

# Lutetium (Lu)

Element 71 | Lanthanide | Period 6 | f-block

|                        |                              |
|------------------------|------------------------------|
| Atomic number          | 71                           |
| Atomic mass            | 174.967                      |
| Electron configuration | [Xe] 4f14 5d1 6s2            |
| Reference isotope      | 175Lu                        |
| Density                | 9.84 g/cm3                   |
| Melting point          | 1936 K                       |
| Boiling point          | 3675 K                       |
| Structure              | Hexagonal close-packed (HCP) |

## Big idea

Lutetium closes the lanthanide sequence. Search results often mix elemental Lu with lutetium-containing scintillator crystals and medical compounds, so the guide keeps the element separate from its engineered materials.

## Five things to remember

- Atomic number 71 means every lutetium nucleus has 71 protons.
- The ground-state/reference electron configuration is [Xe] 4f14 5d1 6s2.
- The representative teaching isotope is 175Lu.
- Lutetium closes the lanthanide sequence. Search results often mix elemental Lu with lutetium-containing scintillator crystals and medical compounds, so the guide keeps the element separate from its engineered materials.
- 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 Lutetium. 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?

**Catalysts in selected petroleum chemistry** - Element-specific use context; compounds/alloys are distinguished from pure metal.

**Lu-containing scintillator crystals in radiation detection and medical imaging** - Element-specific use context; compounds/alloys are distinguished from pure metal.

**Research and specialized materials** - Element-specific use context; compounds/alloys are distinguished from pure metal.

## Discovery and history

**1907** - Georges Urbain reported the separation of lutetium in Paris; Charles James independently obtained the element around the same period.

**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 lutetium?

Lutetium is chemical element 71, symbol Lu, classified here as lanthanide.

## What is the atomic number of lutetium?

The atomic number is 71, meaning every lutetium nucleus has 71 protons.

## What is the symbol for lutetium?

The chemical symbol is Lu.

## What is lutetium used for?

Lutetium has limited uses, including selected catalysts and lutetium-containing scintillator crystals used in radiation-detection and imaging systems.

## Is lutetium a metal?

Yes. Lutetium is a dense silvery lanthanide metal.

## Where is lutetium on the periodic table?

Lutetium is element 71 at the end of the lanthanide series in Period 6; many tables place it with Group 3.

## Quick review

### What is Lutetium's atomic number?

Answer: 71

Atomic number 71 defines Lutetium by its proton count.

### Which statement best describes the material evidence for Lutetium?

Answer: Hexagonal close-packed (HCP)

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

### What is the safest rule for Lutetium 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 - Lutetium: <https://periodic-table.rsc.org/element/71/>

NIST - Atomic Weights and Isotopic Compositions: [https://physics.nist.gov/cgi-bin/Compositions/stand\\_alone.pl](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/>