

Argon

Ar

General Information

Discovery

Argon was discovered in 1894 by Lord Rayleigh and Sir William Ramsey in the UK, although the presence of an inert component in air was suspected by Cavendish in 1785.

Appearance

Argon is a colourless, odourless gas.

Source

The atmosphere contains 0.94% argon. It is obtained commercially from liquid air.

Uses

Argon is used in electric light bulbs and fluorescent tubes at a pressure of about 3 mm. Industrially, it is used as an inert gas shield for arc welding, and as a blanket for the production of titanium and other reactive elements.

Biological Role

Argon has no known biological role.

General Information

Argon is considered to be a very inert gas and does not form true compounds as do others in the same Group. However, it does form clathrates with water and quinol in which the argon atoms are trapped inside a lattice of the other molecules.

Physical Information

Atomic Number	18
Relative Atomic Mass ($^{12}\text{C}=12.000$)	39.948
Melting Point/K	84
Boiling Point/K	87
Density/kg m ⁻³	1.783 (273K)
Ground State Electron Configuration	[Ne]3s ² 3p ⁶
Electron Affinity (M-M ⁻)/kJ mol ⁻¹	+35 (calc)

Key Isotopes

Nuclide	³⁶ Ar	³⁷ Ar	³⁸ Ar	³⁹ Ar	⁴⁰ Ar
Atomic mass	35.968	36.967	37.963	38.964	39.962
Natural abundance	0.337%	0%	0.063%	0%	99.6%
Half-life	stable	35 days	stable	269 yrs	stable

Ionisation Energies/kJ mol⁻¹

M - M ⁺	1520.4
M ⁺ - M ²⁺	2665.2
M ²⁺ - M ³⁺	3928
M ³⁺ - M ⁴⁺	5770
M ⁴⁺ - M ⁵⁺	7238
M ⁵⁺ - M ⁶⁺	8811
M ⁶⁺ - M ⁷⁺	12021
M ⁷⁺ - M ⁸⁺	13844
M ⁸⁺ - M ⁹⁺	40759
M ⁹⁺ - M ¹⁰⁺	46186

Other Information

Enthalpy of Fusion/kJ mol ⁻¹	1.21
Enthalpy of Vaporisation/kJ mol ⁻¹	6.53

Oxidation States

Ar⁰