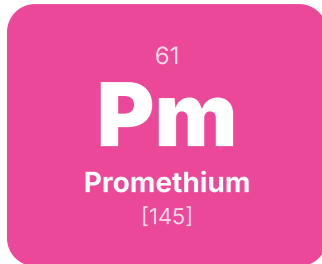


# Promethium (Pm)

Element 61 — Complete Summary  
theperiodictable.io



## 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 Promethium is so rare it was predicted \*before\* it was officially discovered! Scientists noticed a gaping hole for element 61 in the periodic table years earlier.
- 2 It's named after Prometheus, the Greek Titan who famously stole fire from the gods and gave it to humanity – a perfect name for an element that literally 'shines' with its own internal energy!
- 3 Promethium is one of only two elements in the first 82 on the Periodic Table that has absolutely NO stable isotopes. Every single Promethium atom is a ticking radioactive clock!
- 4 You won't find Promethium veins in a mine! It's virtually absent from Earth's crust in natural quantities, primarily formed as a byproduct when heavier elements like Uranium split apart.
- 5 Remember those old glow-in-the-dark watch dials or instrument panels? Promethium-147 was a superstar in self-luminous paints, often mixed with a phosphor to create a consistent, reliable glow.
- 6 Tiny amounts of Promethium are used in 'atomic batteries' or betavoltaics! These don't create huge currents, but they provide a long-lasting, reliable power source for critical tech like pacemakers or space probes.
- 7 Its radioactivity can be harnessed for super portable X-ray sources, especially useful for checking the thickness of materials in industrial settings or for specific medical devices.
- 8 Most Promethium today is synthesized in nuclear reactors by bombarding Uranium-235 with neutrons, proving that sometimes, the coolest things are a result of bigger, more complex nuclear processes.
- 9 In its pure metallic form, Promethium is a soft, silvery metal, but handling it requires extreme caution due to its constant radioactive emission.
- 10 While it can power things for a while, its most common isotope, Promethium-147, has a half-life of only about 2.62 years. This means half of its atoms decay in that short time, making it a powerful but relatively short-term energy source.
- 11 Promethium can also be used in gauging instruments to measure the thickness of very thin materials with incredible precision, ensuring quality control in manufacturing processes.

### APPEARANCE

A soft, silvery-metallic glint, but don't get too close – it's always buzzing with energy!

### SUPERHERO PERSONA

"Promethium is the elusive Light-Bringer, radiating a steady, powerful glow from within, empowering the darkest corners with its unique energy!"

### EVERYDAY CONNECTION

Think of those glow-in-the-dark stickers on your ceiling, but way more powerful and for serious tech!

### POP CULTURE

Like the mythical Prometheus who gifted humanity fire, this element brings its own kind of light and power, but from deep within atomic nuclei!

## 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.