Niobium (Nb) Metal – Physical, Chemical Properties & Medical Applications

Company: Baoji Aulister Import and Export Co., Ltd.

1. Basic Information

Chemical Symbol: Nb
Atomic Number: 41
Atomic Weight: 92.906
Crystal Structure: Body-Centered Cubic (BCC)
Appearance: Silvery-gray metal, ductile and lustrous
Density: 8.57 g/cm^3
Melting Point: 2477 °C
Boiling Point: 4744 °C

2. Physical Properties

Density: 8.57 g/cm^3
Melting Point: 2477 °C
Boiling Point: 4744 °C
Heat of Fusion: 19 kJ/mol
Thermal Conductivity: 53 W/m·K
Electrical Resistivity: 15×10^{-8} Ω·m
Young's Modulus: 105 GPa

Highlights:
- Excellent ductility and formability
- Good weldability and machinability

3. Chemical Properties

- Forms a stable Nb_2O_5 oxide layer in air, providing excellent corrosion resistance
- Highly stable in strong acids and alkalis
- Resistant to most chemical solutions; soluble only in hydrofluoric acid

4. Medical Applications

- Niobium and its alloys exhibit excellent biocompatibility, suitable for long-term implantation
- Non-toxic, does not cause allergic or rejection responses
- Widely used in orthopedic implants, dental implants, artificial joints, and bone fixation devices
- Outstanding corrosion resistance ensures durability and safety of implanted devices

5. Key Characteristics

- High melting point and strength
- Exceptional corrosion resistance
- Good ductility and workability
- Superior biocompatibility for medical use

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