

What is Niobium?

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About Niobium:

- It is a rare, soft, malleable, ductile, gray-white metal.
- Atomic symbol: Nb
- It has a body-centered cubic crystalline structure.
- It must be placed in a protective atmosphere when processed at even moderate temperatures because it tends to react with oxygen, carbon, the halogens, nitrogen, and sulfur.
- Melting point: 2,477 degrees Celsius
- Boiling point: 4,744 degrees Celsius
- In air, an oxide layer forms over it whose color depends on its thickness. Shades of blue, green, and yellow are typical.
- Niobium resists corrosion due to the oxide film.
- The metal starts to oxidize rapidly in the air at 200 degrees Celsius.
- The metal is inert to acids, even to aqua regia at room temperature, but is attacked by hot, concentrated acids, and especially by alkalis and oxidizing agents.
- It is one of the five major refractory metals (metals with very high resistance to heat and wear).
- It has the property of becoming superconducting at low temperatures.
- Sources:

- It is not found free in nature but in minerals such as columbite and tantalite.
 - Commercially, niobium is extracted by first forming the oxide (Nb_2O_5). The oxide is then reduced using carbon or hydrogen.
 - Major Producers: Brazil is the world's largest supplier, with Canada a distant second.
 - Applications:
 - It is used for the production of high-temperature-resistant alloys and special stainless steels.
 - It is also used in its pure form to make superconducting accelerating structures for particle accelerators.
 - Niobium alloys are used in surgical implants because they do not react with human tissue.
 - Niobium carbide is used in cutting tools.
 - Niobium-tin and niobium-titanium alloys are used as wires for superconducting magnets capable of producing exceedingly strong magnetic fields.
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Q1) What are Rare Earth Elements (REE)?

REE are a set of seventeen elements in the periodic table. These include the fifteen lanthanides on the periodic table plus scandium and yttrium. REE are all metals, and the group is often referred to as the "rare earth metals." Although called "rare", they are actually found relatively abundantly in the Earth's crust. These metals are very difficult to mine because it is unusual to find them in concentrations high enough for economical extraction.

Source: [Cabinet approves royalty rates for lithium, niobium, Rare Earth Elements](#)

Source: <https://vajiramandravi.com/current-affairs/niobium/>

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