

Francium

Fr

General Information

Discovery

Francium was discovered by Marguerite Perey in 1939 at the Curie Institute, Paris.

Appearance

Francium has never actually been seen, as it is a short-lived product of the decay of actinium. It is a highly radioactive metal.

Source

Francium occurs as a result of the alpha disintegration of actinium, which is obtained from the neutron bombardment of radium. It can also be made artificially by bombarding thorium with protons.

Uses

Francium has no uses.

Biological Role

Francium has no known biological role. It is toxic due to its radioactivity.

General Information

Francium occurs naturally in uranium minerals but to an extremely small extent - there is probably less than 10g of francium at any one time in the crust of the earth. It is the most unstable of the first 101 elements of the Periodic Table. All its isotopes are highly unstable, so knowledge of its chemical properties comes from radiochemical techniques, and it most closely resembles caesium.

Physical Information

Atomic Number	87
Relative Atomic Mass ($^{12}\text{C}=12.000$)	223 (radioactive)
Melting Point/K	300
Boiling Point/K	950
Ground State Electron Configuration	$[\text{Rn}]7s^1$
Electron Affinity (M-M ⁺)/kJ mol ⁻¹	44

Key Isotopes

Nuclide	^{212}Fr	^{223}Fr
Atomic mass		223.02
Natural abundance	0%	some
Half-life	19 mins	22 mins

Ionisation Energies/kJ mol⁻¹

M - M ⁺	400
M ⁺ - M ²⁺	2100
M ²⁺ - M ³⁺	3100
M ³⁺ - M ⁴⁺	4100
M ⁴⁺ - M ⁵⁺	5700
M ⁵⁺ - M ⁶⁺	6900
M ⁶⁺ - M ⁷⁺	8100
M ⁷⁺ - M ⁸⁺	12300
M ⁸⁺ - M ⁹⁺	12800
M ⁹⁺ - M ¹⁰⁺	29300

Other Information

Oxidation State

Fr^I

Covalent Bonds/kJ mol⁻¹

Not applicable