Ytterbium - Yb

Chemical properties of Ytterbium - Health effects of ytterbium - Environmental effects of ytterbium

Atomic number	70
Atomic mass	173.04 $g.mol^{-1}$
Electronegativity according to Pauling	1.1
Density	7 $g.cm^{-3}$ at 20°C
Melting point	824 °C
Boiling point	1466 °C
Vanderwaals radius	unknown
Ionic radius	unknown
Isotopes	9
Electronic shell	[Xe] $4f^{14}$ $6s^{2}$
Energy of second ionisation	602.4 $kJ.mol^{-1}$
Energy of second ionisation	1172.3 $kJ.mol^{-1}$
Energy of third ionisation	2472.3 $kJ.mol^{-1}$
Standard potential	- 2.27 V
Discovered by	Jean de Marignac in 1878

Ytterbium

Ytterbium is a soft, malleable and rather ductile element that exhibits a bright silvery luster. A rare earth, the element is easily attacked and dissolved by mineral acids, slowly reacts with water, and oxidizes in air. The oxide forms a protective layer on the surface. Compounds of ytterbium are rare.

Applications

Ytterbium is sometimes associated with yttrium or other related elements and is used in certain steels. Its metal could be used to help improve the grain refinement, strength, and other mechanical properties of stainless steel. Some ytterbium alloys have been used in dentistry. One ytterbium isotope has been used as a radiation source substitute for a portable X-ray machine when electricity was not available. Like other rare-earth elements, it can be used to dope phosphors, or for ceramic capacitors and other electronic devices, and it can even act as an industrial catalyst.

Ytterbium in the environment

Ytterbium is found with other rare earth elements in several rare minerals as gadolinite, monazite, and xenotime. Natural ytterbium is a mix of seven stable isotopes. It is most often recovered commercially from

monazite sand (~0.03% ytterbium). The main mining areas are China, US, Brazil, India, Sri Lanka, and Australia and reserves of ytterbium are estimated to be around a million tonnes. World production of ytterbium is around 50 tonnes per year.

Health effects of ytterbium

Ytterbium has no biological role, but it has been noted that its salts stimulate metabolism. Ytterbium is a skin and eye irritant and it is also a suspected teratogen. All compounds should be stored in closed containers, protected from air and moisture and treated as highly toxic.

Effects of ytterbium on the environment

Metallic ytterbium dust poses a fire and explosion hazard. Ytterbium poses no threat to plants and animals and its salts are being introduced into the chemical industry as catalysts in place of ones that are regarded as toxic and polluting.