



>>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]4f⁷5d¹6s². Atomic radius 180 pm. 17 Isotopes are known of which ¹⁵⁶Gd (20.5%), ¹⁵⁸Gd (24.9%) and ¹⁶⁰Gd (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 GdF₃ + 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 O₂, H₂O. Dissolves in acids

Melting Point: Mp 1313°

Boiling Point: Bp 3273° (3266°, 3000°)

Hazard & Toxicity: ¹⁵²Gd is an α-emitter

Aldrich: 26111-4

Fluka: 48210

>>Variant: Gadolinium 146

CAS Registry Number: 14952-32-0

General Statement: Radioactive, *t*_{1/2} 48.3 d

Source/Synthesis: Prod. from ¹⁴⁴Sm (α,2n), also by proton bombardment of Er or Ta

Other Data: *I* = +0. Decays by orbital electron capture (99.8%), or by β⁽⁺⁾ emission (0.2%) to ¹⁴⁶Eu

>>Variant: Gadolinium 147

CAS Registry Number: 14952-31-9

General Statement: Radioactive, *t*_{1/2} 1.588 d

Source/Synthesis: Prod. from ¹⁴⁴Sm (α,n), or ¹⁴⁷Sm (α,4n)

Other Data: *I* = - 7/2 ; μ = 1.0 μ_N. Decays by orbital electron capture to ¹⁴⁷Eu

>>Variant: Gadolinium 148

CAS Registry Number: 14119-21-2

General Statement: Radioactive, *t*_{1/2} 75 y

Source/Synthesis: Prod. from ¹⁴⁷Sm (α,3n), or ¹⁵¹Eu (p,4n). Also obt. by proton spallation in Ta targets (commercial production route)

Other Data: *I* = +0. Decays by α emission to ¹⁴⁴Sm

>>Variant: Gadolinium 149

CAS Registry Number: 14937-16-7

General Statement: Radioactive, *t*_{1/2} 9.3 d

Source/Synthesis: Prod. from ¹⁵¹Eu (p,3n), or ¹⁴⁷Sm (α,2n)

Other Data: *I* = - 7/2 ; μ = 0.9 μ_N. Decays by orbital electron capture to ¹⁴⁹Eu

>>Variant: Gadolinium 150

CAS Registry Number: 14119-22-3

General Statement: Radioactive, *t*_{1/2} 1.8 x 10⁶ y

Source/Synthesis: Prod. from ¹⁵¹Eu (d,3n), or by bombardment of Sm by α-particles. Daughter of ¹⁵⁰Eu (12.6 h)

Other Data: *I* = +0. Decays by α emission to ¹⁴⁶Sm

>>Variant: Gadolinium 151

CAS Registry Number: 14937-17-8

General Statement: Radioactive, *t*_{1/2} 124 d

Source/Synthesis: Prod. from ¹⁵¹Eu (p,n), or ¹⁵¹Eu (d,2n)

Other Data: *I* = - 7/2 ; μ = 0.8 μ_N. Decays by orbital electron capture to ¹⁵¹Eu