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Cs
Caesium
132.905

Key Properties

Atomic Mass	132.905
Category	Alkali Metals
State at 20°C	solid
Melting Point	28.5°C
Boiling Point	671°C
Density	1.93
Electron Config	[Xe] 6s1
Electronegativity	0.79
Year Discovered	1860
Discovered By	Robert Bunsen & Gustav Kirchhoff

Did You Know?

- 1 It is considered the most reactive of all the metals on the periodic table; it reacts explosively with water and can ignite spontaneously in air.
- 2 The official definition of a second is based on the vibrations of a caesium-133 atom. Caesium atomic clocks are so accurate they would only lose about one second in 300 million years.
- 3 Caesium has a silvery-gold appearance and is one of only five elemental metals that are liquid at or near room temperature.
- 4 It was the first element to be discovered using a spectroscope, identified by its two bright blue spectral lines. Its name comes from the Latin 'caesius', meaning 'sky-blue'.
- 5 It is so reactive that it is stored in sealed glass ampoules under an inert atmosphere.

APPEARANCE

Caesium is a soft, silvery-gold alkali metal.

SUPERHERO PERSONA

"Father Time, the most reactive hero, whose atomic vibrations define the second itself."

EVERYDAY CONNECTION

Caesium is found in the atomic clocks that regulate GPS and the internet.

POP CULTURE

Caesium provides the basis for hyper-accurate timekeeping needed for interstellar navigation.

Overview of Caesium

Caesium is a soft, gold-colored alkali metal that is among the most reactive elements in the periodic table. It tarnishes rapidly in air and reacts explosively with water. Its name comes from the Latin word caesius, meaning "sky blue," referring to the bright blue spectral lines first observed when it was discovered.

Uses of Caesium

Although the pure metal is rarely used, caesium and its compounds have critical high-tech applications:

Atomic clocks: Caesium is the standard for the definition of the second. Caesium atomic clocks, based on the resonance frequency of caesium-133 atoms, are vital for GPS, mobile networks, satellite communications, and the internet. The best caesium clocks are so accurate they lose or gain less than one second in 15 million years.

Industrial applications: Caesium formate brines are used in oil and gas drilling fluids due to their high density and low environmental impact.

Electronics and optics: Caesium compounds are used in vacuum tubes, photoelectric cells, radiation monitoring equipment, and special optical glass.

Catalysis: Caesium salts act as catalyst promoters in certain industrial chemical reactions.

Natural Occurrence and Production of Caesium

Caesium occurs in trace amounts in several minerals but is mainly obtained from pollucite (CsAlSi₂O₆). Large deposits exist in Canada and the United States, and commercial production is often a by-product of lithium mining.

History of Caesium

1860 – **Discovery:** German scientists Robert Bunsen and Gustav Kirchhoff discovered caesium while analyzing mineral water using spectroscopy. They observed distinctive blue spectral lines, the first time a new element was discovered with this method.

1881 – **Isolation:** Pure metallic caesium was first isolated by Carl Theodor Setterberg through the electrolysis of molten caesium cyanide.

Biological Role of Caesium

Caesium has no known essential biological role. Caesium chloride and other caesium compounds are considered to pose low health risks in small amounts, though exposure to radioactive isotopes (such as caesium-137) is dangerous due to their radioactivity.