>>**Entry Name: Gadolinium**

CAS Registry Number: 7440-54-2
Related CAS Registry Numbers(s): 19180-89-3 22541-19-1

Gd

Molecular Formula: Gd
Molecular Weight: 157.25
Accurate Mass: 157.924099
Percentage Composition: Gd 100.00%
General Statement: Atomic No. 64. Ground state electron config. [Xe]$4f^7 5d^1 6s^2$. Atomic radius 180 pm. 17 Isotopes are known of which ^{156}Gd (20.5%), ^{158}Gd (24.9%) and ^{160}Gd (21.9%) are the most abundant of 7 natural isotopes. Abundance 6.1 ppm (earth's crust). Discovered in 1880 by J.-C. Galissard (Geneva) and isol. by P.-E. Lecoq de Boisbaudran (Paris). α-Form (hcp) transforms into β-form (bcc) at 1262°: there is also a high pressure form. No biological role
Source/Synthesis: Main ores include monazite, bastnaesite and gadolinite. Metal obt. from GdF_3 + Ca
Use/Importance: Used in nuclear control systems, neutron radiography, making garnets for microwave applications
Physical Description: Malleable silvery-white lustrous metal. Tarnishes in moist air. Reacts slowly with O_2, H_2O. Dissolves in acids
Melting Point: Mp 1313°
Boiling Point: Bp 3273° (3266°, 3000°)
Hazard & Toxicity: ^{152}Gd is an α-emitter

Aldrich: 26111-4
Fluka: 48210

>>**Variant: Gadolinium 146**

CAS Registry Number: 14952-32-0
General Statement: Radioactive, $t_{½}$ 48.3 d
Source/Synthesis: Prod. from ^{144}Sm (α,2n), also by proton bombardment of Er or Ta
Other Data: I = +0. Decays by orbital electron capture (99.8%), or by $\beta^{(+)}$ emission (0.2%) to ^{146}Eu

>>**Variant: Gadolinium 147**

CAS Registry Number: 14952-31-9
General Statement: Radioactive, $t_{½}$ 1.588 d
Source/Synthesis: Prod. from ^{144}Sm (α,n), or ^{147}Sm (α,4n)
Other Data: I = - 7/2 ; μ = 1.0 μ_N. Decays by orbital electron capture to ^{147}Eu

>>**Variant: Gadolinium 148**

CAS Registry Number: 14119-21-2
General Statement: Radioactive, $t_{½}$ 75 y
Source/Synthesis: Prod. from ^{147}Sm (α,3n), or ^{151}Eu (p,4n). Also obt. by proton spallation in Ta targets (commercial production route)
Other Data: I = +0. Decays by α emission to ^{144}Sm

>>**Variant: Gadolinium 149**

CAS Registry Number: 14937-16-7
General Statement: Radioactive, $t_{½}$ 9.3 d
Source/Synthesis: Prod. from ^{151}Eu (p,3n), or ^{147}Sm (α,2n)
Other Data: I = - 7/2 ; μ = 0.9 μ_N. Decays by orbital electron capture to ^{149}Eu

>>**Variant: Gadolinium 150**

CAS Registry Number: 14119-22-3
General Statement: Radioactive, $t_{½}$ 1.8 x 10^6 y
Source/Synthesis: Prod. from ^{151}Eu (d,3n), or by bombardment of Sm by α-particles. Daughter of ^{150}Eu (12.6 h)
Other Data: I = +0. Decays by α emission to ^{146}Sm

>>**Variant: Gadolinium 151**

CAS Registry Number: 14937-17-8
General Statement: Radioactive, $t_{½}$ 124 d
Source/Synthesis: Prod. from ^{151}Eu (p,n), or ^{151}Eu (d,2n)
Other Data: I = - 7/2 ; μ = 0.8 μ_N. Decays by orbital electron capture to ^{151}Eu