

# Barium

**Ba**

## ***General Information***

### **Discovery**

Barium was discovered by Sir Humphry Davy in 1808 in London.

### **Appearance**

Barium is a relatively soft, silvery-white metal resembling lead. It oxidises very easily and is therefore stored under petroleum or in an inert gas atmosphere.

### **Source**

Barium occurs only in combination with other elements, chiefly in the ores barytes and witherite. It can be prepared by electrolysis of the chloride, or by heating barium oxide with aluminium.

### **Uses**

Barium is not an extensively used element. The best-known use is in the form of barium sulphate, which can be drunk as a medical cocktail to outline the stomach and intestines for medical examination. The sulphate is also used in paint and in glassmaking.

Barium carbonate has been used as a rat poison. Barium nitrate gives fireworks a green colour.

### **Biological Role**

Barium and all its compounds that are water or acid soluble are toxic.

### **General Information**

Barium is attacked by air, and decomposed by water and alcohol.

# Physical Information

Atomic Number	56
Relative Atomic Mass ( <sup>12</sup> C=12.000)	137.33
Melting Point/K	1002
Boiling Point/K	1910
Density/kg m <sup>-3</sup>	3594 (293K)
Ground State Electron Configuration	[Xe]6s <sup>2</sup>
Electron Affinity (M-M <sup>-</sup> )/kJ mol <sup>-1</sup>	-46

# Key Isotopes

Nuclide	<sup>130</sup> Ba	<sup>132</sup> Ba	<sup>133</sup> Ba	<sup>134</sup> Ba	<sup>136</sup> Ba	<sup>137</sup> Ba
Atomic mass	129.9	131.9		133.9	135.9	136.9
Natural abundance	0.106%	0.101%	0%	2.417%	7.854%	11.32%
Half-life	stable	stable	7.2 yrs	stable	stable	stable
Nuclide	<sup>138</sup> Ba	<sup>140</sup> Ba				
Atomic mass	137.9					
Natural abundance	71.7%	0%				
Half-life	stable	12.7 days				

# Ionisation Energies/kJ mol<sup>-1</sup>

M - M <sup>+</sup>	502.8
M <sup>+</sup> - M <sup>2+</sup>	965.1
M <sup>2+</sup> - M <sup>3+</sup>	3600
M <sup>3+</sup> - M <sup>4+</sup>	4700
M <sup>4+</sup> - M <sup>5+</sup>	6000
M <sup>5+</sup> - M <sup>6+</sup>	7700
M <sup>6+</sup> - M <sup>7+</sup>	9000
M <sup>7+</sup> - M <sup>8+</sup>	10200
M <sup>8+</sup> - M <sup>9+</sup>	13500
M <sup>9+</sup> - M <sup>10+</sup>	15100

# Other Information

Enthalpy of Fusion/kJ mol <sup>-1</sup>	7.66
Enthalpy of Vaporisation/kJ mol <sup>-1</sup>	150.9

# Oxidation States

Ba<sup>II</sup>

# Covalent Bonds/kJ mol<sup>-1</sup>

Not applicable