

**\* Name Origin:**

Greek: osmê (odor). A metal with pungent smell.

**\* Sources:**

Obtained from the same ores as platinum.

**\* Uses:**

Used to tip gold pen points, instrument pivots (such as compass needles and clock bearings), to make electric light filaments. Used for high temperature alloys and pressure bearings.

**\* Additional Notes:**

Discovered in 1803 by Tennant in the residue left when crude platinum is dissolved by aqua regia. Osmium occurs in iridosmine and in platinum-bearing river sands of the Urals, North America, and South America. It is also found in the nickel-bearing ores of Sudbury, Ontario, region along with other platinum metals. While the quantity of platinum metals in these ores is very small, the large tonnages of nickel ores processed make commercial recovery possible. The metal is lustrous, bluish white, extremely hard, and brittle even at high temperatures. It has the highest melting point and the lowest vapor pressure of the platinum group. The metal is very difficult to fabricate, but the powder can be sintered in a hydrogen atmosphere at a temperature of 2000°C. The solid metal is not affected by air at room temperature, but the powdered or spongy metal slowly gives off osmium tetroxide, which is a powerful oxidizing agent and has a strong smell. The tetroxide is highly toxic, and boils at 130°C (760 mm).

Concentrations in air as low as 10–7 g/m<sup>3</sup> can cause lung congestion, skin damage, or eye damage. The tetroxide has been used to detect fingerprints and to stain fatty tissue for microscope slides. The metal is almost entirely used to produce very hard alloys, with other metals of the platinum group, for fountain pen tips, instrument pivots, phonograph needles, and electrical contacts. Natural osmium contains seven isotopes, one of which, <sup>186</sup>Os, is radioactive with a very long half-life. Thirty four other isotopes and isomers are known, all of which are radioactive. The measured densities of iridium and osmium seem to indicate that osmium is slightly more dense than iridium, so osmium has generally been credited with being the heaviest known element.

Calculations of the density from the space lattice, which may be more reliable for these elements than actual measurements, however, give a density of 22.65 for iridium compared to 22.61 for osmium. At present, therefore, we know either iridium or osmium is the heaviest element, but the data do not allow selection between the two.