Nickel

Nickel is a chemical element with the symbol **Ni** and atomic number 28. It is a silvery-white lustrous metal with a slight golden tinge. Nickel belongs to the transition metals and is hard and ductile. Pure nickel, powdered to maximize the reactive surface area, shows a significant chemical activity, but larger pieces are slow to react with air under standard conditions because an oxide layer forms on the surface and prevents further corrosion (passivation). Even so, pure native nickel is found in Earth's crust only in tiny amounts, usually in ultramafic rocks,[4][5] and in the interiors of larger nickel–iron meteorites that were not exposed to oxygen when outside Earth's atmosphere.

Meteoric nickel is found in combination with iron, a reflection of the origin of those elements as major end products of supernova nucleosynthesis. An iron–nickel mixture is thought to compose Earth's outer and inner cores.[6]

Use of nickel (as a natural meteoric nickel–iron alloy) has been traced as far back as 3500 BCE. Nickel was first isolated and classified as a chemical element in 1751 by Axel Fredrik Cronstedt, who initially mistook the ore for a copper mineral, in the cobalt mines of Los, Hälsingland, Sweden. The element's name comes from a mischievous sprite of German miner mythology, Nickel (similar to Old Nick), who personified the fact that copper-nickel ores resisted refinement into copper. An economically important source of nickel is the iron ore limonite, which often contains 1–2% nickel. Nickel's other important ore minerals include pentlandite and a mixture of Ni-rich natural silicates known as garnierite. Major production sites include the Sudbury region in Canada (which is thought to be of meteoric origin), New Caledonia in the Pacific, and Norilsk in Russia.

Nickel is slowly oxidized by air at room temperature and is considered corrosion-resistant. Historically, it has been used for plating iron and brass, coating chemistry equipment, and manufacturing certain alloys that retain a high silvery polish, such as German silver. About 9% of world nickel production is still used for corrosion-resistant nickel plating. Nickel-plated objects sometimes provoke nickel allergy. Nickel has been widely used in coins, though its rising price has led to some replacement with cheaper metals in recent years.

Nickel is one of four elements (the others are iron, cobalt, and gadolinium)[7] that are ferromagnetic at approximately room temperature. Alnico permanent magnets based partly on nickel are of intermediate strength between iron-based permanent magnets and rare-earth magnets. The metal is valuable in modern times chiefly in alloys; about 68% of world production is used in stainless steel. A further 10% is used for nickel-based and copper-based alloys, 7% for alloy steels, 3% in foundries, 9% in plating and 4% in other applications, including the fast-growing battery sector.[8] As a compound, nickel has a number of niche chemical manufacturing uses, such as a catalyst for hydrogenation, cathodes for batteries, pigments and metal surface treatments.[9] Nickel is an essential nutrient for some microorganisms and plants that have enzymes with nickel as an active site.