



>>Entry Name: Gallium

CAS Registry Number: 7440-55-3

Related CAS Registry Numbers(s): 14877-29-3 15091-79-9 22537-33-3

Ga

Molecular Formula: Ga

Molecular Weight: 69.723

Accurate Mass: 68.92558

Percentage Composition: Ga 100.00%

General Statement: Atomic No. 31. Ground state electron config. $[\text{Ar}]3d^{10}4s^24p^1$. 14 Isotopes have been reported of which ^{71}Ga and ^{69}Ga are stable. Discovered in 1875 by P.-E. Lecoq de Boisbaudran (Paris). Abundance: 19 ppm (earth's crust), traces (sea water). No known biological role. Unique orthorhombic struct.; (α -form), each Ga atom has 1 close neighbour at 244 pm, and 6 at 270-279 pm. When cooled, α -form transforms through a series of metastable forms to the rhombic γ -form at -35.6° . High pressure forms also exist

Source/Synthesis: By-product of Al and Zn extraction industries. Associated with Al in bauxite and may be with Ge. Also obt. from coals and flue dusts. Extracted electrolytically

Use/Importance: Used in semiconductor industry (particularly when associated with As, P, Sb). Used in liquid seals for vacuum apparatus; high temp. thermometry

Physical Description: Soft sl. blue-white metal. Stable in air and not attacked by H_2O . Contracts on melting. Longest liq. range of all elements. Wets glass, porcelain and most other surfaces except graphite, quartz and teflon

Melting Point: Mp 29.8°

Boiling Point: Bp 2403°

Solubility: Sol. acids and alkalis

Other Data: Easily oxidised by O_2 at 1000° . Conc. mineral acids react slowly at amb. temp. Oxidising agents e.g. aqua regia, H_2O_2 , HClO_4 and H_2SO_4 attack Ga readily. Reacts readily with most non-metals

Hazard & Toxicity: Poison by subcutaneous and intravenous routes

Aldrich: 20331-9

Fluka: 48340

>>Variant: Gallium 65

CAS Registry Number: 16922-44-4

General Statement: Radioactive, $t_{1/2}$ 15.2 min.

Source/Synthesis: Prod. from ^{63}Cu ($\alpha,2n$), ^{64}Zn (d,n), ^{64}Zn (p, γ) or ^{56}Fe ($^{11}\text{B},2n$)

Other Data: $I = -3/2$. Decays by orbital electron capture or $\beta^{(+)}$ emission to ^{65}Zn

>>Variant: Gallium 66

CAS Registry Number: 14119-08-5

General Statement: Radioactive, $t_{1/2}$ 9.5 h

Source/Synthesis: Prod. from ^{63}Cu (α,n), or ^{69}Ga ($\gamma,3n$). Daughter of ^{66}Ge

Use/Importance: Used in diagnostic nuclear medicine

Other Data: $I = +0$. Decays by $\beta^{(+)}$ emission, orbital electron capture, or γ emission to ^{66}Zn

>>Variant: Gallium 67

CAS Registry Number: 14119-09-6

General Statement: Radioactive, $t_{1/2}$ 3.260 d

Source/Synthesis: Prod. from ^{66}Zn (d,n), or ^{65}Cu ($\alpha,2n$)

Use/Importance: Used in diagnostic nuclear medicine

Other Data: $I = -3/2$; $\mu = +1.8507 \mu_N$. Decays by orbital electron capture to ^{67}Zn

>>Variant: Gallium 68

CAS Registry Number: 15757-14-9

General Statement: Radioactive, $t_{1/2}$ 1.103 h

Source/Synthesis: Prod. from ^{65}Cu (α,n), ^{68}Zn (p,n), ^{67}Zn (d,n), ^{69}Ga (n,2n), or ^{70}Ge ($\gamma,n+p$). Daughter of ^{68}Ge

Use/Importance: Used in diagnostic nuclear medicine

Other Data: $I = +1$; $\mu = 0.01175 \mu_N$. Decays by $\beta^{(+)}$ emission, or orbital electron capture to ^{68}Zn

>>Variant: Gallium 69

CAS Registry Number: 14391-02-7

General Statement: Stable. Representative abundance 60.108 atom %

Other Data: $I = -3/2$; $\mu = +2.01659 \mu_N$. Nmr relative sensitivity ($^1\text{H}=1.00$) 0.0691; receptivity ($^{13}\text{C}=1.00$) 237