Selenium (Se)

Element 34 — Complete Summary

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34
Se
Selenium
78.971

Key Properties

Atomic Mass	78.971
Category	Nonmetals
State at 20°C	solid
Melting Point	220.8°C
Boiling Point	685°C
Density	4.81
Electron Config	[Ar] 3d104s24p4
Electronegativity	2.55
Year Discovered	1817
Discovered By	Jöns Jacob Berzelius

✨ Did You Know?

1. It has the unusual property of photoconductivity, meaning it conducts electricity better when light is shining on it. This property was used in early photocopiers.
2. It was named after Selene, the Greek goddess of the Moon, because it was always found in nature associated with tellurium (named after Tellus, the Roman goddess of the Earth).
3. While toxic in large amounts, selenium is an essential trace nutrient for humans and animals, acting as an important antioxidant.
4. Eating too much selenium can lead to a condition called selenosis, with symptoms that include garlic-scented breath and hair loss.
5. Selenium is used to give glass a red color and to decolorize green glass.

APPEARANCE
Selenium is a gray metalloid that conducts electricity when light shines on it.

SUPERHERO PERSONA
"The Moonbeam, a hero whose power grows in the light, used in the 'electric eye' of photocopiers."

EVERYDAY CONNECTION
Selenium is found in the blue-tinted glass on some buildings.

POP CULTURE
Selenium is the key weakness for the alien creatures in the movie Evolution.

Selenium: The Photovoltaic Semi-Metal

Selenium is a semi-metal that can appear either as a shiny, silvery solid or as a red powder. Its name comes from the Greek word selene (moon), chosen because it was discovered just after tellurium (named after Earth). Selenium's unique electrical and optical properties make it useful in technology, glassmaking, and even medicine.

Why Is Selenium Useful?

Selenium has a wide range of specialized applications:

Electronics: Selenium shows both photovoltaic action (turns light into electricity) and photoconductivity (its resistance drops in light). These properties made it essential in early photocopiers, solar cells, photocells, and rectifiers that convert AC to DC power.

Glass & Pigments: Small amounts of selenium remove the green tint from glass, while larger amounts give glass a deep red or bronze color. It's also used to make pigments for ceramics, paints, and plastics.

Medicine: Selenium sulfide is toxic to the scalp fungus that causes dandruff, so it's a key ingredient in anti-dandruff shampoos.

Alloys: Selenium is sometimes added to stainless steel to improve its properties.

Biological Role

Selenium is an essential trace element for humans and many other organisms. The average human body contains about 14 milligrams, with each cell holding more than a million selenium atoms.

Too little selenium can cause health problems.

Too much selenium is toxic—it can cause birth defects, is carcinogenic, and even causes a characteristic "garlic breath" odor.

Natural Abundance

Selenium is relatively rare. Most commercial selenium is obtained as a by-product of copper refining. During the electrolytic process, it collects in the anode muds, which are later processed to extract selenium.

History of Discovery

1817: Swedish chemist Jöns Jacob Berzelius discovered selenium while investigating a strange red-brown residue from a sulfuric acid factory.

At first, he thought it was tellurium, since heating it gave off a radish-like smell. But closer study proved it was a new element similar to both sulfur and tellurium.

Fun fact: Berzelius himself reportedly developed bad breath from absorbing selenium through his skin while working with it!