



### Key Properties

Atomic Mass	[145]
Category	Lanthanides
State at 20°C	solid
Melting Point	1042°C
Boiling Point	3000°C
Density	7.26
Electron Config	[Xe] 4f56s2
Electronegativity	null
Year Discovered	1945
Discovered By	Jacob A. Marinsky, Lawrence E. Glendenin & Charles D. Coryell

### Did You Know?

- 1 It is named after the Titan Prometheus from Greek mythology, who stole fire from the gods and gave it to humans.
- 2 It is the second-to-last naturally occurring rare-earth element to be discovered because all of its isotopes are radioactive and it is extremely rare.
- 3 Tiny amounts of promethium can be used to make atomic batteries, where the radioactive decay is converted into electricity to power devices like pacemakers or spacecraft for many years.
- 4 It was once used in luminous paint for watch dials, but this has been discontinued due to concerns about radiation.
- 5 Although some is found in uranium ores, most promethium is produced artificially in nuclear reactors.

#### APPEARANCE

Promethium is a radioactive, metallic element.

#### SUPERHERO PERSONA

"The Stolen Fire, a synthetic hero who provides long-lasting power in the darkest places."

#### EVERYDAY CONNECTION

Promethium is found in the luminous paint on old watch dials.

#### POP CULTURE

Promethium is portrayed as a power source for deep space probes in some science fiction.

### Promethium: The Radioactive Element That Glows

Promethium is a rare, silvery, radioactive metal. In fact, it's so unstable that no significant amounts exist naturally on Earth—any promethium that formed when Earth was young has long since decayed away. Its name comes from Prometheus, the Titan in Greek mythology who stole fire from the gods, a fitting choice for an element that can literally glow from its radioactivity.

### A Man-Made Element

The longest-lived isotope of promethium has a half-life of only 18 years, so it must be created artificially. Scientists make it by irradiating neodymium or praseodymium with neutrons, or by extracting it as a by-product from nuclear reactor fuel waste using ion-exchange methods.

### Why Is Promethium Useful?

Despite being rare, promethium has some very specific high-tech applications:

**Atomic Batteries:** Tiny amounts of promethium are used in nuclear-powered batteries, about the size of a drawing pin. They provide long-lasting energy for pacemakers, guided missiles, and radios.

**Illumination:** When promethium decays, it can make a phosphor glow. This glowing light can then be converted into electricity using a solar cell. It was once used in luminous watch dials and gauges, replacing radium.

**Measuring Instruments:** Promethium can also be used as a source of X-rays and radiation in measuring devices.

### History of Discovery

1902: Chemist Bohuslav Branner predicted an element should exist between neodymium and samarium on the periodic table. For decades, scientists searched for it without success—unaware that all of its isotopes were radioactive and therefore had vanished from Earth.

1945: At Oak Ridge National Laboratory in Tennessee, Jacob Marinsky, Lawrence Glendenin, and Charles Coryell finally created and identified promethium. They used ion-exchange chromatography to separate it from the fission products of uranium fuel.