



ANITA WANLESS

AMERICIUM

Element Symbol: **Am**

Atomic Number: **95**

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Americium is a malleable, silvery white metal that tarnishes slowly in dry air at room temperature. Americium does not occur naturally but is produced artificially by successive neutron capture reactions by plutonium isotopes. There are sixteen known isotopes of americium and all of them are radioactive (Isotopes are different forms of an element that have the same number of protons in the nucleus but a different number of neutrons.)

Americium-241 was first produced in 1944 in a nuclear reactor at the University of Chicago. Dr. Glenn Seaborg gave the new element its name in 1946 in honour of the continent on which it was discovered. The researchers at first referred to americium as “pandemonium” owing to the difficulties they encountered trying to isolate it from another new element with which it was very closely associated, curium - or “delirium” as it was first called.

Americium is used as the active element in domestic smoke detectors. The americium is present in the form of fine particles rolled into a metallic foil. In this form it cannot be suspended in air and inhaled.

In Australia, individual smoke detectors can be discarded in household garbage. The amount of americium-241 in a single smoke detector is negligible compared with the natural radioactivity in one cubic metre of soil. In addition, due to the construction of these detectors the americium is highly immobile in the environment, so the associated environmental risks are very low.

Americium-241 has a few other commercial uses within Australia. These utilise the low-energy gamma rays emitted. Americium is used in brachytherapy, a treatment in which americium-241 pellets are placed in the body for cancer treatment. It is also used in scientific and medical research. Americium-241 coupled with caesium-137 is used in fluid density gauges. A mixture of americium-241 and beryllium is used in industrial soil moisture-sensing gauges, pavement density gauges, gauges that detect the thickness of paper, glass and metal foil, as well as being used in a device that detects lead levels in paint. Americium-241 also has a use in fluid level gauges, such as the ones employed in some aircraft fuel gauges.

Americium-241 presents a danger if it is taken into the body through ingestion, inhalation or through open wounds. It emits alpha radiation, which does not present an external risk as the radiation is absorbed by the dead layer of human skin without causing any harm. It also emits a small amount of low-energy gamma radiation.

Under normal circumstances, there is no risk of adverse health effects due to the use of americium-241 in smoke detectors or the disposal of individual units in household garbage. This is because the amount of alpha-emitting radioactivity in a cubic metre of normal soil is generally at least 12 times as much as the alpha emitting radioactivity present in a smoke detector.

Provided by the element sponsor Chris Hyland

ARTISTS DESCRIPTION

Americium is a peaceful nuclear/radioactive element, used in domestic smoke detectors and medical therapies. The dove is a recognisable symbol that depicts and communicates the peaceful personality, and usage of the element.

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