

Thallium (Tl)

Element 81 | Post-transition metal | Period 6 | p-block

Atomic number	81
Atomic mass	204.38
Electron configuration	[Xe] 4f14 5d10 6s2 6p1
Reference isotope	205Tl
Density	11.8 g/cm3
Melting point	577 K
Boiling point	1746 K
Structure	Hexagonal close-packed (HCP) at room temperature

Big idea

Thallium is a metal with important +1 and +3 chemistry, but its toxicity dominates safe interpretation. Elemental Tl and thallium compounds must not be treated as interchangeable.

Five things to remember

- Atomic number 81 means every thallium nucleus has 81 protons.
- The ground-state/reference electron configuration is [Xe] 4f14 5d10 6s2 6p1.
- The representative teaching isotope is 205Tl.
- Thallium is a metal with important +1 and +3 chemistry, but its toxicity dominates safe interpretation. Elemental Tl and thallium compounds must not be treated as interchangeable.
- Material structure status: Hexagonal close-packed (HCP) at room temperature.

Structure, evidence and real-world context

The viewer represents the reviewed Hexagonal close-packed (HCP) at room temperature material reference for elemental Thallium. 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?

Specialized optical and electronic materials - Element-specific use context; compounds/alloys are distinguished from pure metal.

High-refractive-index and low-melting glasses via thallium compounds - Element-specific use context; compounds/alloys are distinguished from pure metal.

Historical/specialized low-temperature alloy applications - Element-specific use context; compounds/alloys are distinguished from pure metal.

Discovery and history

1861 - William Crookes discovered thallium spectroscopically in London; Claude-Auguste Lamy soon isolated metallic thallium.

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

Thallium and many thallium compounds are highly toxic; this page is educational and not exposure/handling guidance.

Search-led questions and review

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

What is the atomic number of thallium?

The atomic number is 81, meaning every thallium nucleus has 81 protons.

What is the symbol for thallium?

The chemical symbol is Tl.

What is thallium?

Thallium is element 81, a soft post-transition metal in Group 13.

Is thallium a metal?

Yes. Thallium is a metal, but it and many thallium compounds are highly toxic.

What is thallium used for?

Modern uses are specialized and often involve thallium compounds in electronics, optics or glass rather than bulk thallium metal.

Quick review

What is Thallium's atomic number?

Answer: 81

Atomic number 81 defines Thallium by its proton count.

Which statement best describes the material evidence for Thallium?

Answer: Hexagonal close-packed (HCP) at room temperature

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

What is the safest rule for Thallium 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 - Thallium: <https://periodic-table.rsc.org/element/81/>

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/>