

General Information

Discovery

Gallium was discovered by P.-E. Lecoq de Boisbaudran in 1875 in Paris. Mendeléeiev predicted and described this element, and called it ekaaluminum.

Appearance

Gallium is a silvery, glass-like, soft metal.

Source

Gallium is present in trace amounts in the minerals diaspore, sphalerite, germanite, bauxite and coal. The free metal can be obtained by electrolysis of a solution of gallium(III) hydroxide in potassium hydroxide.

Uses

Gallium readily alloys with most metals, and is used especially in low-melting alloys. It has a high boiling point, which makes it ideal for recording temperatures that would vaporise a thermometer. It has found recent use in doping semiconductors and producing solid-state devices such as transistors.

Biological Role

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

General Information

Gallium reacts with acids and alkalis. It has the longest liquid range of all elements, and can be liquid near room temperatures - it can melt in the hand. It also expands as it freezes, which is unusual for a metal, by 3.1%. Gallium wets glass or porcelain, and forms a brilliant mirror when painted on glass.

Physical Information

Atomic Number	31
Relative Atomic Mass ($^{12}\text{C}=12.000$)	69.723
Melting Point/K	303
Boiling Point/K	2676
Density/kg m ⁻³	5907 (293K)
Ground State Electron Configuration	[Ar]3d ¹⁰ 4s ² 4p ¹
Electron Affinity (M-M ⁻)/kJ mol ⁻¹	-36

Key Isotopes

Nuclide	⁶⁷ Ga	⁶⁹ Ga	⁷¹ Ga	⁷² Ga
Atomic mass		68.926	70.925	
Natural abundance	0%	60.1%	39.9%	0%
Half-life	78.1 h	stable	stable	14.1 h

Ionisation Energies/kJ mol⁻¹

M - M ⁺	578.8
M ⁺ - M ²⁺	1979
M ²⁺ - M ³⁺	2963
M ³⁺ - M ⁴⁺	6200
M ⁴⁺ - M ⁵⁺	8700
M ⁵⁺ - M ⁶⁺	11400
M ⁶⁺ - M ⁷⁺	14400
M ⁷⁺ - M ⁸⁺	17700
M ⁸⁺ - M ⁹⁺	22300
M ⁹⁺ - M ¹⁰⁺	26100

Other Information

Enthalpy of Fusion/kJ mol ⁻¹	5.59
Enthalpy of Vaporisation/kJ mol ⁻¹	270.3

Oxidation States

Main	Ga ⁺³
Others	Ga ⁺¹ , Ga ⁺²