= Tantalum =

Tantalum is a chemical element with symbol Ta and atomic number 73 . Previously known as tantalium , its name comes from Tantalus , a villain from Greek mythology . Tantalum is a rare , hard , blue @-@ gray , lustrous transition metal that is highly corrosion @-@ resistant . It is part of the refractory metals group , which are widely used as minor components in alloys . The chemical inertness of tantalum makes it a valuable substance for laboratory equipment and a substitute for platinum . Its main use today is in tantalum capacitors in electronic equipment such as mobile phones , DVD players , video game systems and computers . Tantalum , always together with the chemically similar niobium , occurs in the minerals tantalite , columbite and coltan (a mix of columbite and tantalite) .

= = History = =

Tantalum was discovered in Sweden in 1802 by Anders Ekeberg . One year earlier , Charles Hatchett had discovered the element columbium . In 1809 , the English chemist William Hyde Wollaston compared the oxides derived from both columbium ? columbite , with a density 5 @.@ 918 g / cm3 , and tantalum ? tantalite , with a density 7 @.@ 935 g / cm3 , and concluded that the two oxides , despite their difference in measured density , were identical . He decided to keep the name tantalum . After Friedrich Wöhler confirmed these results , it was thought that columbium and tantalum were the same element . This conclusion was disputed in 1846 by the German chemist Heinrich Rose , who argued that there were two additional elements in the tantalite sample , and he named them after the children of Tantalus : niobium (from Niobe , the goddess of tears) , and pelopium (from Pelops) . The supposed element " pelopium " was later identified as a mixture of tantalum and niobium , and it was found that the niobium was identical to the columbium already discovered in 1801 by Hatchett .

The differences between tantalum and niobium were demonstrated unequivocally in 1864 by Christian Wilhelm Blomstrand , and Henri Etienne Sainte @-@ Claire Deville , as well as by Louis J. Troost , who determined the empirical formulas of some of their compounds in 1865 . Further confirmation came from the Swiss chemist Jean Charles Galissard de Marignac , in 1866 , who proved that there were only two elements . These discoveries did not stop scientists from publishing articles about the so @-@ called ilmenium until 1871 . De Marignac was the first to produce the metallic form of tantalum in 1864 , when he reduced tantalum chloride by heating it in an atmosphere of hydrogen . Early investigators had only been able to produce impure tantalum , and the first relatively pure ductile metal was produced by Werner von Bolton in Charlottenburg in 1903 . Wires made with metallic tantalum were used for light bulb filaments until tungsten replaced it in widespread use .

The name tantalum was derived from the name of the mythological Tantalus , the father of Niobe in Greek mythology . In the story , he had been punished after death by being condemned to stand knee @-@ deep in water with perfect fruit growing above his head , both of which eternally tantalized him . (If he bent to drink the water , it drained below the level he could reach , and if he reached for the fruit , the branches moved out of his grasp .) Ekeberg wrote " This metal I call tantalum ... partly in allusion to its incapacity , when immersed in acid , to absorb any and be saturated . "

For decades , the commercial technology for separating tantalum from niobium involved the fractional crystallization of potassium heptafluorotantalate away from potassium oxypentafluoroniobate monohydrate , a process that was discovered by Jean Charles Galissard de Marignac in 1866 . This method has been supplanted by solvent extraction from fluoride @-@ containing solutions of tantalum .

= = Characteristics = =

= = = Physical properties = = =

Tantalum is dark (blue @-@ gray) , dense , ductile , very hard , easily fabricated , and highly conductive of heat and electricity . The metal is renowned for its resistance to corrosion by acids ; in fact , at temperatures below 150 ° C tantalum is almost completely immune to attack by the normally aggressive aqua regia . It can be dissolved with hydrofluoric acid or acidic solutions containing the fluoride ion and sulfur trioxide , as well as with a solution of potassium hydroxide . Tantalum 's high melting point of 3017 ° C (boiling point 5458 ° C) is exceeded among the elements only by tungsten , rhenium and osmium for metals , and carbon .