# Tantalum - Ta

**Chemical properties of tantalum - Health effects fo tantalum - Environmetal effects of tantalum**

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| **Atomic number** | 73 |
| **Atomic mass** | 180.95 $g.mol^{-1}$ |
| **Electronegativity according to Pauling** | 1.5 |
| **Density** | 16.69 $g.cm^{-3}$ at 20°C |
| **Melting point** | 2850 °C |
| **Boiling point** | 6000 °C |
| **Vanderwaals radius** | 0.1425 nm |
| **Ionic radius** | 0.070 nm (+5) |
| **Isotopes** | 4 |
| **Electronic shell** | [ Xe ] $4f^{14}$ $5d^{3}$ $6s^{2}$ |
| **Energy of first ionisation** | 674.2 $kJ.mol^{-1}$ |
| **Discovered by** | Anders Ekeberg in 1802 |

## Tantalum

Tantalum is a shiny, silvery metal which is soft when is pure. It is almost immune to chemical attack at temperatures below 150 C. Tantalum is virtually resistant to corrosion due to an oxide film on its surface.

*Applications*

Tantalum finds use in four areas: high-temperature applications, such as aircraft engines; electrical devices, such as capacitors; sirurgical impants and handling corrosive chemicals. It is rarely used as an alloying agent because it tends to make metals brittle. Tantalum resist corrosion and is almost impervious to chemical attack, for this reason it has been employed in chemical industry, e.g. for heat exchanger in boilers where strong acids are vaporized.

*Tantalum in the environment*

Because tantalum oxide is very insoluble, there is almost no tantalum to be found in natural waters. Few attemps have been made to measure its level in soils, revealing a range from 0.1 to 3 ppm. Only tiny amounts of tantalum are taken by plants: the amount in vegetation rarely exceeds 5 ppb.

The chief tantalum ores are tantalite, which also contains iron, manganese and niobium, and samarskite, which contains seven metals. Another ore which contains tantalum and niobium is pyrochlore. The main mining areas are Thailandia, Australia, Congo, Brazil, Portigal and Canada. The demand of tantalum is about 2300 tonnes a year. No assessment of total reserves of extractable metal have been reliably calculated.

## Health effects of tantalum

May be harmful by inhalation, ingestion or skin absorption. Causes eye & skin irritation. Material is irritating to mucous membranes & upper respiratory tract.

There are no reports of adverse health effects in industrially exposed workers. Massive doses of tantalum given by intratracheal route to rats have produced respiratory tract lesions. In contact with tissue, metallic tantalum is inert.

## Environmental effects of tantalum

Do not allow material to be released to the environment without proper governmental permits.

Isolate runoff of tantalum oxide to prevent environmental pollution.

Sources of periodic table.