

56  
**Ba**  
Barium  
137.327

**Key Properties**

Atomic Mass	137.327
Category	Alkaline Earth Metals
State at 20°C	solid
Melting Point	727°C
Boiling Point	1845°C
Density	3.51
Electron Config	[Xe] 6s2
Electronegativity	0.89
Year Discovered	1774
Discovered By	Carl Wilhelm Scheele

**Did You Know?**

- 1 The compound barium sulfate is completely insoluble in water, making it non-toxic. It is also opaque to X-rays, so patients drink a 'barium meal' or 'barium milkshake' to provide a clear X-ray image of their digestive tract.
- 2 Barium compounds are used to produce a brilliant pale green color in fireworks.
- 3 All water- or acid-soluble barium compounds are extremely poisonous.
- 4 The element's name comes from the Greek word 'barys', which means 'heavy', because its compounds were known for their high density.
- 5 It is used as a 'getter' in vacuum tubes to remove the last traces of oxygen and other gases.

**APPEARANCE**

Barium is a soft, silvery-white, reactive metal.

**SUPERHERO PERSONA**

*"The X-ray Visionary, a heavy hero who allows doctors to see inside the human body."*

**EVERYDAY CONNECTION**

Barium is found in the contrast agent a patient drinks for a medical CT scan.

**POP CULTURE**

Barium is used to create the green color in many sci-fi laser blasts.

**Overview of Barium**

Barium is a soft, silvery alkaline earth metal that tarnishes quickly in air and reacts vigorously with water. Because it is never found as a free element in nature, barium is always bound within minerals such as barite and witherite. Though toxic in many forms, certain barium compounds have become essential in medicine, industry, and fireworks.

**Uses of Barium**

Barium's usefulness comes mainly from its compounds:

**Medical imaging:** A suspension of barium sulfate ( $\text{BaSO}_4$ ), known as a barium meal or barium enema, is used to examine the digestive tract with X-rays. Barium's high atomic mass makes internal organs clearly visible during radiographic studies.

**Drilling fluids:** Large amounts of barium sulfate are used in oil and gas drilling fluids. Its density helps prevent blowouts in high-pressure wells.

**Fireworks:** Barium compounds, such as barium nitrate ( $\text{Ba}(\text{NO}_3)_2$ ), produce the vivid green colors in fireworks displays.

**Other uses:** Barium compounds are used in certain types of glass and paints. In the past, barium carbonate was even used as a rat poison, though this is now obsolete.

**Natural Occurrence and Production of Barium**

Barium is not found in its pure metallic state due to its reactivity. Instead, it occurs in minerals such as barite ( $\text{BaSO}_4$ ) and witherite ( $\text{BaCO}_3$ ). These ores are the primary sources of barium compounds used in industry and medicine.

**History of Barium**

**1600s – Bologna stones:** In 1603, Vincenzo Casciarolo, an Italian shoemaker and amateur alchemist, discovered that pebbles of barite glowed in the dark after being heated. These "Bologna stones" were an early clue to barium's unique properties.

**1760s – Recognition of a new element:** Swedish chemist Carl Scheele determined that barite contained an unknown substance, while British mineralogist William Withering studied witherite and reached a similar conclusion.

**1808 – Isolation of barium metal:** Sir Humphry Davy finally isolated metallic barium by using electrolysis on molten barium hydroxide, confirming it as a new element.

**Biological Role of Barium**

Barium has no known biological role and is toxic in most soluble forms. Barium sulfate is an important exception: it is insoluble in water and safe for medical imaging when ingested.