

Cobalt

Cobalt (pronounced /ˈkɒlbɔlt/) is a hard, lustrous, silver-grey metal, a chemical element with symbol Co. It is found in various ores, and is used in the preparation of magnetic, wear-resistant, and high-strength alloys. Its compounds are used in the production of inks, paints, and varnishes.



Characteristics

Cobalt is a silver or gray ferromagnetic metal. Pure cobalt is not found in nature, but compounds of cobalt occur naturally in many forms. Small amounts of it are found in most rocks, soil, water, plants, and animals. It is the element of atomic number 27. The Curie temperature is 1388 K with 1.6~1.7 Bohr magnetons per atom. In nature, it is frequently associated with nickel, and both are characteristic ingredients of meteoric iron. Mammals require small amounts of cobalt which is the basis of vitamin B12. Cobalt-60, an artificially produced radioactive isotope of cobalt, is an important radioactive tracer and cancer-treatment agent. Cobalt has a relative permeability two thirds that of iron. Metallic cobalt commonly presents a mixture of two crystallographic structures hcp and fcc with a transition temperature hcp→fcc of 722 K. Cobalt has a hardness of 5.5 on the Mohs scale of mineral hardness.

Applications

- Alloys, such as
 - o Superalloys, for parts in gas turbine aircraft engines.
 - o Corrosion- and wear-resistant alloys.
 - o High speed steels.
 - o Cemented carbides (also called hard metals) and diamond tools.
- Magnets and magnetic recording media.
 - o Alnico magnets.
 - o Samarium-cobalt magnets.
- Catalysts for the petroleum and chemical industries, e.g. for hydroformylation and oxidation.
- Electroplating because of its appearance, hardness, and resistance to oxidation.
- Drying agents for paints, varnishes, and inks.
- Ground coats for porcelain enamels.
- Pigments (cobalt blue and cobalt green).

- Cobalt blue glass
- Lithium ion battery electrodes.
- Steel-belted radial tires.
- Purification of histidine-tagged fusion proteins in biotechnology applications.