Neptunium - Np

Chemical properties of neptunium - **Health effects of neptunium** - **Environmental effects of neptunium**

Atomic number	93
Atomic mass	(237) $g.mol^{-1}$
Electronegativity according to Pauling	1.3
Density	20.2 $g.cm^{-3}$ at 20°C
Melting point	640 °C
Boiling point	3902 °C
Vanderwaals radius	unknown
Ionic radius	unknown
Isotopes	8
Discovered by	McMillan in 1940

Neptunium

Neptunium is a ductile, silvery, radioactive metal. Neptunium forms numerous chemical compounds. Chemically it is extremely reactive and is attacked by oxygen, steam and acids, but not by alkalis. It can exist in many oxidation states, from neptunium (II) to neptunium (VII).

Applications

Neptunium has been used in neutron detectors. It does not have any commercial application.

Neptunium in the environment

Neptunium occurs naturally in Earth, being present in minute quantities in uranium ores. Today neptunium-237 is extracted in kg quantities from the spent uranium fuel rods of nuclear reactors.

Health effects of neptunium

Neptunium plays no rule in living things an is never encountered outside nuclear facilities or research laboratories.

Possible health effects: Bone cancer

Organ receiving main dose: Gastrointestinal tract

Summary of health studies: Most of the neptunium that is retained in the body deposits in the bones. Some is also retained in the liver. Several studies report "relatively high concentrations" of neptunium in adrenal glands of laboratory animals.

No health effects specific to exposure from neptunium "have been observed" in human beings. Roy C. Thompson, Biology Department of Battelle Pacific Northwest Laboratory in Richland, conducted an extensive review of studies involving neptunium. This review included Russian studies that found an increase in the number of bone tumors in animals receiving bone doses as low as a few rad. Thompson concluded that "there can be little doubt" that neptunium can cause cancer in bone.

In 1984, a team of German scientists reported preliminary results of an experiment with mice designed to measure the combined effect of having neptunium-239 deposit in bone and decay into plutonium-239. These initial results found evidence that the buildup of plutonium-239 (as the neptunium decayed) increased the number of bone tumors compared to those expected from exposure to neptunium alone.

Environmental effects of neptunium

No negative environmental effects have been reported.