



>>Entry Name: Samarium

CAS Registry Number: 7440-19-9

Related CAS Registry Numbers(s): 16396-66-0 16701-49-8 22541-17-9
Sm

Molecular Formula: Sm

Molecular Weight: 150.36

Accurate Mass: 151.919729

Percentage Composition: Sm 100.00%

and ^{154}Sm (22.7%) are the more abundant of 7 natural ones. Abundance 7 ppm (earth's crust). Discovered in 1879 by P.-E. Lecoq de Boisbaudran (Paris). α -Rhombohedral form converts into the β -cubic form at 917°. A high pressure form also exists

Source/Synthesis: Main ores are monazite and bastnaesite. Metal obt. from $\text{Sm}_2\text{O}_3 + \text{Ba}$ or La

Use/Importance: Alloy with Co (SmCo_5) excellent permanent magnet material. Found in mischmetal (1%). Used as catalyst, in ceramics and specialist glasses

Physical Description: Bright, silvery-white metal. Rel. stable in dry air. Moist air $\rightarrow$ oxide film. Dissolved by dil. acid.

Melting Point: Mp 1074° (1077°)

Boiling Point: Bp 1794° (1778°)

Other Data: Reacts with most non-metals on heating

Hazard & Toxicity: Ignites in air at 150°. Probably of low toxicity but ^{147}Sm , ^{148}Sm are α -emitters

Aldrich: 26318-4

Fluka: 84433

>>Variant: Samarium 143

CAS Registry Number: 15758-36-8

Source/Synthesis: Prod. from Nd ($\alpha, 3n$), Sm ($n, 2n$), ^{144}Sm (γ, n), or ^{142}Nd ($^3\text{He}, 2n$)

Other Data: $I = +3/2$; $\mu = +1.01 \mu_N$. Decays by $\beta^{(+)}$ emission (46%) or orbital electron capture (54%) to ^{143}Pm

>>Variant: Samarium 143m

Source/Synthesis: Prod. from Nd ($\alpha, 2n$), ^{144}Sm ($n, 2n$), ^{144}Sm (γ, n), or ^{144}Sm (p, pn)

Other Data: $I = -11/2$. Decays by isomeric transition (99.76%) to ^{143}Sm , also by orbital electron capture or $\beta^{(+)}$ emission (0.2%) to ^{143}Pm

>>Variant: Samarium 144

CAS Registry Number: 14981-82-9

Other Data: $I = +0$

>>Variant: Samarium 145

CAS Registry Number: 15065-02-8

Source/Synthesis: Prod. from Sm (n, γ)

Other Data: $I = -7/2$; $\mu = -1.1 \mu_N$. Decays by $\beta^{(+)}$ emission or orbital electron capture to ^{145}Pm

>>Variant: Samarium 146

Source/Synthesis: Prod. from Sm ($n, 2n$), or by bombardment of Nd with α -particles

Other Data: $I = +0$. Decays by α emission to ^{142}Nd

>>Variant: Samarium 147

Use/Importance: Sm/ Nd used for radiometric dating of geological samples

Other Data: $I = +7/2$; $\mu = -0.8149 \mu_N$. Nmr relative sensitivity ($^1\text{H}=1.00$) 1.48×10^{-3} ; receptivity ($^{13}\text{C}=1.00$) 1.28. Decays by α emission to ^{143}Nd