

*** Name Origin:**

Greek: molubdos (lead).

*** Sources:**

Found in the minerals molybdenite (MoS_2) and wulfenite (MoO_4Pb).

*** Uses:**

Used in steel, aircraft, missiles, filaments in electric heaters, lubricants and protective coatings in boiler plates.

*** Additional Notes:**

Before Scheele recognized molybdenite as a distinct ore of a new element in 1778, it was confused with graphite and lead ore. The metal was prepared in an impure form in 1782 by Hjelm. Molybdenum does not occur native, but is obtained principally from molybdenite (MoS_2). Wulfenite (PbMoO_4) and Powellite ($\text{Ca}(\text{MoW})\text{O}_4$) are also minor commercial ores. Molybdenum is also recovered as a by-product of copper and tungsten mining operations. The metal is prepared from the powder made by the hydrogen reduction of purified molybdic trioxide or ammonium molybdate. The metal is silvery white, very hard, but is softer and more ductile than tungsten. It has a high elastic modulus, and only tungsten and tantalum, of the more readily available metals, have higher melting points. It is a valuable alloying agent, as it contributes to the hardenability and toughness of quenched and tempered steels. It also improves the strength of steel at high temperatures. It is used in certain nickel-based alloys, such as the "Hastelloys®" which are heat-resistant and corrosion-resistant to chemical solutions. Molybdenum oxidizes at elevated temperatures. The metal has found recent application as electrodes for electrically heated glass furnaces and forehearth. The metal is also used in nuclear energy applications and for missile and aircraft parts. Molybdenum is valuable as a catalyst in the refining of petroleum. It has found application as a filament material in electronic and electrical applications. Molybdenum is an essential trace element in plant nutrition. Some lands are barren for lack of this element in the soil. Molybdenum sulfide is useful as a lubricant, especially at high temperatures where oils would decompose. Almost all ultra-high strength steels with minimum yield points up to 300,000 psi(lb/in.2) contain molybdenum in amounts from 0.25 to 8%. Natural molybdenum contains seven isotopes. Twenty three other isotopes and isomers are known, all of which are radioactive.