

Hafnium (Hf)

Element 72 | Transition metal | Period 6 | d-block

Atomic number	72
Atomic mass	178.486
Electron configuration	[Xe] 4f14 5d2 6s2
Reference isotope	180Hf
Density	13.3 g/cm3
Melting point	2506 K
Boiling point	4873 K
Structure	Hexagonal close-packed (HCP)

Big idea

Hafnium is chemically close to zirconium but has a much larger neutron-capture cross section. Elemental Hf, HfO₂ and hafnium-containing superalloys are different materials with different structures and functions.

Five things to remember

- Atomic number 72 means every hafnium nucleus has 72 protons.
- The ground-state/reference electron configuration is [Xe] 4f14 5d2 6s2.
- The representative teaching isotope is 180Hf.
- Hafnium is chemically close to zirconium but has a much larger neutron-capture cross section. Elemental Hf, HfO₂ and hafnium-containing superalloys are different materials with different structures and functions.
- Material structure status: Hexagonal close-packed (HCP).

Structure, evidence and real-world context

The viewer represents the reviewed Hexagonal close-packed (HCP) material reference for elemental Hafnium. It is a teaching model, not a refined crystallographic coordinate set or a model of every compound.

Evidence boundary

Atomic identity and source-reviewed reference values are separated from predictions. Search demand shapes headings and FAQs but never overrides scientific evidence; unknown bulk structure/density/phase values remain visibly unknown.

Where is it used?

Neutron-absorbing control components - Element-specific use context; compounds/alloys are distinguished from pure metal.

High-temperature alloys and plasma-electrode applications - Element-specific use context; compounds/alloys are distinguished from pure metal.

Hafnium oxide high-k dielectric materials in microelectronics - Element-specific use context; compounds/alloys are distinguished from pure metal.

Discovery and history

1923 - Dirk Coster and George de Hevesy identified hafnium in zirconium minerals in Copenhagen.

Naming / context - The element name and discovery story are part of the historical record; search-led questions are answered without turning history into scientific evidence for bulk properties.

Today - Current use is described at the level supported by the element's availability and evidence, with research-only elements kept research-only.

Safety / interpretation

Use material-specific safety information for real substances; element, compound and alloy hazards can differ.

Search-led questions and review

The questions below reflect genuine learner/search intent. Answers remain source- and evidence-led.

What is hafnium?

Hafnium is chemical element 72, symbol Hf, classified here as transition metal.

What is the atomic number of hafnium?

The atomic number is 72, meaning every hafnium nucleus has 72 protons.

What is the symbol for hafnium?

The chemical symbol is Hf.

What is hafnium used for?

Hafnium is used in neutron-absorbing reactor components, high-temperature alloys, and hafnium-oxide dielectric materials in electronics.

What is the electron configuration of hafnium?

The ground-state configuration is [Xe] 4f¹⁴ 5d² 6s².

Why is hafnium associated with zirconium?

Hafnium and zirconium have very similar chemistry and commonly occur together in zirconium minerals, making them difficult to separate.

Quick review

What is Hafnium's atomic number?

Answer: 72

Atomic number 72 defines Hafnium by its proton count.

Which statement best describes the material evidence for Hafnium?

Answer: Hexagonal close-packed (HCP)

The Structure view follows measured/reviewed evidence; unknown bulk structures remain unknown.

What is the safest rule for Hafnium uses?

Answer: Distinguish the element from its isotopes, compounds and engineered materials

Elemental, isotope-specific and compound properties must not be conflated.

Sources

Royal Society of Chemistry - Hafnium: <https://periodic-table.rsc.org/element/72/>

NIST - Atomic Weights and Isotopic Compositions: https://physics.nist.gov/cgi-bin/Compositions/stand_alone.pl

IUPAC - Periodic Table of Elements: <https://iupac.org/what-we-do/periodic-table-of-elements/>