



>>Entry Name: Germanium

CAS Registry Number: 7440-56-4

Related CAS Registry Numbers(s): 12184-87-1 12596-05-3 15735-13-4 15888-69-4 16065-84-2 54603-69-9 61349-37-9

Ge

Molecular Formula: Ge

Molecular Weight: 72.61

Accurate Mass: 73.921177

Percentage Composition: Ge 100.00%

Abundance: 1.5 ppm (earth's crust). Trimorphic; α -form has the diamond struct.

Source/Synthesis: Synth. by H_2 reduction of GeO_2 as powdered Ge. Now obt. commercially as by-product from processing of Zn ores

Use/Importance: Main use is in transistor technology, semiconductors, and phosphors

Physical Description: Brittle, grey-white, lustrous cryst. Dissolves slowly in hot conc. H_2SO_4 . No reaction with H_2O or dil. acids or alkalis unless oxidant present

Melting Point: Mp 945° (937°)

Boiling Point: Bp 2850° (2830°)

Other Data: $d^{20}_{\text{H}_2\text{O}}$ 5.32 (α -form) $d^{20}_{\text{H}_2\text{O}}$ 6.71 (β -form). Air oxidation starts at 400°

Hazard & Toxicity: Non-toxic. Ignites in Cl_2 or Br_2 . Explosive reaction with conc. HNO_3

Aldrich: 32739-5

Fluka: 48842

>>Variant: *Allo*-form

Molecular Formula: Ge

Molecular Weight: 72.61

Accurate Mass: 73.921177

Percentage Composition: Ge 100.00%

Source/Synthesis: Synth. from $\text{Li}_7\text{Ge}_{12} + \text{Ph}_2\text{CO}$ in THF

Physical Description: Grey, shiny, metallic leaflets, like graphite

Other Data: Diamagnetic semiconductor. At *ca.* 147° , transforms into the *4H*-form

>>Variant: *4H*-form

Molecular Formula: Ge

Molecular Weight: 72.61

Accurate Mass: 73.921177

Percentage Composition: Ge 100.00%

Physical Description: Metastable, hexagonal solid

Melting Point: Mp 925°

Other Data: At *ca.* 447° , transforms into the α -(diamond) form

>>Variant: Germanium 68

CAS Registry Number: 15756-77-1

Source/Synthesis: Prod. from Zn ($\alpha, 2n$). Commercial production routes: proton reaction on GaCl_3 targets, on RbBr , or on Mo metal

Other Data: $I = +0$. Decays by orbital electron capture to ^{68}Ga

>>Variant: Germanium 69

CAS Registry Number: 15034-49-8

Source/Synthesis: Prod. from Ga ($d, 2n$), ^{70}Zn ($\alpha, 2n$), ^{70}Ge ($n, 2n$), or ^{70}Ge (γ, n). Also obt. by bombardment of ^{59}Co with ^{12}C , or Ga with protons

Other Data: $I = -5/2$. $\mu = 0.735 \mu_N$. Decays by $\beta^{(+)}$ emission, or orbital electron capture to ^{69}Ga

>>Variant: Germanium 70

CAS Registry Number: 14687-55-9

Other Data: $I = +0$