



>>Entry Name: Beryllium

Synonym(s): Glucinium. Glucinum

CAS Registry Number: 7440-41-7

Related CAS Registry Numbers(s): 14452-60-9 14701-08-7 15721-53-6 22537-20-8 35800-52-3 57348-29-5 58500-89-3

Be

Molecular Formula: Be

Molecular Weight: 9.012

Accurate Mass: 9.012182

Percentage Composition: Be 100.00%

General Statement: Atomic No 4. Ground state electron config. $[\text{He}]2s^2$. There are 6 isotopes of which only ^9Be is naturally occurring. Discovered in 1797 by L.N. Vauquelin and independently isolated in 1828 by F. Wöhler (Berlin) and A.H.B. Bussy (Paris). Abundance: 2 ppm (earth's crust), 5×10^{-5} ppm (sea water). The α -form (hcp) transforms into β -form (bcc) at 1250°

Source/Synthesis: Main mineral is beryl (emerald). Metal obt. by electrolysis of BeF_2/MF mixt., or of pure BeCl_2 or from $\text{BeCl}_2 + \text{K}$, $\text{BeF}_2 + \text{Mg}$

Use/Importance: Commercially available. Neutron multiplier in fusion reactors. Used as implant (dopant) in semiconducting devices (GaAs, InP, InAs). Forms alloys with Cu, Ni

Physical Description: Rel. soft silvery-white, lustrous metal; brittle at r.t., ductile at red heat. Unreactive to H_2O and air; dissolves vigorously in dil. acids. Reacts with halogens and higher chalcogens at high temp. Cold conc. HNO_3 passivates Be. Reacts with aq. alkalis $\rightarrow \text{H}_2$

Melting Point: Mp $1287\text{-}1292^\circ$

Boiling Point: Bp 2970° (ca. 2500°)

Hazard & Toxicity: Highly toxic: suspected carcinogen. The powdered metal is a fire and explosion hazard

Aldrich: 45999-2

Fluka: 14200

>>Variant: Beryllium 6

CAS Registry Number: 13982-26-8

General Statement: Radioactive, $t_{1/2}$ 5.0×10^{-21} s

Source/Synthesis: Prod. from ^3He ($^3\text{He}, \gamma$), ^4He ($^3\text{He}, n$), ^6Li (p,n), ^6Li ($^3\text{He}, t$), ^6Li ($^6\text{Li}, ^6\text{He}$), or ^9Be ($^3\text{He}, ^6\text{He}$)

Other Data: $I = +0$. Decays by 2 proton emission/ α emission

>>Variant: Beryllium 7

CAS Registry Number: 13966-02-4

General Statement: Radioactive, $t_{1/2}$ 53.28 d

Source/Synthesis: Prod. from ^6Li (d,n), ^{10}B (p, α), or ^{12}C ($^3\text{He}, 2\alpha$). Commercial production routes: proton spallation in H_2O and stainless steel encapsulated carbon black; proton spallation on natural ZnO targets

Other Data: $I = -3/2$. Decays by orbital electron capture to ^7Li

>>Variant: Beryllium 8

CAS Registry Number: 13981-60-7

General Statement: Radioactive, $t_{1/2}$ 6.7×10^{-17} s

Source/Synthesis: Prod. from nuclear reactions using accelerators, e.g. ^4He (α, γ), ^6Li (d, γ), ^7Li (p, γ), ^9Be (γ, n), ^{10}B (n,t), or ^{12}C ($^3\text{He}, ^7\text{Be}$), etc.

Other Data: $I = +0$. Decays by 2α emission

>>Variant: Beryllium 9

General Statement: Stable. Natural abundance 100 atom %

Other Data: $I = -3/2$; $\mu = -1.1779 \mu_N$. Nmr relative sensitivity ($^1\text{H}=1.00$) 1.39×10^{-2} ; receptivity ($^{13}\text{C}=1.00$) 78.8

>>Variant: Beryllium 10

CAS Registry Number: 14390-89-7

General Statement: Radioactive, $t_{1/2}$ 1.52×10^6 y

Source/Synthesis: Prod. from ^9Be (n, γ), or ^9Be (d,p)

Use/Importance: Used for radiometric dating

Other Data: $I = +0$. Decays by $\beta^{(-)}$ emission to ^{10}B