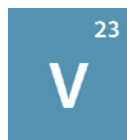


Stable isotopes of vanadium available from ISOFLEX

| Isotope | Z(p) | N(n) | Atomic Mass | Natural Abundance | Enrichment Level | Chemical Form |
|---------|------|------|-------------|-------------------|------------------|---------------|
| V-50 | 23 | 27 | 49.947163 | 0.25% | >55.00% | Oxide |
| V-51 | 23 | 28 | 50.943964 | 99.75% | >99.90% | Oxide |



Vanadium was discovered in 1801 by both Manuel del Rio and Nils Sefström. Its name derives from that of Vanadis, the goddess of beauty in Scandinavian mythology.

Vanadium is a bright, silvery-white, ductile solid with a body-centered cubic structure. It is insoluble in water, dilute sulfuric acid, hydrochloric acid and alkalis. It is resistant to corrosion but soluble in nitric, hydrofluoric and concentrated sulfuric acids. It can act as either a metal or a nonmetal, and it forms a variety of complex compounds and is nontoxic as metal.

Vanadium forms four oxides: the light gray monoxide, VO; the blue-black dioxide, VO₂; the black sesquioxide, V₂O₃; and the orange-red pentoxide, V₂O₅. It also combines with chlorine on heating, producing three known chlorides: the green dichloride, VCl₂; the pink trichloride, VCl₃; and the brown-red tetrachloride, VCl₄.

Among its industrial applications, vanadium is added to steel for high resistance to oxidation and to stabilize carbide. The foil is used for cladding titanium to steel, and a vanadium-gallium alloy is used in making superconductive magnets.

Properties of Vanadium

| | |
|---------------------------------|-----------------------|
| Name | Vanadium |
| Symbol | V |
| Atomic number | 23 |
| Atomic weight | 50.9415 |
| Standard state | Solid at 298 °K |
| CAS Registry ID | 7440-62-2 |
| Group in periodic table | 5 |
| Group name | None |
| Period in periodic table | 4 |
| Block in periodic table | d-block |
| Color | Silvery gray metallic |
| Classification | Metallic |

Properties of Vanadium (continued)

| | |
|-------------------------------|--|
| Melting point | 1910 °C |
| Boiling point | 3380 °C |
| Vaporization point | 3407 °C |
| Thermal conductivity | 30.70 W/(m·K) at 298.2 °K |
| Electrical resistivity | 18.10 $\mu\Omega\cdot\text{cm}$ at 0 °C |
| Electronegativity | 1.6 |
| Specific heat | 0.39 kJ/kg K |
| Heat of vaporization | 453.00 kJ·mol ⁻¹ |
| Heat of fusion | 22.80 kJ·mol ⁻¹ |
| Density of solid | 5.96 g/cm ³ |
| Electron configuration | [Ar] 3d ³ 4s ² |
| Atomic radius | 1.34 Å |
| Ionic radius | V ²⁺ : 0.79 Å, V ³⁺ : 0.64 Å, V ⁴⁺ : 0.58 Å, and V ⁵⁺ : 0.54 Å (coordination number 6) |
| Oxidation states | +2, +3, +4, +5 |