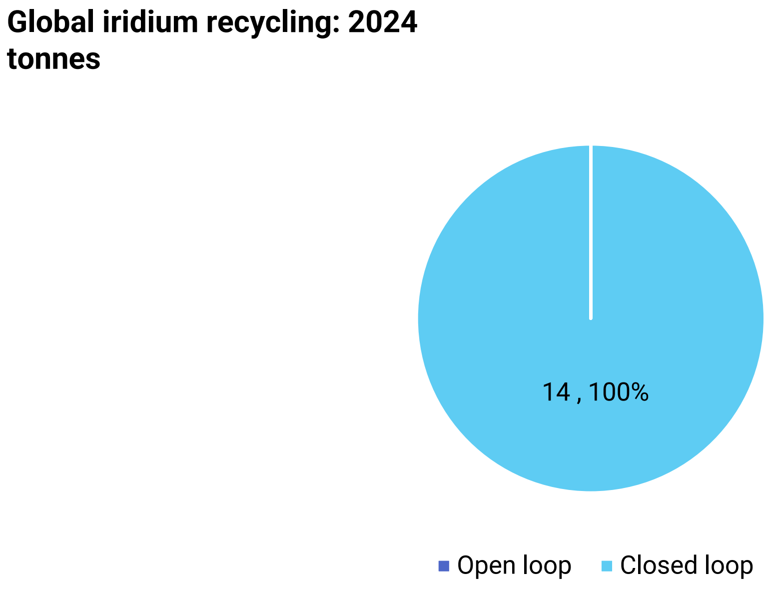
World PGM resources are estimated at more than 100 million kilograms, with the largest reserves and resources located in South Africa's Bushveld Complex. Although the Bushveld is most associated with platinum, it is also critically important for iridium, which occurs alongside the other platinum group metals and is recovered from the same mineralised systems.

South Africa is the dominant global source of PGMs and, by extension, one of the most important sources of iridium. Since iridium is exceptionally rare and is produced almost entirely as a by-product of PGM mining and refining, global supply depends heavily on the performance of a limited number of South African operations. In particular, ores from the Bushveld Complex, especially UG2, are central to global iridium availability.

SUPPLY FROM SECONDARY MATERIALS/PRODUCTION

RECYCLING

Historically, closed-loop recycling volumes have not been very visible. In its 2024 Circularity Whitepaper, Johnson Matthey has provided estimates of the total (open plus closed-loop) global recycling volumes, shown below. In its 2026 Whitepaper, Heraeus Precious Metals shows similar results. Iridium recycled volumes arise almost entirely from closed-loop systems, where the original owner retains metal ownership, rather than in open-loop markets, recognising the importance of retaining control of a metal with such a low primary supply. Open-loop recycling is not yet well developed, as the iridium content is often very low in final products (typically, a few milligrams e.g. in a spark plug) and recovery processes have not been developed, given the economics of dealing with small amounts of metal despite its value.



Source: Johnson Matthey (January 2026)

PGMs are highly recyclable from a technical standpoint. However, the recycling route used depends on the nature of the material being treated, the combination of materials present, the contaminants to be removed, and the specific PGM mixture to be separated.

In the case of iridium recovery from spent catalysts, the raw material must first be prepared to remove non-catalyst material from the spent industrial catalyst. Recovery of PGMs is most carried out through hydrometallurgical processing, typically involving leaching in acidic or alkaline solutions in the presence of strong oxidising agents. The individual PGMs are then separated and purified using a range of chemical techniques, including precipitation, dissolution, solvent extraction, distillation, ion exchange, and electrolytic, pyrolytic or reduction processes. Some of these steps may need to be repeated several times to achieve the required level of purity.

OTHER CONSIDERATIONS

HEALTH AND SAFETY ISSUES

As a lower volume PGM, only three forms of iridium have been registered under the EU REACH Regulation: iridium metal, hexachloroiridic acid, and diammonium hexachloroiridate. Iridium metal is not classified for any health hazard under the EU CLP Regulation, while the two chloroiridate compounds that may be encountered by workers in occupational settings have low acute oral toxicity but the potential to cause irritation/corrosion to the eyes and/or skin. The acid compound is too corrosive for sensitisation testing, but diammonium hexachloroiridate was concluded to not possess sensitisation potential when tested.

The International Platinum Group Metals Association (IPA) has developed comprehensive guidance on the safe use of PGMs in the workplace. This guidance is used by PGM producers and downstream users to design and continually improve occupational health and safety programmes, helping to ensure that the benefits of PGM-containing technologies are delivered while protecting workers along the supply chain. *Source: IPA*

ENVIRONMENTAL ISSUES

PGMs in metallic form are generally regarded as inert and non-hazardous. Platinum, for example, is widely used in high-value jewellery because of its rarity, purity, natural white colour and resistance to tarnishing.

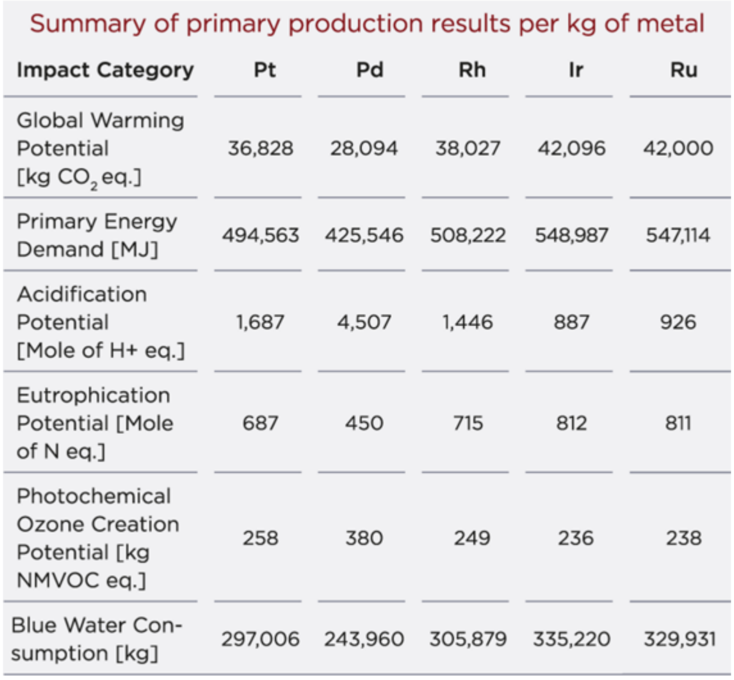
PGMs also play an important role in medical applications. Many pacemakers use platinum-iridium electrodes on their leads to deliver electrical impulses to the heart reliably over long periods. Platinum components are also used to connect the pulse generator to the leads, providing durability within the body. In cardiovascular procedures such as angioplasty, platinum marker bands and guidewires help to ensure the precise placement of stents. Some stents, including platinum-chromium alloy designs such as those developed by Boston Scientific, use PGMs to provide strength, flexibility and X-ray visibility. Platinum-iridium alloys are also used in certain experimental or specialised stent applications.

The main occupational health concern related to PGMs is respiratory allergy associated with exposure to soluble platinum compounds, particularly in refining and catalyst production. By contrast, metallic PGMs have not been shown to cause allergic reactions. On this basis, occupational exposure limits have been established for soluble chloroplatinate compounds to protect workers in these specialised industrial settings.

These findings relate to specific compounds, controlled industrial uses and workplace exposure conditions, and should not be generalised to PGMs. They do not support the conclusion that PGMs are inherently toxic to the general population, especially when used in finished products such as automotive catalytic converters, medical devices or fuel cell components, where exposure to soluble platinum species is extremely limited.

The IPA routinely conducts Life Cycle Assessments of the PGMs to assess the potential environmental impacts of their production and makes the results for key impact categories available on its website.

In 2025, the IPA has published a CO_2 scenario for primary production in 2030, based on investments by South African producers and the South African government into renewable energy, which shows a potential decrease in the CO_2 footprint of mining of between 35% and 61%, depending on the metal (Bossi/Gediga, Decarbonisation in the Mining of Platinum Group Metals – A CO2 Outlook to 2030 | Johnson Matthey Technology Review).



Summary of primary production results per kg of metal

Impact Category	Pt	Pd	Rh	Ir	Ru
Global Warming Potential [kg CO_2 eq.]	36,828	28,094	38,027	42,096	42,000
Primary Energy Demand [MJ]	494,563	425,546	508,222	548,987	547,114
Acidification Potential [Mole of H+ eq.]	1,687	4,507	1,446	887	926
Eutrophication Potential [Mole of N eq.]	687	450	715	812	811
Photochemical Ozone Creation Potential [kg NMVOC eq.]	258	380	249	236	238
Blue Water Consumption [kg]	297,006	243,960	305,879	335,220	329,931

For the secondary production route (recycling), the IPA has published values for Pt, Pd, and Rh, but could not publish data on recycled iridium due to limited availability of data (at least three reporting companies would be needed for confidentiality reasons).

The environmental footprint of primary iridium production remains material, but intensity metrics have improved over time through operational efficiency gains, increased secondary supply from recycling, and the progressive adoption of recognised responsible mining frameworks. Leading PGM producers are implementing structured water and energy management systems, enhanced tailings governance in line with the Global Industry Standard on Tailings Management (GISTM), and biodiversity programmes. These efforts are increasingly aligned with frameworks such as the IRMA Standard for Responsible Mining, ICMM Performance Expectations, ISO 14001 environmental management systems, and climate disclosure and target-setting initiatives including TCFD and the Science Based Targets initiative (SBTi).

NORMATIVE REQUIREMENTS

Normative requirements include REACH compliance (EC 1907/2006) for handling, strict particulate ventilation, personal protective equipment (PPE), and waste disposal in accordance with local environmental regulations. Safety Data Sheets must be provided with materials.

At the sector level, the International Platinum Group Metals Association (IPA) has developed comprehensive guidance on the safe use of PGMs in the workplace, including recommendations on exposure monitoring, medical surveillance and best practices for controlling occupational exposures to certain soluble PGM compounds that can cause respiratory sensitisation. This guidance is used by PGM producers and downstream users to design and continually improve occupational health and safety programmes, helping to ensure that the benefits of palladium-containing technologies are delivered while protecting workers along the supply chain.

Source: IPA

SOCIOECONOMIC AND ETHICAL ISSUES

Iridium and PGM supply are highly geographically concentrated, so social and governance issues in producer countries are more focused than for many other commodities. These include worker safety, wage bargaining, electricity reliability, water stress, community relations, local economic dependence on mining, and the distribution of value along the chain. Governments in the major producing countries in Southern Africa expect companies mining there to increase the amount of beneficiation and value-adding processes performed in-country, rather than exporting for these processes. PGM mining companies operate under comprehensive mining legislation, environmental regulation, and binding social and labour obligations. Mining companies adhere to rigorous sustainability reporting, environmental permitting and labour compliance requirements.

All IPA PGM mining companies are publicly listed (LSE, JSE, NSE) companies which routinely report about their environmental, social and governance performance and abide by the regulations set out by national/local authorities and the respective stock exchanges.

IPA members apply sustainability reporting principles to ensure organizations communicate and demonstrate accountability for their environmental, economic, and social impacts, in line with global best practices such as the UN Sustainable Development Goals (UN SDGs), the Global Reporting Initiative (GRI), and the UN Global Compact.

Ethical sourcing issues in PGMs are therefore less about artisanal-mining narratives common in some other minerals and more about industrial-scale mining conditions, labour relations, community impacts, and geopolitical exposure. Customers increasingly expect assurance not only on origin but also on processing integrity, responsible sourcing, and sanction screening.

The extraction and refining of PGMs can place significant pressure on local environments; however, industry takes the environmental and social impacts of PGM extraction very seriously and has focused on substantial improvements in recent years, particularly in water stewardship, air emissions control, and waste management. Water remains a critical input to flotation and processing, but major PGM mines in South Africa and elsewhere now operate closed-loop systems that recycle a large share of process water, supported by site-specific water balances and dedicated treatment plants that repurpose mine water for cooling and other uses. Recent case studies from deep-level PGM operations in Limpopo show that membrane-based treatment and reuse can replace a significant portion of potable "board" water, delivering both cost savings and reduced pressure on local water resources, in line with IRMA's detailed requirements for water management. South Africa continues to face structural water stress in some areas, with renewable water resources of around 800–900 m^3 per person per year, but national water use efficiency and mine water management programmes, together with company-level integrated water and waste management plans, are designed to ensure that mining does not crowd out essential domestic and agricultural uses.

Sources: PGM mining and processing in the circular economy: A framework towards circularity (J. Kruger, 2022) and UN

Tailings and waste rock are an inherent by-product of all hard-rock mining, but in the PGM sector, they are managed as engineered storage facilities rather than unmanaged "waste dumps", with design, monitoring and closure governed by international standards such as the Global Industry Standard on Tailings Management and, increasingly, IRMA requirements. Leading PGM producers report full conformance with these standards for high-consequence facilities and are investing in tailings retreatment, revegetation, and long-term stability measures to reduce legacy impacts and recover additional metal value. Through the IPA, member companies have committed and continue to align their operations with recognised responsible mining and sourcing frameworks, including IRMA and other sustainability assurance schemes (such as the forthcoming Consolidated Mining Standard Initiative - CMSI), demonstrating measurable progress over time and helping to ensure that PGM production supports local development while minimising environmental impacts.

Source: IPA

ECONOMIC IMPORTANCE OF IRIDIUM FOR EXPORTING COUNTRIES

Iridium and the PGM industry are economically significant for South Africa and, to a far lesser extent, for Zimbabwe and Russia. In South Africa, platinum group metals are a major mining industry, a source of export earnings, industrial employment and fiscal revenue, and an anchor for local refining and fabrication capabilities.

PGM mines in South Africa and Zimbabwe are not government-owned but are owned by publicly listed companies and their shareholders.

For producers and their downstream customers, the government policies, infrastructure performance and macroeconomic conditions in the countries where they mine can significantly affect supply. Such issues may cause short-term disruptions, while, of course, the fundamental geology determines the long-term potential of a mine region.

RESEARCH AND DEVELOPMENT TRENDS

Iridium and all the PGMs continue to feature in R&D projects from the highly academic to those close to market.

A new collaboration was launched in February 2026 to develop high-impact PGM technologies and drive the next wave of industrial innovation. This recognises that currently, some 60% of global PGM supply is used in autocatalysts (catalytic converters); in the long term, this will contract due to the increasing share of battery-electric vehicles. Johnson Matthey, Sibanye-Stillwater, and Valterra Platinum launched the programme to explore and scale technologies that leverage the exceptional performance and durability of PGMs, as well as their robust, circular supply chains. Expected to expand with additional partners in the coming months, the collaboration will explore uses across multiple sectors, including clean hydrogen, enhanced emissions detection and reduction across stationary and mobile sources, new electronic materials, and high-performance alloys and other advanced materials.

APPENDIX: RELEVANT HS/CN CODES

IRIDIUM METAL, SEMI-MANUFACTURED AND SCRAP

Level	Code	Description
7110	7110.41	Iridium, osmium and ruthenium — unwrought or in powder form. Covers bars, ingots, sponge, granules and powder. Iridium has no separate WCO subheading; it shares this code with osmium and ruthenium at the 6-digit level.
	7110.49	Iridium, osmium and ruthenium — other semi-manufactured forms. Includes iridium crucibles, wire, rod, foil, sheet, sputtering targets, and thermocouple elements.
7112	7112.30	Ash containing precious metal or precious metal compounds — principally for recovery. Covers iridium-bearing sweepings, spent catalyst ash and furnace residues.
	7112.92	Waste and scrap of platinum-group metals. Standard WCO 6-digit code for PGM scrap; iridium scrap (e.g. spent Ir electrodes, worn crucibles) is typically declared here where no dedicated national sub-split exists.
	7112.99	Other precious metal waste and scrap not elsewhere specified. Used for mixed or unspecified PGM scrap containing iridium when not classifiable to a single-metal line.

IRIDIUM COMPOUNDS (SALTS ETC)

Level	Code	Description
2843	2843.10	Colloidal precious metals. Explicitly covers colloidal iridium suspensions — the WCO notes to heading 2843 list iridium by name as one of the precious metals covered in colloidal form.
	2843.90	Other inorganic or organic compounds of precious metals; amalgams. The primary code for all iridium salts and chemical intermediates — iridium(III) chloride, iridium(IV) chloride, iridium(III) bromide, iridium acetate, iridium oxide (IrO_2), hexachloroiridic acid (H_2IrCl_6), and organometallic iridium complexes (e.g. $Ir(acac)_3$). No dedicated iridium sub-split exists at WCO 6-digit level; all fall under the "other compounds" basket.

IRIDUM REAGENT SOLUTIONS AND KITS

Level	Code	Description (short)
3815	3815.12	Supported precious metal catalysts where the active substance is a precious metal or compound. Covers iridium-on-carbon (Ir/C), Ir/Al$_2$O$_3$ and other heterogeneous iridium catalytic preparations used in hydrogenation and carbonylation.
3815	3815.90	Other reaction initiators and accelerators not elsewhere specified. Used for homogeneous iridium catalyst systems (e.g. Crabtree's catalyst, Ir-phosphine complexes) where 3815.12 does not apply.
3822	3822.19	Prepared diagnostic or laboratory reagents (other), including kits. Standard code for iridium ICP/AAS standard solutions and analytical reagent preparations without certified reference material status.
	3822.90	Certified reference materials. Covers iridium single-element CRM standards (e.g. 1,000 mg/L Ir in HCl/HNO$_3$). Plain iridium chloride solutions without CRM certification remain under 2843.90.

REFERENCES

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Johnson Matthey Circularity Whitepaper - Reclaiming the future: PGM insights for a circular economy (2025)
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Johnson Matthey PGM Market Reports – latest market data available behind the link:
https://matthey.com/products-and-markets/pgms-and-circularity/pgm-markets/pgm-market-reports

Other sources: Eurostat and Bloomberg Finance LP

DEFINITIONS & METHODOLOGY FOR DATA

The demand, primary, and secondary data used to create charts and quoted in the text are based on Johnson Matthey's PGM Market Report dataset (most recent edition: May 2025) and have been updated with estimates to reflect the situation as of December 2025.

Primary supply

Supply figures represent producers' sales of primary PGM and are allocated to the region where mining took place, rather than to the region of subsequent processing.

Secondary supply

Secondary supply is the quantity of metal recovered from open-loop recycling (i.e. where the original purchaser does not retain ownership of the PGM).

Outside the automotive, jewellery and electronics markets, open-loop recycling is negligible.

Automotive recycling represents the weight of metal recovered from end-of-life vehicles and aftermarket scrap. It does not include warranty or production scrap.

Demand

Demand figures for any given application represent the sum of industry demand for new metal in that application, net of any closed-loop recycling (i.e. where industry participants retain ownership of the metal: an example would be recycling of spent chemical catalysts, where the metal is retained to be used on fresh catalyst that replaces the spent charge).

Automotive demand is allocated to the region where the vehicle is manufactured and is accounted for at the time of vehicle production. It includes emissions catalysts on vehicles, motorcycles and three-wheelers, as well as fuel cell vehicles. Non-road mobile machinery is counted as industrial demand, in the pollution control category.

Jewellery demand is allocated to the region where the finished jewellery is manufactured, not to the region where it is sold.

Regional definitions

Europe: EU+ (includes UK and Turkey but excludes Russia)

Open-loop recycling

When the original purchaser of the metal does not retain control over the PGM, the metal is available to the market again once recovered. The main source of open-loop metal is automotive catalytic converters, which are widely recovered from scrapped vehicles and recycled to recover the contained platinum, palladium or rhodium contained. Some metal is also recovered from the jewellery and electronics markets.

Closed-loop recycling

Refers to the situation where the metal remains within the application, e.g., when metal is recovered from used chemical catalysts and is used to produce fresh catalysts to replace the spent charge. While this metal is processed by PGM refiners, the equivalent amount of metal is usually returned to the original owner, who retains the metal value. As the net amount of metal in use has not changed, this returned metal is not counted towards market supply. Re-using metal in such way avoids the need for virgin mined metal, thereby contributing to make demand more sustainable.