



>>Entry Name: Copper

Synonym(s): Cuprum (L.)

CAS Registry Number: 7440-50-8

Related CAS Registry Numbers(s): 12190-70-4 15158-11-9 15721-63-8 17493-86-6 19498-52-3 37366-57-7 39417-05-5 65357-62-2 66771-03-7 66771-05-9 68112-39-0 81543-63-7 81543-64-8

Cu

Molecular Formula: Cu

Molecular Weight: 63.546

Accurate Mass: 62.939598

Percentage Composition: Cu 100.00%

General Statement: Atomic No. 29. Ground state electron config. [Ar]3d¹⁰4s¹. Known since *ca.* 5000 BC. 11 Isotopes are known of which ⁶³Cu and ⁶⁵Cu are natural, and useful in nmr spectroscopy. Abundance: 68 ppm (earth's crust), 0.003 ppm (sea water). Fcc struct. (A1 type)

Source/Synthesis: Occurs as natural metal; as oxides e.g. cuprite (Cu₂O), tenorite (CuO); malachite (basic carbonate); and as sulfides e.g. chalcocite (Cu₂S), covellite (CuS), chalcopyrite (main ore, CuFeS₂). Direct smelting v. rare. Ores concd. by flotation, S removed as SO₂ by roasting, and oxides reduced by CO or H₂. Metal refined electrolytically

Use/Importance: Excellent electrical and thermal conductor, and used mainly in electrical equipment. Essential trace element. Constit. of historically important alloys.

Reagent for the cyclisation and/or coupling of various functional groups, decarboxylation, preparation of α -alkynic alcohols, cyclopropanes, nitriles and ketones by benzylic oxidn.

Physical Description: Reddish, malleable and ductile metal. Slowly weathers to green patina of the carbonate

Melting Point: Mp 1083°

Boiling Point: Bp 2595° (2570°)

Other Data: Stable in dry air at r.t. At red heat → Cu₂O. Attacked by S, and by halogens. Reactive to hot conc. H₂SO₄, and dil. HNO₃. Resistant to H₂O

Hazard & Toxicity: Toxic in excess

Aldrich: 36532-7

Fluka: 61144

>>Variant: Copper 59

CAS Registry Number: 15128-02-6

General Statement: Radioactive, *t*_{1/2} 1.358 min.

Source/Synthesis: Prod. from ⁵⁸Ni (p,γ), or ⁵⁸Ni (d,n)

Other Data: *I* = - 3/2 . Decays by orbital electron capture or β⁽⁺⁾ emission to ⁵⁹Ni

>>Variant: Copper 60

CAS Registry Number: 13982-06-4

General Statement: Radioactive, *t*_{1/2} 23.2 min.

Source/Synthesis: Prod. from ⁶⁰Ni (p,n), or ⁶⁰Ni (d,2n)

Other Data: *I* = +2; μ = +1.219 μ_N. Decays by orbital electron capture or β⁽⁺⁾ emission to ⁶⁰Ni

>>Variant: Copper 61

CAS Registry Number: 15128-03-7

General Statement: Radioactive, *t*_{1/2} 3.408 h

Source/Synthesis: Prod. from ⁶⁰Ni (d,n), ⁶³Cu (γ,2n), or ⁵⁹Co (α,2n)

Other Data: *I* = - 3/2 ; μ = +2.14 μ_N. Decays by orbital electron capture or β⁽⁺⁾ emission to ⁶¹Ni

>>Variant: Copper 62

CAS Registry Number: 14276-53-0

General Statement: Radioactive, *t*_{1/2} 9.74 min.

Source/Synthesis: Prod. from ⁵⁹Co (α,n), or ⁶²Ni (p,n). Daughter of ⁶²Zn

Other Data: *I* = +1; μ = -0.380 μ_N. Decays by orbital electron capture or β⁽⁺⁾ emission to ⁶²Ni

>>Variant: Copper 63

CAS Registry Number: 14191-84-5

General Statement: Stable. Natural abundance 69.24-68.98 atom %

Other Data: *I* = - 3/2 ; μ = +2.2233 μ_N. Nmr relative sensitivity (¹H=1.00) 0.0931; receptivity (¹³C=1.00) 365