## Stable isotopes of nickel available from ISOFLEX

| Isotope | Z(p) | N(n) | Atomic Mass | Natural Abundance | Enrichment Level | Chemical Form |
|---|---|---|---|---|---|---|
| Ni-58 | 28 | 30 | 57.935348 | 68.08% | ≥99.48% | Metal |
| Ni-58 | 28 | 30 | 57.935348 | 68.08% | ≥98.81% | Oxide |
| Ni-60 | 28 | 32 | 59.930790 | 26.22% | 89.00-99.60% | Metal |
| Ni-60 | 28 | 32 | 59.930790 | 26.22% | 89.00-99.60% | Oxide |
| Ni-61 | 28 | 33 | 60.931060 | 1.14% | 91.00->99.00% | Metal |
| Ni-61 | 28 | 33 | 60.931060 | 1.14% | 91.00->99.00% | Oxide |
| Ni-62 | 28 | 34 | 61.928348 | 3.63% | 98.00-99.28% | Metal |
| Ni-62 | 28 | 34 | 61.928348 | 3.63% | 98.00-99.28% | Oxide |
| Ni-64 | 28 | 36 | 63.927969 | 0.93% | 95.00-99.32% | Metal |
| Ni-64 | 28 | 36 | 63.927969 | 0.93% | 91.00-99.32% | Oxide |


Nickel was discovered in 1751 by Axel Fredrik Cronstedt. Its name is derived from the German word *kupfernickel,* meaning “Devil's copper,” “false copper” or “St. Nicholas's copper.”

A malleable, silvery-white lustrous metal, nickel has a face-centered cubic crystal structure. It is also ductile, ferromagnetic, and readily fabricated by hot and cold working. It takes high polish and demonstrates an excellent resistance to corrosion. It is insoluble in water as well as in ammonia solution, it is slightly soluble in dilute hydrochloric acid, and it is slightly soluble in dilute hydrochloric and sulfuric acids.

Because of nickel's slow rate of oxidation at room temperature, it is considered corrosion-resistant. Historically, this has led to its use for plating metals such as iron and brass; in chemical apparatus; and in certain alloys that retain a high silvery polish, such as German silver. About six percent of world nickel production is still used for corrosion-resistant pure-nickel plating. Nickel was once a common component of coins, but it has largely been replaced by cheaper iron for this purpose, especially since the metal is a skin allergen for some people. It was reintroduced into United Kingdom coinage in 2012 despite objections from dermatologists. Nickel is preeminently an alloy metal, and its chief use is in nickel steels and nickel cast irons, of which there are many varieties. It is also widely used in many other alloys, such as nickel brasses and bronzes, and alloys with copper, chromium, aluminium, lead, cobalt, silver and gold.

As a compound, nickel has a number of niche chemical manufacturing uses, such as a catalyst for hydrogenation. Enzymes of some microorganisms and plants contain nickel as an active site, which makes the metal an essential nutrient for them.

Nickel can be flammable and toxic as either a dust or a fume. It is also classified as a carcinogen.

ISOFLEX
Isotopes for Science, Medicine and Industry

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PO Box 29475 | San Francisco, CA 94129 USA | isoflex.com

## Properties of Nickel

| | |
|---|---|
| **Name** | Nickel |
| **Symbol** | Ni |
| **Atomic number** | 28 |
| **Atomic weight** | 58.693 |
| **Standard state** | Solid at 298 °K |
| **CAS Registry ID** | 7440-02-0 |
| **Group in periodic table** | 10 |
| **Group name** | None |
| **Period in periodic table** | 4 |
| **Block in periodic table** | d-block |
| **Color** | Lustrous metallic silvery tinge |
| **Classification** | Metallic |
| **Melting point** | 1445 °C |
| **Boiling point** | 2730 °C |
| **Thermal conductivity** | 90.9 W/cm/K at 298.2 °K |
| **Electrical resistivity** | 6.97 μΩ·cm at 20 °C |
| **Electronegativity** | 1.8 |
| **Specific heat** | 0.44 kJ/kg K |
| **Heat of vaporization** | 378 $kJ \cdot mol^{-1}$ at 2732 °C |
| **Heat of fusion** | 17.2 $kJ \cdot mol^{-1}$ |
| **Density of solid** | 8.91 $g/cm^3$ at 20 ºC |
| **Electron configuration** | $[Ar]3d^8 4s^2$ |
| **Oxidation states** | 0, +1, +2, +3 |
| **Most common oxidation state** | +2 |
| **Atomic radius** | 1.24 Å |
| **Ionic radius** | $Ni^{2+}$: 0.70 Å |

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