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OSMIUM

The Rarest Precious Metal on Earth.

What is it, and what is it used for?

Osmium is a metal. Unlike alloys such as steel or bronze, osmium does not comprise a mix of different materials: Osmium is a chemical element. Its atomic number is 76 on the periodic table, placing it snug between rhodium and iridium. It's classified as a platinum group metal along with metals such as palladium, rhodium, and of course, platinum. It is also considered the "noble metal" because of its high resistance against oxidization.

Osmium's list of superlative qualities runs long. At 22.61g/cm³, it is the densest naturally occurring element known to mankind. To compare, the urethane core of a 16-pound bowling ball – the heaviest allowed in competitions – is seventeen times less dense. (A bowling ball sized sphere of crystalline osmium would weigh over 270 pounds and sell for approximately \$230.5M USD, but we'll talk more about that later.) Osmium has the highest abrasion resistance of any metal and offers exceedingly high protection against gamma radiation. It would be the preeminent material in myriad industries – civil engineering, space industry, marine technology, to name a few – if it weren't for its rarity.

And when we say that osmium is rare, we mean it: With only an estimated seventeen cubic meters of osmium in the Earth's entire crust, it is the rarest element on the planet. To compare, the estimated volume of cubic meters of gold in the Earth's crust is well over ten thousand.

Why is it, then, that so few people have heard of osmium? Why hasn't such a rare element been coveted in the past?

For starters, working with osmium wasn't always easy. Freshly extracted, its "raw" form – a black powder referred to as "Osmium Sponge" – is a potentially hazardous material. At normal temperatures and atmospheric conditions, osmium sponge oxidizes to form a compound named Osmium Tetroxide: A volatile gas that can cause an alarming series of reactions, from inflammation of the lungs to permanent damage to one's eyes.

Osmium had a brief foray into industrial application in the early 20th century as a material for lightbulb filaments. However, the metal was eventually substituted for a less-dense but far-less-expensive metal.

In 2014, a group of Swiss scientists discovered a method to crystallize osmium. Crystallizing a metal involves rearranging atoms into a geometrically sound structure while maintaining the metal's purity. The result is osmium in a form that is solid, non-toxic, and over 99.9995% pure. Conveniently, crystallized osmium is also spectacular to behold. Crystalline osmium is flat – typically between 1 and 2 millimetres, and yet the metallic edges that form on the crystalline surface create a dazzling sparkle that can be seen from an incredible distance. Unlike diamonds, whose edges only reflect a percentage of light that isn't absorbed into the gem itself, osmium reflects nearly 100% of all incident light.



Apart from adding a splendid aesthetic quality to the metal, the crystalline structure of osmium also offers a key advantage as a physical asset: Identifiability.

Every piece of crystalline osmium has its own unique crystalline structure. This structure, when scanned using high-definition microscopes, acts a sort of fingerprint. And like a biological fingerprint, this scan can then be archived and used as an unfalsifiable identity for each piece of osmium. Every piece of crystalline osmium could its exact dimensions, weight, value, and ownership assigned to this identity.



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This is exactly what is done at the Osmium-Institut zur Inverkehrbringung und Zertifizierung von Osmium GmbH, or simply "The Osmium Institute." The company, based in southern Germany, is the world-leading authority on the certification and distribution of crystalline osmium. During their process to confirm a piece of crystalline osmium's purity, they employ the use of 3D-imaging microscopes to identify and tag every single piece of osmium to enter the market. Each piece is given a unique identity number, or "Osmium Identification Code" in the form an 8-digit alphanumeric code. Anyone in the world can look up an osmium piece's OIC with their smartphone and confirm, on the spot, whether the piece of osmium they are looking at is indeed the metal that it is supposed to be. This is especially true of American Customs and Border Control agents, with whom the Osmium Institute has collaborated to fulfil the requirements for important regulations for quality control.

Crystalline osmium's good looks and unmatched security are driving the push behind its growing popularity in both jewelry markets and tangible investment asset markets. Heræus Precious Metals, a leading authority on precious metal investment news, writes that "In order for osmium to be processed as jewelry, osmium must be crystallized in many complex steps, so that safe handling of the osmium is possible. Crystalline osmium has a purity of 99.9995 % and in this form is completely harmless to the body and skin."

In 2014, Swiss Watchmaker Hublot used crystalline osmium in their timepiece line "Firmament Tourbillon." Crystalline osmium was featured in the Aqua Wave ring that won the Innovation Award at the 2019 National Association of Jewelers competition in the UK. And in 2020, the company Oslery GmbH was founded, the first jewelry producer to work exclusively with osmium in their

jewelry lines, using the metal as an inlay in pieces made from rose gold, white gold, and titanium.

The market for osmium as a tangible asset has also grown substantially since the discovery of its crystallization in 2014. In 2017, the price for a gram of osmium rose from \$867 USD to \$957 USD. What began as a small niche market based primarily in Germany quickly grew internationally. As of spring of 2021, the price of Osmium ran for over \$1,800. Demand drivers for the metal included its growing use in the jewelry and luxury goods sector, as well as its allure as a potential hedge against the increasingly volatile gold and silver markets. Its security, backed by its unmatched physical properties and the invention of the Osmium Identification Code, attracts many individuals whose portfolios already contain holdings in precious metals, but who seek other viable alternatives. And of course, it goes without saying that the notion of procuring samples the rarest stable element on Earth while it is

still available appeals heavily to those who speculate that a shortage of osmium in the future could lead to a massive hike in market prices. The expected price surge that would be caused by a worldwide shortage of osmium has even been given a nickname: The Osmium Big Bang. Crystalline osmium is still a relatively unknown precious metal in North America. One need only look to the performance of osmium as a tangible asset in overseas, however, to see what may happen if the world's rarest precious metal catches on.

Readers in the USA can learn more by contacting the Osmium Institute at 1-888-805-MIUM (867-6486) and at usa@osmium-institute.com. More information can also be found at www.buy-osmium.com.

