

95
Am
Americium
[243]

Key Properties

Atomic Mass	[243]
Category	actinide
State at 20°C	solid
Melting Point	1176°C
Boiling Point	2011°C
Density	13.67
Electron Config	[Rn] 5f77s2
Electronegativity	1.3
Year Discovered	1944
Discovered By	Glenn Seaborg and colleagues

Did You Know?

- 1 A very small amount (about 0.29 micrograms) of americium-241 is used in nearly all common household smoke detectors. It works by ionizing the air between two electrodes.
- 2 It was synthesized by Glenn T. Seaborg's team at the University of California, Berkeley, and was humorously nicknamed 'pandemonium' before it received its official name.
- 3 It is named after the Americas, in analogy to the element europium which was named after Europe.
- 4 During the Cold War, the element's discovery was kept secret and was only revealed to the public on a children's radio show in 1945.
- 5 It is a byproduct of plutonium production in nuclear reactors.

APPEARANCE

Americium is a silvery-white, radioactive metal.

SUPERHERO PERSONA

"The Smoke Detector, the unsung hero protecting every home from fire."

EVERYDAY CONNECTION

Americium is found as the tiny radioactive source inside a household smoke detector.

POP CULTURE

Americium's discovery was first announced on the children's radio show Quiz Kids.

Overview of Americium

Americium is a silvery, shiny, radioactive metal. It was first synthesized in the United States during World War II and named after the Americas, the continent of its discovery. Unlike naturally occurring metals, americium is entirely man-made, though small quantities are present in everyday devices such as smoke alarms.

Uses of Americium

Americium's radioactivity makes it useful in several scientific and practical applications:

Smoke alarms: The isotope americium-241 is widely used in ionization smoke detectors. It emits alpha particles between two electrically charged plates; when smoke disrupts this flow, the alarm is triggered.

Spacecraft power: Americium isotopes are being investigated as fuel for radioisotope thermoelectric generators (RTGs), which provide long-lasting energy for deep-space missions.

Nuclear research: Americium is studied in nuclear power and waste management, since it appears as a byproduct of nuclear reactions.

History of Americium

Americium was first synthesized in 1944 at the University of Chicago by a team led by Glenn T. Seaborg. They produced it by bombarding plutonium with neutrons in a nuclear reactor. The most common isotope, americium-241, has a half-life of 432 years.

Interestingly, natural americium once existed in the ancient natural nuclear reactors at Oklo, Gabon, but because of its relatively short half-life, no primordial americium remains on Earth today.

Natural Occurrence and Production of Americium

Americium does not occur naturally in the Earth's crust in measurable amounts. It is primarily produced in nuclear reactors through neutron bombardment of plutonium, and it can also be generated as a byproduct of nuclear weapons testing. Trace amounts may occur in uranium minerals due to nuclear processes.

Biological Role of Americium

Americium has no known biological function. It is highly toxic because of its intense radioactivity and can pose serious health risks if inhaled or ingested. Strict controls are required when handling the element in laboratory and industrial settings.