Francium (Fr)

Element 87 — Complete Summary

87
Fr
Francium
[223]

Key Properties

Atomic Mass	[223]
Category	Alkali Metals
State at 20°C	solid
Melting Point	21°C
Boiling Point	650°C
Density	1.87*
Electron Config	[Rn] 7s1
Electronegativity	0.7
Year Discovered	1939
Discovered By	Marguerite Perey

✨ Did You Know?

1. It is the second rarest element in nature, after astatine. It is estimated that there are only about 20-30 grams of it in the entire Earth's crust at any time.
2. It is the most unstable of the first 101 elements; its most stable isotope has a half-life of only 22 minutes.
3. It was the last naturally occurring element to be discovered, identified in 1939 by Marguerite Perey in Paris. She named it after her home country, France.
4. As an alkali metal, it is predicted to be the most reactive metal on the periodic table, though it's too unstable to ever gather enough to test this.
5. It has no commercial applications and is only used for scientific research.

APPEARANCE
Francium is a highly radioactive and reactive alkali metal.

SUPERHERO PERSONA
"The Fleeting Phantom, the most unstable hero of the first 101, disappearing in a flash of energy."

EVERYDAY CONNECTION
Francium has no everyday connection due to its extreme instability.

POP CULTURE
Francium's most stable isotope has a half-life of only 22 minutes.

Overview of Francium

Francium is a highly radioactive alkali metal with atomic number 87. It is the second-rarest naturally occurring element in Earth's crust, existing only in trace amounts at any given time. The most stable isotope, francium-223, has a half-life of just 22 minutes, which makes it impossible to collect in visible quantities. Because of its extreme instability, francium has no practical applications beyond research.

How Francium Is Formed

Francium is produced naturally through the radioactive decay of actinium. In laboratory settings, it can be synthesized in small amounts by:

Bombarding radium with neutrons in a nuclear reactor.

Bombarding thorium with protons in a particle accelerator.

Due to its short lifespan and strong radioactivity, francium is highly toxic and studied only under controlled research conditions.

Uses and Biological Role of Francium

Francium has no known uses outside of research, where it is employed to better understand the behavior of alkali metals and heavy elements.

It has no biological role and is extremely toxic due to its intense radioactivity.

History of Francium

Predicted by Mendeleev: When Dmitri Mendeleev created the first periodic table in 1869, he predicted the existence of an element below cesium, which he called eka-cesium. Scientists searched for it for decades.

False claims: Throughout the late 19th and early 20th centuries, several chemists claimed to have discovered element 87, but these were later disproven.

1939 – Discovery: French physicist Marguerite Perey, working at the Curie Institute in Paris, successfully identified francium while studying the decay of actinium. She demonstrated that the new element was indeed the missing alkali metal.

Recognition: Perey's discovery was confirmed after World War II, and she was officially credited. The element was named francium in honor of France.