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Ac

Actinium

[227]

Key Properties

Atomic Mass	[227]
Category	actinide
State at 20°C	solid
Melting Point	1050°C
Boiling Point	3200°C
Density	10.07
Electron Config	[Rn] 6d17s2
Electronegativity	1.1
Year Discovered	1899
Discovered By	André-Louis Debierne

Did You Know?

- 1 Its name comes from the Greek word 'aktis' or 'aktinos', meaning 'beam' or 'ray', due to its intense radioactivity.
- 2 It glows in the dark with an eerie pale blue light. This is not due to phosphorescence, but because its intense radioactivity excites the nitrogen and oxygen atoms in the surrounding air, causing them to emit light.
- 3 It is about 150 times more radioactive than radium.
- 4 It is the first element in the actinide series, which is named after it.
- 5 It is primarily used as a powerful source of neutrons for research purposes.

APPEARANCE

Actinium is a silvery, highly radioactive metal that glows blue in the dark.

SUPERHERO PERSONA

"The Blue Glow, a hero who is so radioactive it makes the very air around it glow."

EVERYDAY CONNECTION

Actinium has no everyday connection, used only in research.

POP CULTURE

Actinium is the first element of the actinide series which is named after it.

Overview of Actinium

Actinium is a soft, silvery-white, highly radioactive metal. One of its striking features is a faint blue glow, caused by its intense radioactivity exciting the air around it.

It was the first element discovered in the actinide series of the periodic table. The name comes from the Greek aktinos, meaning "ray" or "beam," reflecting its radioactive nature.

Uses of Actinium

Actinium is not used in consumer products because of its scarcity and radioactivity, but it is valuable in scientific research and medicine.

Alpha particle source: Actinium is an intense emitter of alpha radiation, making it useful for studies in nuclear physics.

Targeted cancer therapy: The isotope actinium-225 is being investigated for targeted alpha therapy (TAT). When linked to molecules that seek out cancer cells, it can deliver concentrated radiation to tumors while minimizing harm to healthy tissue.

Natural abundance and production

Actinium is extremely rare in nature. It occurs in trace amounts within uranium ores, most commonly as actinium-227, which has a half-life of 21.7 years and forms during the decay of uranium-235. A tonne of pitchblende ore contains only about 150 milligrams of actinium.

For research purposes, actinium is usually produced artificially by bombarding radium-226 with neutrons in a nuclear reactor.

Discovery and history

Actinium's discovery involved two chemists:

André-Louis Debierne (1899): Working with Marie and Pierre Curie, Debierne first reported the new element, which he extracted from pitchblende.

Friedrich Otto Giesel (1902): Independently isolated the same element and called it emanium, unaware of Debierne's earlier announcement.

Although Giesel provided a clearer description of the element's properties, official credit for the discovery goes to Debierne.