# 004 – BERYLLIUM – BE

| *Fact File* | |
|---|---|
| **Chemical Element Name** | Beryllium (prev. Glucine) |
| **Chemical Symbol** | Be (prev. G) |
| **Appearance** | White-grey metal |
| **Standard Atomic Weight, $A_r$** | 9.012 1831 amu |
| **Atomic/Proton Number, *Z*** | 4 |
| **Group** | Group 2 |
| **Period** | Period 2 |
| **Block** | s-block |
| **Electron Configuration/Ground Shells** | [He] $2s^2$ |
| **Electrons Per Shell** | 2, 2 |
| **Core Electrons** | 2 |
| **Valence Electrons** | 2 |
| **Phase/State of Matter at STP** | Solid |
| **Melting/Liquefaction Point** | 1560 K |
| **Boiling Point** | 2743 K |
| **Density at STP** | 1.85 g/L |
| **Ionic Charge(s)** | 2+ |
| **Emission Spectrum** |  |
| **Natural Occurrence** | Primordial |
| **Discovered By** | Louis Nicolas Vauquelin, 1798 |
| **Named By** | Friedrich Wöhler, 1828 |

## *Discovery*

The mineral beryl ($Be_3Al_2Si_6O_{18}$) has been used since the Ptolemaic dynasty of Egypt and early analysis of beryls and emeralds ($Be_3Al_2(SiO_3)_6$) – noted to be similar by Pliny the Elder in his encyclopedia *Natural History* – by Martin Heinrich Klaproth, Torbern Olof Bergman, Franz Karl Achard, and Johann Jakob Bindheim always yielded similar elements, leading to the false conclusion that both substances are aluminium silicates. Mineralogist René Just Haüy discovered that both crystals are geometrically identical, and he asked chemist Louis-Nicolas Vauquelin for a chemical analysis.

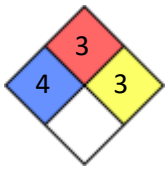
In a 1798 paper read before the Institut de France, Vauquelin reported that he found a new "earth" (element) by dissolving aluminium hydroxide from emerald and beryl in an additional alkali. The editors of the journal *Annales de Chimie et de Physique* named the new earth "glucine" for the sweet taste of some of its compounds. However, Klaproth preferred the name "beryllina" because yttria ($Y_2O_3$) also formed sweet salts.

## *Name Origins*

The name "beryllium" was first used by Friedrich Wöhler in 1828 and is derived from the name beryl, the mineral from which it was first isolated.

*Isotopes*

Lithium has three naturally occurring isotopes; $^{7}$Be (Trace) $^{9}$Be (100%) and $^{10}$Be (Trace). $^{5}$Be, $^{6}$Be, $^{8}$Be and $^{11}$Be to $^{16}$Be (excluding $^{10}$Be) have also been synthesised in laboratory conditions. In addition, $^{9}$Be, $^{11}$Be and $^{12}$Be can be excited ($^{9m}$Be: 14,390.3 keV, $^{11}$Be: 21,158 keV, $^{12}$Be: 2251 keV).

| *Hazards* | |
|---|---|
| **GHS pictograms** |  GHS06, GHS08 |
| **GHS Signal word** | Danger |
| **GHS hazard statements** | H301, H315, H317, H319, H330, H335, H350i, H372 |
| **GHS precautionary statements** | P201, P260, P280, P284, P301, P304, P310, P330, P340 |
| **NFPA 704 (fire diamond)** |   |