



>>Entry Name: Chromium

CAS Registry Number: 7440-47-3

Related CAS Registry Numbers(s): 12184-82-6 14067-03-9 14280-17-2 14392-02-0 15723-28-1 16065-83-1 18540-29-9 22541-79-3 37185-66-3

Cr

Molecular Formula: Cr

Molecular Weight: 51.996

Accurate Mass: 51.940509

Percentage Composition: Cr 100.00%

General Statement: Atomic No. 24. Ground state electron config. $[\text{Ar}]3d^54s^1$. There are 9 isotopes of which 4 are natural. ^{53}Cr used in nmr spectroscopy. ^{51}Cr is radioactive. First isol. by N.L. Vauquelin (Paris) in 1780. Abundance: 122 ppm (earth's crust), traces (sea water). Bcc form transforms into fcc form at *ca.* 1840°

Source/Synthesis: Occurs as crocoite (PbCrO_4) but main ore is chromite (FeCr_2O_4). Reduced with coke, this yields ferrochrome (alloy) directly. Pure metal also obt. from Cr_2O_3 + Al, Si or C or by electrolysis of chrome alum

Use/Importance: Essential trace element. Employed in hard alloys (e.g. *Ferrochrome*) and electroplating. ^{51}Cr used as radioactive tracer

Physical Description: Hard ductile blue-white metal. Resists oxidation in air. More reactive to acids than Mo or W and can be rendered passive. Rapidly attacked by fused NaOH + KNO_3 or KClO_4

Melting Point: Mp 1900° (1857°, 1875°)

Boiling Point: Bp 2690° (2670°)

Hazard & Toxicity: Finely divided metal may be explosive. Human poison by ingestion

Aldrich: 26629-9

Fluka: 27060

>>Variant: Chromium 48

CAS Registry Number: 14833-09-1

General Statement: Radioactive, $t_{1/2}$ 21.6 h

Source/Synthesis: Prod. from ^{46}Ti ($\alpha, 2n$)

Other Data: $I = +0$. Decays by orbital electron capture to ^{48}V

>>Variant: Chromium 49

CAS Registry Number: 15758-14-2

General Statement: Radioactive, $t_{1/2}$ 42.09 min.

Source/Synthesis: Prod. from ^{48}Ti ($\alpha, 3n$), ^{47}Ti ($\alpha, 2n$), ^{46}Ti (α, n), ^{51}V (p, 3n), or ^{50}Cr (n, 2n)

Other Data: $I = -5/2$; $\mu = 0.476 \mu_N$. Decays by orbital electron capture or $\beta^{(+)}$ emission to ^{49}V

>>Variant: Chromium 50

CAS Registry Number: 14304-94-0

General Statement: Stable. Representative abundance 4.345 atom %

Other Data: $I = +0$

>>Variant: Chromium 51

CAS Registry Number: 14392-02-0

General Statement: Radioactive, $t_{1/2}$ 27.70 d

Source/Synthesis: Prod. from ^{50}Cr (n, γ)

Use/Importance: Used in diagnostic nuclear medicine; also (as sodium chromate) to label red blood cells

Other Data: $I = -7/2$; $\mu = -0.934 \mu_N$. Decays by orbital electron capture to ^{51}V

>>Variant: Chromium 52

CAS Registry Number: 14092-98-9

General Statement: Stable. Representative abundance 83.789 atom %

Other Data: $I = +0$

>>Variant: Chromium 53

CAS Registry Number: 13981-78-7

General Statement: Stable. Representative abundance 9.501 atom %

Other Data: $I = -3/2$; $\mu = -0.47454 \mu_N$. Nmr relative sensitivity ($^1\text{H}=1.00$) 9.03×10^{-4} ; receptivity ($^{13}\text{C}=1.00$) 0.49