


Radium - Ra

Chemical properties of radium - Health effects of radium - Environmental effects of radium		
Atomic number	88	
Atomic mass	226.0254 g.mol ⁻¹	
Electronegativity according to Pauling	0.9	
Density	5 g.cm ⁻³ at 20°C	
Melting point	700 °C	
Boiling point	1140 °C	
Vanderwaals radius	0.230 nm	
Ionic radius	unknown	
Isotopes	6	
Electronic shell	[Rn] 7s ²	
Energy of first ionisation	509.1 kJ.mol ⁻¹	
Energy of second ionisation	975 kJ.mol ⁻¹	
Discovered by	Pierre and Marie Curie 1898	

Radium

Radium is silvery, lustrous, soft, intensely radioactive. It readily oxidizes on exposure to air, turning from almost pure white to black. Radium is luminescent, corrodes in water to form radium hydroxide. Although is the heaviest member of the alkaline-earth group it is the most volatile.

Applications

Radium is used in luminous paint (in the form of radium bromide). Radium and beryllium were once used as a portable source of neutrons. Radium is used in medicine to produce radon gas, used for cancer treatment. At the beginning of the 19th century radium was used as additive in products like toothpaste, hair creams and even food items.

Radium in the environment

It has been estimated that each square kilometer of the earth surface (to a depth of 40 cm) contains 1 gram of radium. Early in the twentieth century radium was extracted from uranium ores for use in luminous dials and medical treatment. The amount of radium in uranium ores varies between 150 and 350 mg/ton. The most is contained in the ores of Zaire and Canada.

Health effects of radium

Radium is naturally present in the environment in very small amounts. Because of that we are always exposed to radium and to small amounts of radiation that it releases into the environment.

Radium levels in the environment have greatly increased as a result of human activity. Humans release radium into the environment by burning coal and other fuels. Radium levels in drinking water may be high when it is extracted from deep wells that are located near radioactive waste disposal sites.

Currently there is no information available on the amounts of radium in air and soil.

There is no evidence that exposure to naturally present levels of radium has harmful effects on human health. However, exposure to higher levels of radium may result in health effects, such as teeth fracture, anaemia and cataract. When the exposure lasts for a long period of time radium may even cause cancer and the exposure can eventually lead to death. These effects may take years to develop. They are usually caused by gamma radiation of radium, which is able to travel fairly long distances through air. Therefore contact with radium is not necessary, for radium to cause health effects.

Environmental effects of radium

Radium is constantly produced by the radioactive decay of uranium and thorium. Radium is present at very low levels in rocks and soil and strongly attaches to those materials. It is also found in air. High concentrations of radium exist in water on some locations.

Uranium mining results in higher levels of radium in water near uranium mines. Plants absorb radium from the soil. Animals that eat these plants will accumulate radium.

Finally, radium may concentrate in fish and other aquatic organisms and bio magnify up the food chain.