



>>Entry Name: Dysprosium

CAS Registry Number: 7429-91-6

Related CAS Registry Numbers(s): 14701-44-1 20575-26-2 22541-21-5

Type of Compound Code(s): NA0020

Dy

Molecular Formula: Dy

Molecular Weight: 162.5

Accurate Mass: 163.929171

Percentage Composition: Dy 100.00%

General Statement: Atomic No. 66. Ground state electron config. $[\text{Xe}]4f^{10}6s^2$. Atomic radius 177 pm. 21 Isotopes have been reported of which ^{162}Dy (25.5%), ^{165}Dy (25%) and ^{164}Dy (28.2%) are the more abundant of 7 natural isotopes. Discovered in 1886 by P.-E. Lecoq de Boisbaudran (Paris). Abundance: 4.5 ppm (earth's crust). Three modifications: rhombic transforms into hcp form at -187° , which is stable to 1381° becoming bcc. A high pressure form is also known

Source/Synthesis: More important ores are monazite and bastnaesite. Metal obt. from DyF_3 with Ca

Use/Importance: Used in nuclear reactor control rods

Physical Description: Hard lustrous silvery metal; relatively stable, but reacts slowly with H_2O , dissolves in dil. acid

Melting Point: Mp 1412° (1407°)

Boiling Point: Bp 2567° (2559°)

Aldrich: 26302-8

Fluka: 44640

>>Variant: Dysprosium 150

CAS Registry Number: 15055-17-1

General Statement: Radioactive, $t_{1/2}$ 7.17 min.

Source/Synthesis: Prod. from ^{141}Pr ($^{14}\text{N}, 5\text{n}$), ^{140}Ce ($^{16}\text{O}, 6\text{n}$), or ^{159}Tb (p,10n). Also obt. by proton bombardment of Er or Ta

Other Data: $I = +0$. Decays by orbital electron capture or $\beta^{(+)}$ emission (69%) to ^{150}Tb , also by α emission (31%) to ^{146}Gd

>>Variant: Dysprosium 151

CAS Registry Number: 15055-18-2

General Statement: Radioactive, $t_{1/2}$ 16.9 min.

Source/Synthesis: Prod. from ^{141}Pr ($^{14}\text{N}, 5\text{n}$), ^{140}Ce ($^{16}\text{O}, 5\text{n}$), ^{159}Tb (p,9n), or ^{142}Nd ($^{12}\text{C}, 3\text{n}$)

Other Data: $I = -7/2$; $\mu = -0.95 \mu_{\text{N}}$. Decays by orbital electron capture (89%) or $\beta^{(+)}$ emission (5%) to ^{151}Tb , also by α emission (6%) to ^{147}Gd

>>Variant: Dysprosium 152

CAS Registry Number: 15904-62-8

General Statement: Radioactive, $t_{1/2}$ 2.38 h

Source/Synthesis: Prod. from ^{141}Pr ($^{14}\text{N}, 5\text{n}$), ^{152}Gd ($\alpha, 4\text{n}$), ^{142}Nd ($^{12}\text{C}, 2\text{n}$), ^{154}Gd ($^3\text{He}, 5\text{n}$), or by proton bombardment of Ta

Other Data: $I = +0$. Decays by orbital electron capture (99.90%) to ^{152}Tb , or α emission (0.10%) to ^{148}Gd

>>Variant: Dysprosium 153

CAS Registry Number: 14981-96-5

General Statement: Radioactive, $t_{1/2}$ 6.4 h

Source/Synthesis: Prod. from ^{152}Gd ($\alpha, 3\text{n}$), or ^{154}Gd ($^3\text{He}, 4\text{n}$)

Other Data: $I = -7/2$; $\mu = -0.78 \mu_{\text{N}}$. Decays by orbital electron capture (ca. 99%) or $\beta^{(+)}$ emission (ca. 1%) to ^{153}Tb , also by α emission (0.009%) to ^{149}Gd

>>Variant: Dysprosium 154

CAS Registry Number: 16484-49-4

General Statement: Radioactive, $t_{1/2}$ 3×10^6 y

Source/Synthesis: Prod. from ^{154}Gd ($\alpha, 4\text{n}$), or by proton bombardment of Ta

Other Data: $I = +0$. Decays by α emission to ^{150}Gd

>>Variant: Dysprosium 155

CAS Registry Number: 14982-00-4

General Statement: Radioactive, $t_{1/2}$ 10.0 h

Source/Synthesis: Prod. from ^{159}Tb (p,5n), ^{153}Gd ($\alpha, 2\text{n}$), ^{154}Gd ($\alpha, 3\text{n}$), ^{152}Gd (α, n), or ^{159}Tb (d,6n). Also obt. by proton bombardment of U or Ta

Other Data: $I = -3/2$; $\mu = -0.385 \mu_{\text{N}}$. Decays by orbital electron capture (98%) or $\beta^{(+)}$ emission (2%) to ^{155}Tb