Rutherfordium (Rf)

Element 104 — Complete Summary

104
Rf
Rutherfordium
[267]

Key Properties

Atomic Mass	[267]
Category	Transition Metals
State at 20°C	solid
Melting Point	null
Boiling Point	null
Density	23.2*
Electron Config	[Rn] 5f146d27s2
Electronegativity	null
Year Discovered	1964
Discovered By	Joint Institute for Nuclear Research (JINR)

✨ Did You Know?

1. It is named in honor of Ernest Rutherford, the New Zealand-born physicist who is considered the father of nuclear physics for discovering the atomic nucleus.
2. It is the first of the 'transactinide' or 'super-heavy' elements.
3. Its discovery was claimed by research teams at both the Joint Institute for Nuclear Research (JINR) in Dubna, Russia, and at the Lawrence Berkeley National Laboratory in California.
4. Because it is so unstable, its chemical properties can only be predicted and studied using a few atoms at a time in specialized experiments.
5. Its most stable isotope has a half-life of only about 1.3 hours.

APPEARANCE
Rutherfordium is a synthetic, highly radioactive metal.

SUPERHERO PERSONA
"The Nucleus, a hero named after the physicist who discovered the atomic nucleus itself."

EVERYDAY CONNECTION
Rutherfordium has no everyday connection, used only in research.

POP CULTURE
Rutherfordium is the first element beyond the actinides a true superheavy.

Rutherfordium: The Element of Controversy

Rutherfordium is a synthetic, radioactive metal that does not occur naturally. Only a few atoms have ever been made, and its most stable isotope lasts just about 1.3 hours before decaying.

It has no practical uses outside of research and was named in honor of physicist Ernest Rutherford, often called the “father of nuclear physics.”

How Is Rutherfordium Made?

Rutherfordium is a transuranium element (heavier than uranium) and can only be created in laboratories. It is usually produced in a particle accelerator by bombarding californium-249 with carbon-12 nuclei, which briefly fuse to form rutherfordium.

Uses & Biological Role

Because of its extreme rarity and short half-life, rutherfordium is only used for scientific research, mainly to study the chemistry of superheavy elements. It has no biological role and is considered toxic due to its radioactivity.

History of Discovery

The story of rutherfordium’s discovery became a Cold War science rivalry:

1964 – Russian Claim: Scientists at the Joint Institute for Nuclear Research (JINR) in Dubna, Russia, announced they had created element 104 by bombarding plutonium with neon. They proposed the name kurchatovium, after Soviet scientist Igor Kurchatov.

1969 – American Claim: Researchers at the Lawrence Berkeley Laboratory (LBL) in California reported making the same element by bombarding californium with carbon. They suggested the name rutherfordium.

1992 – Resolution: After decades of debate, the International Union of Pure and Applied Chemistry (IUPAC) credited both teams with the discovery.

1997 – Official Name: The element was officially named rutherfordium in honor of Ernest Rutherford.