Scandium (Sc)

Element 21 — Complete Summary

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21
Sc
Scandium
44.956

Key Properties

Atomic Mass	44.956
Category	Transition Metals
State at 20°C	solid
Melting Point	1541°C
Boiling Point	2836°C
Density	2.985
Electron Config	[Ar] 3d14s2
Electronegativity	1.36
Year Discovered	1879
Discovered By	Lars Fredrik Nilson

✨ Did You Know?

1. The existence and properties of scandium were predicted by Dmitri Mendeleev five years before it was actually discovered; he called it 'ekaboron'.
2. Adding a small amount of scandium to aluminium creates an alloy that is exceptionally strong and lightweight, used in fighter jets and high-end bicycle frames.
3. Scandium is more abundant in the Moon's crust than it is on Earth.
4. The bright, white light in stadium lamps often comes from scandium iodide being added to mercury-vapor lamps.
5. It is named after Scandinavia, as the chemist who discovered it, Lars Fredrik Nilson, was Swedish.

APPEARANCE
A soft, silvery-white metallic element.

SUPERHERO PERSONA
"The Alloy Ace, a rare hero who makes other metals super-strong, the secret weapon of fighter jets."

EVERYDAY CONNECTION
High-end, lightweight bicycle frames.

POP CULTURE
A valuable and rare resource in many space-based video games like 'Elite Dangerous'.

Scandium: The Predicted Metal of Lightweight Alloys

Scandium is a silvery metal that quickly tarnishes in air, burns easily, and reacts with water. Its discovery was especially important because Dmitri Mendeleev predicted its existence—and when it was found, it proved the power of the periodic table. While pure scandium has few uses, its alloys are prized in aerospace and high-tech applications.

Why Is Scandium Useful?

Scandium's real value is in its ability to make aluminum stronger and lighter:

High-Performance Alloys: Aluminum–scandium alloys are used in Russian MiG fighter jets, as well as in sports equipment like high-end bicycle frames and baseball bats. These alloys are lightweight but very strong, making them perfect for demanding applications.

Lighting: Scandium iodide is added to mercury vapor lamps to create bright, white light that closely resembles sunlight. These lamps are especially useful in television cameras to ensure accurate colors.

Radioactive Tracer: The isotope scandium-46 is used in oil refining to track the movement of materials and to detect leaks in underground pipes.

Natural Abundance & History

Scandium is found in tiny amounts in more than 800 minerals, but concentrated sources are rare. The mineral thortveitite, found in Scandinavia, contains the highest amounts. Today, scandium is also recovered as a by-product of uranium processing. The metal itself is made by reducing scandium fluoride with calcium.

1869: Dmitri Mendeleev predicted scandium's existence, calling it eka-boron. He even guessed many of its properties correctly.

1879: Swedish chemist Lars Frederik Nilson discovered scandium while studying rare minerals. Its properties matched Mendeleev's predictions, so Nilson named it scandium, after Scandinavia.

1937: The first pure sample of metallic scandium was finally produced.

Biological Role

Scandium has no known role in living organisms and is generally considered to be of low toxicity.