Magnesium *Mg*

General Information

Discovery

Joseph Black recognised magnesium as an element in 1755, but it was first isolated by Sir Humphrey Davy in 1808, and prepared in coherent form by Bussy in 1831.

Appearance

Magnesium is a silvery-white, lustrous and relatively soft metal, which tarnishes slightly in air.

Source

Magnesium is the eighth most abundant element in the earth's crust, but does not occur uncombined. It is found in large deposits in minerals such as magnesite and dolomite. Commercially, it is prepared by electrolysis of fused magnesium chloride derived from brines, wells and sea water.

Uses

Magnesium is used in photography, flares, pyrotechnics and incendiary bombs. As it is one third lighter than aluminium, its alloys are useful in aeroplane and missile construction.

It improves the mechanical, fabrication and welding characteristics of aluminium when used as an alloying agent.

Magnesium hydoxide (milk of magnesia), sulphate (Epsom salts), chloride and citrate are used in medicine.

Grignard reagents, which are organic magnesium compounds, are important commercially.

Biological Role

Magnesium is an essential element in both plant and animal life. It is non-toxic. Chlorophyls are magnesium-centred porphyrins.

General Information

Great care should be taken in handling magnesium metal, especially in the finely-divided state, as serious fires can occur. Water should not be used on burning magnesium or magnesium fires.

Physical Information

Atomic Number	12
Relative Atomic Mass (^{12}C=12.000)	24.305
Melting Point/K	922.0
Boiling Point/K	1363
Density/kg m^{-3}	1738 (293K)
Ground State Electron Configuration	$[Ne]3s^2$
Electron Affinity (M-M^-)/kJ mol^{-1}	-67

Key Isotopes

Nuclide	^{24}Mg	^{25}Mg	^{26}Mg
Atomic mass	23.985	24.986	25.983
Natural abundance	78.99%	10.00%	11.01%
Half-life	stable	stable	stable

Ionisation Energies/kJ mol^{-1}

M - M^+	737.7
M^+ - M^{2+}	1450.7
M^{2+} - M^{3+}	7732.6
M^{3+} - M^{4+}	10540
M^{4+} - M^{5+}	13630
M^{5+} - M^{6+}	17995
M^{6+} - M^{7+}	21703
M^{7+} - M^{8+}	25656
M^{8+} - M^{9+}	31642
M^{9+} - M^{10+}	35461

Other Information

Enthalpy of Fusion/kJ mol^{-1}	9.04
Enthalpy of Vaporisation/kJ mol^{-1}	127.6

Oxidation States

Mg^{II}

Covalent Bonds/kJ mol^{-1}

Not applicable