

Caesium

Cs

General Information

Discovery

Caesium was discovered by R. Bunsen and G.R. Kirchoff in 1860 in Heidelberg, Germany.

Appearance

Caesium is silvery-white, soft and ductile. It is liquid at room temperature.

Source

Caesium is found in the minerals pollucite and lepidolite. Pollucite is found in great quantities at Bernic Lake, Manitoba, Canada and the USA, and from this source the element can be prepared. However, most commercial production is as a by-product of lithium production.

Uses

Caesium is little used. It has a great affinity for oxygen and so is used in electron tubes, and it is also used in photoelectric cells and as a catalyst. A more interesting application is the use in atomic clocks which are accurate to 5 seconds in 300 years.

Biological Role

Caesium has no known biological role. It is non-toxic.

General Information

Caesium reacts rapidly with oxygen and explosively with water. It also reacts with ice at temperatures above 116K. The metal is characterised by a spectrum containing two bright lines in the blue along with several others in the red, yellow and green. Caesium hydroxide is the strongest base known, and can attack glass.

Physical Information

Atomic Number	55
Relative Atomic Mass ($^{12}\text{C}=12.000$)	132.91
Melting Point/K	301.6
Boiling Point/K	951.6
Density/kg m ⁻³	1873 (293K)
Ground State Electron Configuration	[Xe]6s ¹
Electron Affinity (M-M ⁻)/kJ mol ⁻¹	45.5

Key Isotopes

Nuclide	¹³³ Cs	¹³⁴ Cs	¹³⁵ Cs	¹³⁷ Cs
Atomic mass	132.9			
Natural abundance	100%	0%	0%	0%
Half-life	stable	2.05 yrs	3x10 ⁶ yrs	30.23 yrs

Ionisation Energies/kJ mol⁻¹

M - M ⁺	375.7
M ⁺ - M ²⁺	2420
M ²⁺ - M ³⁺	3400
M ³⁺ - M ⁴⁺	4400
M ⁴⁺ - M ⁵⁺	6000
M ⁵⁺ - M ⁶⁺	7100
M ⁶⁺ - M ⁷⁺	8300
M ⁷⁺ - M ⁸⁺	11300
M ⁸⁺ - M ⁹⁺	12700
M ⁹⁺ - M ¹⁰⁺	23700

Other Information

Enthalpy of Fusion/kJ mol⁻¹ 2.09

Enthalpy of Vaporisation/kJ mol⁻¹ 66.5

Oxidation States

Cs⁻¹, Cs¹

Covalent Bonds/kJ mol⁻¹

Not applicable