



## >>Entry Name: Barium

**CAS Registry Number:** 7440-39-3

**Related CAS Registry Numbers(s):** 16541-35-8 22541-12-4

Ba

**Molecular Formula:** Ba

**Molecular Weight:** 137.327

**Accurate Mass:** 137.905232

**Percentage Composition:** Ba 100.00%

**General Statement:** Atomic No. 56. Ground state electron config. [Xe]6s<sup>2</sup>. Isol. by Sir Humphrey Davy in 1808. At least 25 isotopes of which 7, <sup>130</sup>Ba, <sup>132</sup>Ba, <sup>134</sup>Ba, <sup>135</sup>Ba, <sup>136</sup>Ba, <sup>137</sup>Ba and <sup>138</sup>Ba, are naturally occurring. <sup>137</sup>Ba, and less so, <sup>135</sup>Ba, are used in nmr spectroscopy. Abundance 390 ppm (earth's crust), 0.03 ppm (sea water). Struct. normally bcc, but high pressure forms are known. Also undergoes phase transitions at 309° and 495°

**Source/Synthesis:** Main mineral is barite (BaSO<sub>4</sub>). Synth. by thermal dec. of Ba(N<sub>3</sub>)<sub>2</sub>, and from BaO + Al or BaO or BaF<sub>2</sub> with H<sub>2</sub>

**Use/Importance:** Getter for removal of residual gases in vacuum tubes. Alloyed with steels to improve corrosion wear resistance. Used in conjunction with Cs in thermionic energy convertors. Commercially available

**Physical Description:** Soft silvery white metal. The bulk metal tarnishes in air forming Ba<sub>3</sub>N<sub>2</sub>, BaO, Ba(OH)<sub>2</sub> and BaCO<sub>3</sub>. Finely divided metal ignites in air → mainly Ba<sub>3</sub>N<sub>2</sub>. Dissolves in H<sub>2</sub>O forming Ba(OH)<sub>2</sub> solns.

**Melting Point:** Mp 727° (710°)

**Boiling Point:** Bp 1640° (1537°)

**Solubility:** Sol. NH<sub>3</sub>(l) → blue-black soln.

**Other Data:** Burns with yellow-green flame

**Hazard & Toxicity:** Compds. are v. toxic. Ignites readily. Reactive towards H<sub>2</sub>O and halogenated hydrocarbons, e.g. CCl<sub>4</sub>

**Aldrich:** 40333-4

**Fluka:** 11720

## >>Variant: Barium 126

**CAS Registry Number:** 15229-36-4

**General Statement:** Radioactive, *t*<sub>1/2</sub> 1.67 h

**Source/Synthesis:** Prod. from <sup>115</sup>In (<sup>14</sup>N,3n), <sup>118</sup>Sn (<sup>12</sup>C,4n), also by bombardment of Sn with <sup>16</sup>O, or Sb with B. Daughter of <sup>126</sup>La

**Other Data:** *I* = +0. Decays by β<sup>(+)</sup> emission or orbital electron capture to <sup>126</sup>Cs

## >>Variant: Barium 127

**CAS Registry Number:** 18393-23-2

**General Statement:** Radioactive, *t*<sub>1/2</sub> 12.7 min.

**Source/Synthesis:** Prod. by bombardment of In with <sup>16</sup>O or <sup>14</sup>N, Sn with <sup>12</sup>C or <sup>16</sup>O, also from <sup>133</sup>Cs (d,8n). Daughter of <sup>127</sup>La

**Other Data:** *I* = +1/2; μ = +0.09 μ<sub>N</sub>. Decays by β<sup>(+)</sup> emission or orbital electron capture to <sup>127</sup>Cs

## >>Variant: Barium 128

**CAS Registry Number:** 15741-25-0

**General Statement:** Radioactive, *t*<sub>1/2</sub> 2.43 d

**Source/Synthesis:** Prod. from <sup>133</sup>Cs (p,6n), <sup>133</sup>Cs (d,7n), or proton bombardment of Pr

**Other Data:** *I* = +0. Decays by orbital electron capture to <sup>128</sup>Cs

## >>Variant: Barium 130

**CAS Registry Number:** 15055-15-9

**General Statement:** Stable. Representative abundance 0.106 atom %

**Other Data:** *I* = +0

## >>Variant: Barium 131

**CAS Registry Number:** 14914-75-1

**General Statement:** Radioactive, *t*<sub>1/2</sub> 11.7 d

**Source/Synthesis:** Prod. from <sup>130</sup>Ba (n,γ), or <sup>133</sup>Cs (p,3n)

**Use/Importance:** Used in diagnostic nuclear medicine

**Other Data:** *I* = +1/2; μ = 0.7081 μ<sub>N</sub>. Decays by orbital electron capture to <sup>131</sup>Cs