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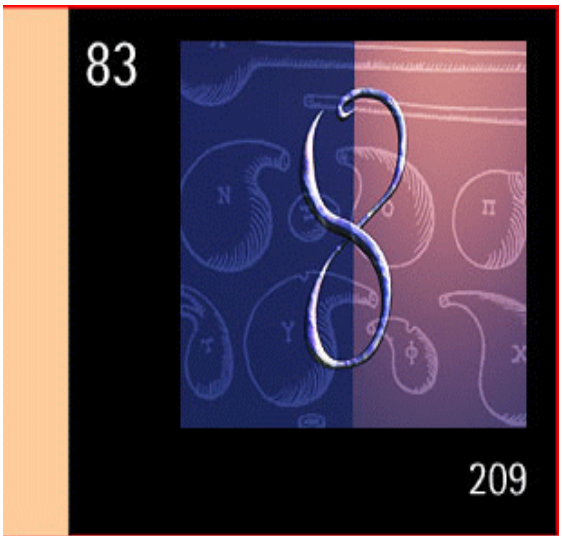
BISMUTH - Bi

Atomic Number: 83 **Atomic Weight: 208.98**



General Information

Discovery: Bismuth has been known since the fifteenth century, although it was often confused with tin and lead. Claude Geoffrey the Younger showed it to be distinct from lead in 1753.

Origin : The name comes from the German 'Weiss Masse' (white mass), which became Latinized as bismutum.

Appearance: Bismuth is a white brittle metal with a pinkish tinge.

Description : A heavy, silvery, pink-tinged metal, but not used as such as it is too brittle. Bismuth is used widely in low-melting alloys with tin and cadmium, which are used in products such as fire detectors and extinguishers, electric fuses and solders. Basic bismuth carbonate is taken in tablet or liquid form for indigestion as ‘‘bismuth mixture’’. Bismuth oxychloride is used in cosmetics to give a pearly effect. Otherwise bismuth does not find wide application.

Bismuth is stable to oxygen and water, and dissolves in concentrated nitric acid. Its soluble salts are characterized by forming insoluble basic salts on the addition of water. This property has been used in forensic work.

Source: Bismuth occurs as the native metal, and in ores such as bismuthinite and bismite. The major commercial source of bismuth is as a by-product of refining lead, copper, tin, silver and gold ores.

Biological Role: Bismuth has no known biological role, and is non-toxic.

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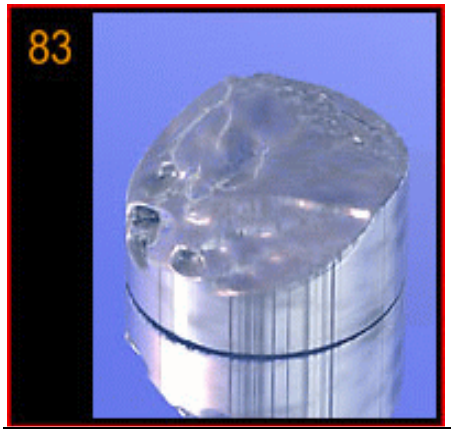
Physical Information

Atomic Number	83
Relative Atomic Mass (^{12}C=12.000)	208.98
Melting Point/^{0}F	520
Boiling Point/^{0}F	2642
Density	9.80
Weight Lb/in^3	0.3541
Ground State Electron Configuration	$[Xe]4f^{14}5d^{10}6s^{2}6p^{3}$
Electron Affinity(M-M-)/kJ mol^{-1}	101



Key Isotopes

nuclide	^{206}Bi	^{207}Bi	^{209}Bi
atomic mass			208.98
natural abundance	0%	0%	100%
half-life	6.3 days	30.2 yrs	stable

Ionization Energies/kJ mol^{-1}

$M - M^{+}$	703.2
$M^{+} - M^{2+}$	1610
$M^{2+} - M^{3+}$	2466
$M^{3+} - M^{4+}$	4372
$M^{4+} - M^{5+}$	5400
$M^{5+} - M^{6+}$	8520
$M^{6+} - M^{7+}$	10300
$M^{7+} - M^{8+}$	12300
$M^{8+} - M^{9+}$	14300
$M^{9+} - M^{10+}$	16300

Other Information

Enthalpy of Fusion/kJ mol^{-1}	10.48
Enthalpy of Vaporization/kJ mol^{-1}	296.2

Oxidation States

Main	Bi^{III}
Others	Bi^{-I}, Bi^{I}, Bi^{IV}

Covalent Bonds /kJ mol^{-1}

Bi - H	194
Bi - C	143
Bi - O	339
Bi - F	314
Bi - Cl	285
Bi- Bi	200