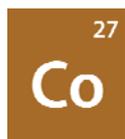


Stable Isotopes of Cobalt

Isotope	Z(p)	N(n)	Atomic Mass	Natural Abundance	Nuclear Spin
Co-59	27	32	58.93320	100.00%	7/2-



Cobalt was discovered in 1735 by Georg Brandt. Its name derives from the German word *kobald*, meaning "goblin" or "evil spirit." Minerals containing cobalt were used by the early civilizations of Egypt and Mesopotamia for coloring glass deep blue. Cobalt oxide is used today to add a pink or blue color to glass. It is also an important trace element in soils and necessary for animal nutrition. The most important modern use of cobalt is in the manufacture of various wear-resistant and superalloys. Its alloys have shown high resistance to corrosion and oxidation at high temperatures.

Radioactive Cobalt-60 is used in radiography and in the sterilization of food.

A silvery-white, shining, hard, ductile, somewhat malleable metal, cobalt is also ferromagnetic, with permeability two-thirds that of iron. It has exceptional magnetic properties in alloys. It is attacked by dilute hydrochloric and sulfuric acids. It corrodes readily in air, and it has unusual coordinating properties, especially the trivalent ion. It is noncombustible except in powder form.

Cobalt occurs in two allotropic modifications over a wide range of temperatures: the crystalline close-packed-hexagonal form is known as the *alpha form*, which turns into the *beta* (or *gamma*) *form* above 417 °C.

In finely powdered form, cobalt ignites spontaneously in air. Reactions with acetylene and bromine pentafluoride proceed to incandescence and can become violent. The metal is moderately toxic by ingestion. Inhalation of dusts can damage lungs. Skin contact with powdered material can cause dermatitis.

Properties of Cobalt

Name	Cobalt
Symbol	Co
Atomic number	27
Atomic weight	58.933
Standard state	Solid at 298 °K
CAS Registry ID	7440-48-4
Group in periodic table	9
Group name	None
Period in periodic table	4

Properties of Cobalt (continued)

Block in periodic table	d-block
Color	Lustrous, metallic, grayish tinge
Classification	Metallic
Melting point	1495 °C
Boiling point	2870 °C
Thermal conductivity	100 W/(m·K) at 298.2 °K
Electrical resistivity	5.60 $\mu\Omega\cdot\text{cm}$ at 20 °C
Electronegativity	1.8
Specific heat	421 J/kg K
Heat of vaporization	375 kJ·mol ⁻¹
Heat of fusion	16.20 kJ·mol ⁻¹
Density of solid	8.86 g/cm ³
Electron configuration	[Ar]3d ⁷ 4s ²
Oxidation states	0, +1, +2, +3, +4, +5