

Element Properties

ALUMINUM

Atomic symbol: Al
Atomic weight: 26.981539
Atomic number: 13
Electron configuration: 2-8-3
Oxidation states: +3
State of matter: solid
Heavy metal: low melting
Discovered in 1827 by Friedrich Wöhler
Boils at 2467°C, melts at 660°C

Notes:

Aluminum is a white, malleable, ductile metal, with a somewhat bluish tint. It occurs in a variety of silicate rocks, mainly mica and feldspar. These rocks disintegrate by a process called weathering, in which moisture and carbon dioxide form clay, and ultimately aluminum oxide. Weathering also forms the principal aluminum ore, bauxite. Aluminum also occurs as cryolite. Because of its light weight, resistance to corrosion, and tensile strength, it is excellent for the construction of the structure of a building. Because it can easily be rolled into sheets, much is used for aluminum foil. Aluminum powder is sometimes used in some types of paint.

ANTIMONY

Atomic symbol: Sb
Atomic weight: 121.760
Atomic number: 51
Electron configuration: 2- 8 -18-18-5
Oxidation states: ± 3 , +5
State of matter: solid
Heavy metal: low melting
Discovered in ancient times
Boils at 1380°C, melts at 630.5°C

Notes:

Antimony exists in many allotropic forms, such as a bright silvery white metal, which is hard and brittle. It is a poor conductor of electricity and heat and does not tarnish in air unless the air is moist, in which case it slowly oxides. It shows a rare characteristic of expanding when it solidifies, and thus is good for casting and type metals. Combined with either tin, lead, or copper it forms anti-friction alloys that are used in machinery bearings.

ARGON

Atomic symbol: Ar
Atomic weight: 39.948
Atomic number: 18
Electron configuration: 2-8-8
Oxidation states: 0
State of matter: gas
Noble Gas
Discovered in 1849 by Lord Rayleigh and Sir William Ramsay
Boils at -185.7°C, melts at -189.2°C

Notes:

Argon is a colorless, odorless, tasteless monatomic inert gas. It is obtained from the fractional distillation of liquid air. It is used with nitrogen in filling electric light bulbs, and is used with helium as an inert atmosphere in scientific work.

ARSENIC

Atomic symbol: As
Atomic weight: 74.92160
Atomic number: 33
Electron configuration: 2-8-18-5
Oxidation states: ± 3 , +5
State of matter: solid
Non-metal
Discovered in 1649
Melts at 814°C

Notes:

Arsenic is found in both yellow and gray crystalline forms. Gray arsenic is very brittle and tarnishes in the air. It sublimes under high heat. It is often used as a wood preservative, and because of its high toxicity, an herbicide and pesticide.

BARIUM

Atomic symbol: Ba
Atomic weight: 74.92160
Atomic number: 33
Electron configuration: 2-8-18-8-18-5
Oxidation states: +2
State of matter: solid
Light metal
Discovered in 1808 by Sir Humphry Davy
Boils at 1640°C, melts at 725°C

Notes:

Barium is used in metallurgy, pyrotechnics, radiology and petroleum mining. It has a silvery-

Element Properties

white luster when cut. Like many other light elements, it is very reactive, and it displaces hydrogen in water to form barium hydroxide.

BERYLLIUM

Atomic symbol: Be
Atomic weight: 9.012182
Atomic number: 4
Electron configuration: 2-2
Oxidation states: +2
State of matter: solid
Light metal
Discovered in 1797 by Louis-Nicolas Vauquelin
Boils at 2970°C, melts at 1278°C
Notes:

Beryllium is very rare, its principal ore is beryl, a complex aluminosilicate. When beryl has traces of chromium impurities, it is emerald. When beryl contains traces of iron, it is aquamarine. Beryllium does not occur free in nature, and is primarily used in alloys—especially copper to form non-sparking tools.

BISMUTH

Atomic symbol: Bi
Atomic weight: 208.98040
Atomic number: 83
Electron configuration: 2-8-18-32-18-5
Oxidation states: +3, +5
State of matter: solid
Heavy metal, low melting
Discovered in 1450 by Basil Valentine
Boils at 1560°C, melts at 271.3°C
Notes:

Bismuth shows the greatest opposition of all metals to being magnetized. It has a tin white color with a red tinge. Its alloys are used in fire-sprinkler heads, fire-door release lines, fuses, and other fire-detection and temperature control devices.

BORON

Atomic symbol: B
Atomic weight: 10.811
Atomic number: 5
Electron configuration: 2-3
Oxidation states: +3
State of matter: solid
Non-metal

Discovered in 1808 by Joseph Louis Gay-Lussac and Louis-Jacques Thénard
Boils at 2550°C, melts at 2300°C
Notes:

Boron is relatively rare, and always found combined with oxygen in borates. It is extremely hard and brittle, and is found in two allotropic forms—crystalline and amorphous. Boron is used in flares to give off a green color, as an igniter in rockets, as filaments in aerospace structures, and in silicon semiconductors to improve conductivity. It is also used in nuclear chemistry as a neutron absorber and typically to harden other metals.

CADMIUM

Atomic symbol: Cd
Atomic weight: 112.411
Atomic number: 48
Electron configuration: 2-8-18-18-2
Oxidation states: +2
State of matter: solid
Heavy metal, low melting
Discovered in 1817 by Friedrich Strohmeyer
Boils at 765°C, melts at 321°C
Notes:

Cadmium is a silvery-white metal that is almost as soft as tin. Like tin, it emits a crackling sound when bent. It is extremely rare, and most cadmium is used in electroplating various alloys to help prevent corrosion.

CALCIUM

Atomic symbol: Ca
Atomic weight: 40.078
Atomic number: 20
Electron configuration: 2-8-8-2
Oxidation states: +2
State of matter: solid
Light metal
Discovered in 1808 by Sir Humphry Davy
Boils at 1484°C, melts at 839°C
Notes:

Calcium is just behind aluminum and iron in the list of abundant metals, and makes up 3% of the earth's crust. Calcium carbonate can be found as limestone, marble, chalk, seashells, and calcite. It is found as dolomite when combined with magnesium. Calcium is a good reducing agent

Element Properties

and forms heavy hydroxide coats when in contact with moist air.

CARBON

Atomic symbol: C
Atomic weight: 12.0107
Atomic number: 6
Electron configuration: 2-4
Oxidation states: +2, ±4
State of matter: solid
Non-metal
Discovered in ancient times
Sublimes, melts at 3600°C
Notes:

Carbon is found free as the mineral graphite or as diamonds. It is essential to all animal and plant life. Graphite found in large crystals is mined, or obtained by heating coke and pitch in furnaces at very high temperatures. Volatiles are driven off and large graphite crystals then grown in the furnace. These crystals are made up of sheets of carbon atoms and are black in color. Graphite is used as a lubricant and when molded with clay, forms pencil lead. Graphite is also used as electrodes for batteries and electric arc furnaces.

CERIUM

Atomic symbol: Ce
Atomic weight: 140.116
Atomic number: 58
Electron configuration: 2-8-18-20-8-2
Oxidation states: +3, +4
State of matter: solid
Heavy metal, brittle
Discovered in 1803 by Jöns Jacob Berzelius and Wilhelm Hisinger
Boils at 3257°C, melts at 798°C
Notes:

Cerium is an iron grayish color that is about as soft and ductile as tin. It is used in metallurgy as stabilizers in alloys, in glass as a polishing agent, in ceramics as an opacifying and strengthening agent, and has many other applications.

CESIUM

Atomic symbol: Cs
Atomic weight: 132.9054519
Atomic number: 55
Electron configuration: 2-8-18-18-8-1

Oxidation states: +1
State of matter: solid
Light metal
Discovered in 1860 by Robert Bunsen and Gustav Kirchhoff
Boils at 671°C, melts at 28.5°C
Notes:
Cesium was the first element to be discovered spectroscopically. It is a silvery-white metal that is extremely reactive and becomes a liquid in warmer atmospheres. Cesium causes an explosive reaction when dropped in water. It has also been used for the construction and operation of a type of atomic clock.

CHLORINE

Atomic symbol: Cl
Atomic weight: 35.453
Atomic number: 17
Electron configuration: 2-8-7
Oxidation states: ±1, +5, +7
State of matter: gas
Non-metal
Discovered in 1774 by Carl Wilhelm Scheele
Boils at -35°C, freezes at -101°C
Notes:
Chlorine is very poisonous and not found free in nature. It is the most abundant halogen, found in seawater, rock salt beds, and human gastric juices. Almost all chlorine comes from the electrolysis of brine or a concentrated solution of salt. Chlorine has a sharp, disagreeable odor, which attacks the skin and mucous membranes of the nose and throat. Much chlorine is used to bleach wood pulp for the paper industry, as well as cotton and linen fabrics. Tap water and swimming pool water and both chlorinated to kill bacteria.

CHROMIUM

Atomic symbol: Cr
Atomic weight: 51.9961
Atomic number: 58
Electron configuration: 2-8-13-1
Oxidation states: +2, +3, +6
State of matter: solid
Heavy metal, brittle
Discovered in 1797 by Louis-Nicolas Vauquelin
Boils at 2482°C, melts at 1890°C

Atlantic Equipment Engineers
24 Industrial Ave, Upper Saddle River, NJ
☎ 201.828.9400 ✉ info@micronmetals.com
www.micronmetals.com

Element Properties

Notes:

Chromium is a bluish white, brittle metal that is both hard and corrosion resistant. It is a very important steel alloy metal, and its chief ore is chromite.

COBALT

Atomic symbol: Co

Atomic weight: 58.933195

Atomic number: 27

Electron configuration: 2-8-15-2

Oxidation states: +2, +3

State of matter: solid

Heavy metal, ductile

Discovered in 1735 by Georg Brandt

Boils at 2908°C, melts at 1495°C

Notes:

Cobalt is a gray, hard, magnetic, ductile, somewhat malleable metal that exists in two allotropic forms. Both forms can exist at room temperature. Alloyed with steel, it is used as permanent magnets. Cobalt occurs mainly as smaltite, and cobalt compounds can be used as a catalyst to speed up reactions.

COPPER

Atomic symbol: Cu

Atomic weight: 63.546

Atomic number: 29

Electron configuration: 2-8-18-1

Oxidation states: +1, +2

State of matter: solid

Heavy metal, ductile

Discovered in ancient times

Boils at 2595°C, melts at 1083°C

Notes:

Copper is a reddish-brown, soft, extremely ductile and malleable metal. When exposed to moist air it is coated with green basic carbonate. Its primary ores are chalcocite, chalcopyrite, and cuprite. It is a great conductor of electricity and is commonly found in electric wires. Alloyed with copper and zinc it is known as brass.

DYSPROSIUM

Atomic symbol: Dy

Atomic weight: 162.500

Atomic number: 66

Electron configuration: 2-8-18-28-8-2

Oxidation states: +3

State of matter: solid

Heavy metal, brittle

Discovered in 1886 by P.É. Lecoq de Boisbaudran

Boils at 2335°C, melts at 1409°C

Notes:

A hard and reactive metal, dysprosium has few uses. Its compounds can be used as catalysts in oil refining, and as components in some electronics. Near absolute zero, dysprosium is superconducting.

ERBIUM

Atomic symbol: Er

Atomic weight: 167.259

Atomic number: 68

Electron configuration: 2-8-18-30-8-2

Oxidation states: +3

State of matter: solid

Heavy metal, brittle

Discovered in 1843 by C.G. Mosander

Boils at 2510°C, melts at 1522°C

Notes:

Erbium is a metal with few uses. It is a grayish-silver color and can be used as an infrared absorbing glass and as an activator in some phosphorescent materials.

FLUORINE

Atomic symbol: F

Atomic weight: 18.9984032

Atomic number: 9

Electron configuration: 2-7

Oxidation states: -1

State of matter: gas

Non-metal

Discovered in 1886 by Henri Moissan

Boils at -188°C, freezes at -220°C

Notes:

Fluorine is the most active member of the halogen family, and produces the most stable compounds. It is very poisonous because of its great activity. It is so active that it is not found free in nature, only in a combined state, and is very abundant. It occurs as either the mineral fluorine, or the mineral cryolite. Freon, the refrigerant, contains fluorine. Cryolite, or sodium aluminum fluoride, is

Atlantic Equipment Engineers

24 Industrial Ave, Upper Saddle River, NJ

☎ 201.828.9400 ✉ info@micronmetals.com

www.micronmetals.com

Element Properties

an important flux in the electrolytic production of aluminum metal. Compounds of fluorine and carbon are important because of their heat and fire resistance. Fluorine is found in tap water and toothpaste, which had beneficial effects on teeth. Other fluorine compounds are used as insecticides and wood preservatives.

GADOLINIUM

Atomic symbol: Gd
Atomic weight: 157.25
Atomic number: 64
Electron configuration: 2-8-18-25-9-2
Oxidation states: +3, +4
State of matter: solid
Heavy metal, brittle
Discovered in 1880 by J.C.G de Marignac and P.É Lecoq de Boisbaudran
Boils at 3223°C, melts at 1311°C
Notes:

Gadolinium has a silvery-white color and is moderately ductile. It becomes ferromagnetic below 17°C, and near absolute zero, becomes superconducting. It is used for some electronics, high-temperature refractories, and as an alloying agent.

GALLIUM

Atomic symbol: Ga
Atomic weight: 69.723
Atomic number: 31
Electron configuration: 2-8-18-3
Oxidation states: +3
State of matter: solid
Heavy metal, low melting
Discovered in 1875 by Paul-Émile Lecoq de Boisbaudran
Boils at 2403°C, melts at 29.78°C
Notes:

Gallium liquefies just above room temperature. It is silvery white, and soft enough to be cut with a knife. It may take on a bluish tinge due to superficial oxidation. Gallium expands when solidified and super-cools readily, sustaining its liquid form as low as 0°C. It can be used as a coating for optical mirrors, as a liquid seal in a strongly heated apparatus, and as a substitute for mercury in ultraviolet lamps.

GERMANIUM

Atomic symbol: Ge
Atomic weight: 72.64
Atomic number: 32
Electron configuration: 2-8-18-4
Oxidation states: +2, +4
State of matter: solid
Heavy metal, low melting
Discovered in 1866 by Clements Winkler
Boils at 2830°C, melts at 937.4°C
Notes:

Germanium is an important element used in the manufacture of transistors and photocells. Germanium is never found free and is quite brittle, even though the atoms of a germanium crystal are found in the same arrangement as carbon atoms in a diamond. It also reacts quickly with the halogens to form tetrahalides.

GOLD

Atomic symbol: Au
Atomic weight: 196.966569
Atomic number: 79
Electron configuration: 2-8-18-32-18-1
Oxidation states: +1, +3
State of matter: solid
Heavy metal, ductile
Discovered in ancient times
Boils at 2966°C, melts at 1063°C
Notes:

Gold is dense, precious, and has a bright yellow color. It is a good conductor of heat and electricity and is soft and very malleable and ductile. It is the most malleable metal known to man. An ounce of gold can be pounded into a sheet of 300 square feet. In thin sheets it transmits a green light, and it is often used in printed circuits and semiconductors.

HAFNIUM

Atomic symbol: Hf
Atomic weight: 178.49
Atomic number: 72
Electron configuration: 2-8-18-32-10-2
Oxidation states: +4
State of matter: solid
Heavy metal, ductile
Discovered in 1923 by Dirk Coster and George Charles de Hevesy

Element Properties

Boils at 5400°C, melts at 2150°C

Notes:

Hafnium is a highly lustrous ductile metal of hexagonal crystal structure. Chemically similar to zirconium and thorium, hafnium is used as nuclear control rods.

HELIUM

Atomic symbol: He

Atomic weight: 4.002602

Atomic number: 2

Electron configuration: 2

Oxidation states: 0

State of matter: gas

Noble gas element

Discovered in 1895 by Sir William Ramsay

Boils at -268.9°C, melts at -272.2°C

Notes:

Helium is a colorless, odorless, tasteless, nonflammable, monatomic inert gas. It is obtained from natural gas deposits by liquefying all other constituents and collecting the helium. The percentage obtained from these deposits may range from 1% to 2%. It is sometimes used to fill balloons and airships, along with many other scientific applications.

HOLMIUM

Atomic symbol: Ho

Atomic weight: 164.93032

Atomic number: 67

Electron configuration: 2-8-18-29-8-2

Oxidation states: +3

State of matter: solid

Heavy metal, brittle

Discovered in 1878 by J.L. Soret and M.

Delafontaine

Boils at 2720°C, melts at 140°C

Notes:

Holmium is a rare earth metal of the yttrium group and a member of the lanthanide series. It is silver in color made of hexagonal close packed crystals. It is one of the most paramagnetic sources known.

HYDROGEN

Atomic symbol: H

Atomic weight: 1.00794

Atomic number: 1

Electron configuration: 1

Oxidation states: ± 1

State of matter: gas

Alkali metal

Discovered in 1790 by Henry Cavendish

Boils at -252.8°C, melts at -259.14°C

Notes:

Hydrogen is a colorless, odorless, tasteless gas that can be flammable or explosive when mixed with air, oxygen, and chlorine. Hydrogen is not very reactive at room temperature, but at higher temperatures it burns vigorously and often explosively in air or oxygen to form water. In the presence of a catalyst and under pressure, hydrogen will combine with vegetable oils to form solid fats used as shortening, in a process known as hydrogenation. This process is extensively used in the refining of oil products to increase the yields of gasoline. It is also commonly used to make ammonia and many other chemical substances. Other uses are to fuel rockets and in fuel cells to generate electricity.

INDIUM

Atomic symbol: In

Atomic weight: 114.818

Atomic number: 49

Electron configuration: 2-8-18-18-3

Oxidation states: +3

State of matter: solid

Heavy metal, low melting

Discovered in 1863 by Ferdinand Reich and

Theodor Richter

Boils at 2080°C, melts at 156.61°C

Notes:

Indium is about as rare as silver. It is a soft, white metal with bluish tinge. Like tin, it emits a screeching sound when bent. It is used in bearing alloys, as a thin film on moving surfaces made from other metals, in dental alloys, and in semiconductor research.

IODINE

Atomic symbol: I

Atomic weight: 126.90447

Atomic number: 53

Electron configuration: 2-8-18-18-7

Oxidation states: ± 1 , +5, +7

State of matter: solid

Atlantic Equipment Engineers
24 Industrial Ave, Upper Saddle River, NJ
☎ 201.828.9400 ✉ info@micronmetals.com
www.micronmetals.com

Element Properties

Non-metal

Discovered in 1811 by Bernard Courtois

Boils at 184°C, melts at 113.5°C

Notes:

Iodine is bluish-black in color with a metallic luster, characteristic odor, and sharp acrid taste. At room temperature, iodine sublimates into a violet vapor that irritates the eyes, nose, and throat. It dissolves in alcohol and partially in water to make a brown colored solution.

IRIDIUM

Atomic symbol: Ir

Atomic weight: 192.217

Atomic number: 77

Electron configuration: 2-8-18-32-15-2

Oxidation states: +3, +4

State of matter: solid

Heavy metal, ductile

Discovered in 1804 by Smithson Tennant

Boils at 4527°C, melts at 2410°C

Notes:

Very dense and rare, iridium is silvery white in color. It's main use is in the form of platinum alloys.

IRON

Atomic symbol: Fe

Atomic weight: 55.845

Atomic number: 26

Electron configuration: 2-8-14-2

Oxidation states: +2, +3

State of matter: solid

Heavy metal, ductile

Discovered in ancient times

Boils at 3000°C, melts at 1535°C

Notes:

Iron is a soft, ductile, malleable silver metal. It is somewhat magnetic, only holding its magnetism after hardening. Its main ores are hematite, magnetite, and pyrites. Iron can be used as a nutritional supplement, and can be alloyed with other elements to make steels.

LANTHANUM

Atomic symbol: La

Atomic weight: 138.9047

Atomic number: 57

Electron configuration: 2-8-18-18-9-2

Oxidation states: +3

State of matter: solid

Heavy metal, brittle

Discovered in 1839 by Carl Gustaf Mosander

Boils at 3454°C, melts at 920°C

Notes:

Lanthanum is a ductile, malleable, silvery white rare earth metal. It forms alloys with several other metals, and has three allotropic forms. At 268°C Lanthanum becomes a superconductor.

LEAD

Atomic symbol: Pb

Atomic weight: 207.2

Atomic number: 82

Electron configuration: 2-8-18-32-18-4

Oxidation states: +2, +4

State of matter: solid

Heavy metal, low melting

Discovered in ancient times

Boils at 1744°C, melts at 327.5°C

Notes:

Lead is a soft silvery white metal. It is very malleable, ductile and dense. When freshly cut, lead is highly lustrous, but tarnishes easily when exposed to air. It can be easily melted, cast, rolled and extruded. Lead is used in bullets and in blocking x-rays and other electromagnetic short-wave radiation. It is also used in vulcanized rubber.

LITHIUM

Atomic symbol: Li

Atomic weight: 6.941

Atomic number: 3

Electron configuration: 2-1

Oxidation states: +1

State of matter: solid

Light metal

Discovered in 1817 by Johan August Arfwedson

Boils at 1342°C, melts at 180.5°C

Notes:

Lithium is a silvery white metal that turns yellow when exposed to moist air. When heated sufficiently, it emits light radiation that is red in color. Lithium is a good electron source in photoelectric cells and cyclotrons.

Element Properties

LUTETIUM

Atomic symbol: Lu
Atomic weight: 174.967
Atomic number: 71
Electron configuration: 2-8-18-32-9-2
Oxidation states: +3
State of matter: solid
Heavy metal, brittle
Discovered in 1907-08 by Carl Auer von Welsbach and Georges Urbain
Boils at 3315°C, melts at 1656°C

Notes:

Lutetium is a silvery white metal, and the hardest and most dense rare earth metal. The radioactive isotope has been used to compare the age of meteorites and the age of earth.

MAGNESIUM

Atomic symbol: Mg
Atomic weight: 24.3050
Atomic number: 12
Electron configuration: 2-8-2
Oxidation states: +2
State of matter: solid
Light metal
Discovered in 1808 by Sir Humphry Davy
Boils at 1090°C, melts at 649°C

Notes:

Magnesium is one of the most common elements in the earth's crust. It burns with a brilliant white color, and slowly oxidizes in moist air. It is an important structural metal, often used in either pure or alloyed form with aluminum in the construction of aircraft. It is also frequently used in the production of objects requiring a light weight. Powdered magnesium is sometimes used in place of aluminum in the thermite reaction.

MANGANESE

Atomic symbol: Mn
Atomic weight: 54.938045
Atomic number: 25
Electron configuration: 2-8-13-1
Oxidation states: +2, +3, +4, +6, +7
State of matter: solid
Heavy metal, brittle
Discovered in 1774 by Carl Wilhelm Scheele
Boils at 2097°C, melts at 1244°C

Notes:

Manganese is one of the most widely distributed, abundant elements. It is a gray-white, hard, brittle metal which is essential to the process of steel making. Nearly all aluminum and magnesium alloys contain manganese for improved corrosion resistance.

MERCURY

Atomic symbol: Hg
Atomic weight: 200.59
Atomic number: 80
Electron configuration: 2-8-18-32-18-2
Oxidation states: +1, +2
State of matter: solid
Heavy metal, low melting
Discovered in ancient times
Boils at 356.9°C, melts at -38.87°C

Notes:

Mercury is the only elemental metal that is liquid at room temperature. It is silvery white in color, and solid mercury is malleable and can be cut with a knife. Electricity discharged through mercury vapor produces a bluish glow with a lot of ultraviolet light- a property that is used often in ultraviolet, fluorescent, and mercury-vapor lamps. Mercury is toxic, and can be lethal if the vapors are breathed, come into contact with skin, or ingested as a soluble compound.

MOLYBDENUM

Atomic symbol: Mo
Atomic weight: 95.94
Atomic number: 42
Electron configuration: 2-8-18-13-1
Oxidation states: +6
State of matter: solid
Heavy metal, ductile
Discovered in 1782 by Peter Jacob Hjelm
Boils at 5560°C, melts at 2610°C

Notes:

Molybdenum is a dark gray or black powder with metallic luster, and is not found free in nature. Its properties resemble that of tungsten. The major use of this element is in strengthening and protecting against corrosion as an alloy.

Element Properties

NEODYMIUM

Atomic symbol: Nd
Atomic weight: 144.24
Atomic number: 60
Electron configuration: 2-8-18-22-8-2
Oxidation states: +3
State of matter: solid
Heavy metal, brittle
Discovered in 1885 by Carl Auer von Welsbach
Boils at 3127°C, melts at 1010°C
Notes:

Used in special alloys and glasses, neodymium is a silvery-white color that turns yellow when exposed to air. It is used in electronics and the manufacture of steel in alloys—especially in cigarette lighter flints. In ceramics it is used as a glaze and to color glass. The crude oxide is used to counteract the green color in iron in glass, and the more pure compound is used in the manufacture of purple glass.

NEON

Atomic symbol: Ne
Atomic weight: 20.1797
Atomic number: 10
Electron configuration: 2-8
Oxidation states: 0
State of matter: gas
Noble gas
Discovered in 1898 by Sir William Ramsay and Morris W. Travers
Boils at -246°C, melts at -248.7°C

Notes:
Neon is obtained from the fractional distillation of liquid air. Its main use is in neon signs. Neon signs are made of helium, neon, argon, or mercury at different pressures. These are then put into different colored glass, which gives off different colors.

NICKEL

Atomic symbol: Ni
Atomic weight: 58.6934
Atomic number: 28
Electron configuration: 2-8-16-2
Oxidation states: +2, +3
State of matter: solid
Heavy metal, ductile

Discovered in 1751 by Baron Axle Fredrik Cronsted

Boils at 2732°C, melts at 1453°C

Notes:

Nickel is a white ferromagnetic metal that resists tarnish. It's one of the most important steel alloys. When divided into tiny pieces, it becomes an excellent catalyst, especially in the hydrogenation of fats and oils. Nickel dioxide was used as the cathode in Edison's storage battery. Nickel compounds have become important in electroplating and various other things.

NIOBIUM

Atomic symbol: Nb
Atomic weight: 92.90638
Atomic number: 41
Electron configuration: 2-8-18-12-1
Oxidation states: +3, +5
State of matter: solid
Heavy metal, brittle
Discovered in 1801 by Charles Hatchett
Boils at 4927°C, melts at 2468°C
Notes:

Niobium is a steel gray lustrous metal that is malleable and ductile when in pure form. It is used in alloys, tools, dyes, and superconductive magnets. Niobium is quite corrosion resistant but needs protection from oxidation at temperatures in excess of 400°C.

NITROGEN

Atomic symbol: N
Atomic weight: 14.00674
Atomic number: 7
Electron configuration: 2-5
Oxidation states: ±1, ±2, ±3, +4, +5
State of matter: gas
Non-metal

Discovered in 1772 by Daniel Rutherford
Boils at -195.8°C, melts at -209.86°C

Notes:

Nitrogen is an odorless gas, usually obtained by the fractional distillation of liquid air. The process of including nitrogen to combine chemically with other substances is known as the fixation of nitrogen. A lot of nitrogen is used in the fixation process, which produces the raw materials for

Element Properties

fertilizers, explosives, drugs, and dyes. It is used in rooms that store explosives, and in light bulbs to lengthen the life of the filament by preventing its oxidation.

OSMIUM

Atomic symbol: Os
Atomic weight: 190.23
Atomic number: 76
Electron configuration: 2-8-18-32-14-2
Oxidation states: +3, +4
State of matter: solid
Heavy metal, ductile
Discovered in 1804 by Smithson Tennant
Boils at 5000°C, melts at 3000°C
Notes:

Osmium is a bluish white lustrous metal that is hard and brittle. It was believed to be the densest element; however, data shows it is slightly less dense than iridium.

PALLADIUM

Atomic symbol: Pd
Atomic weight: 106.42
Atomic number: 46
Electron configuration: 2-8-18-18-0
Oxidation states: +2, +4
State of matter: solid
Heavy metal, ductile
Discovered in 1803 by William Hyde Wollaston
Boils at 2927°C, melts at 1552°C
Notes:

Palladium is a silver, white metal that also occurs as a black powder and as spongy masses that can be compressed to a compact mass. It is extremely ductile and often used as a catalyst. Small amounts of palladium alloyed with gold produces the best white gold. Its chief use is for electrical contacts on telephone equipment.

PHOSPHORUS

Atomic symbol: P
Atomic weight: 30.973762
Atomic number: 15
Electron configuration: 2-8-5
Oxidation states: ± 3 , +5
State of matter: solid
Non-metal
Discovered in 1669 by Hennig Brand

Boils at 280°C, melts at 44.1°C

Notes:

Phosphorus exists in three main allotropic forms—white, black, and red. It is too active to be found in nature, and most of it is combined with oxygen. Its principal ores are phosphorite and apatite. White phosphorous is waxy, soft and translucent, and becomes brittle at 5.5°C. It is crystalline, insoluble in water, and extremely poisonous.

PLATINUM

Atomic symbol: Pt
Atomic weight: 195.084
Atomic number: 78
Electron configuration: 2-8-18-32-16-2
Oxidation states: +2, +4
State of matter: solid
Heavy metal, ductile
Discovered in 1554 by Julius Caesar Scalinger
Boils at 3827°C, melts at 1769°C
Notes:

Platinum is a silver-gray, lustrous, malleable and ductile metal. It is very heavy and very precious. It also has good resistance to corrosion and chemical attack. It is used as crucibles, electrodes, and dishes in the lab for heating up materials.

POTASSIUM

Atomic symbol: K
Atomic weight: 39.0983
Atomic number: 19
Electron configuration: 2-8-8-1
Oxidation states: +2, +4
State of matter: solid
Light metal
Discovered in 1807 by Sir Humphry Davy
Boils at 760°C, melts at 63.3°C
Notes:

Potassium is a soft, silvery-white alkali metal that is brittle at low temperatures and tarnishes when exposed to air. It is a major essential element for plant growth, and extremely reactive. Potassium is an excellent conductor of heat and electricity. When sufficiently heated, it emits a violet color and bursts into flame when in contact with water. Alloyed with sodium it forms an important heat transfer medium in nuclear power plants.

Element Properties

PRASEODYMIUM

Atomic symbol: Pr
Atomic weight: 140.90765
Atomic number: 59
Electron configuration: 2-8-18-21-8-2
Oxidation states: +3
State of matter: solid
Heavy metal, brittle
Discovered in 1885 by Carl Auer von Welsbach
Boils at 3212°C, melts at 931°C

Notes:

Praseodymium is a silver, moderately soft, ductile, and malleable metal. Small amounts of praseodymium are used in a rare-earth alloy used to make cigarette lighter flints and high strength low-creep magnesium alloys used for jet-engine parts.

RADIUM

Atomic symbol: Ra
Atomic weight: (226.0254)
Atomic number: 91
Electron configuration: 2-8-18-32-18-8-2
Oxidation states: +4, +5
State of matter: solid
Light metal
Discovered in 1898 by Pierre and Marie Curie and assistant G. Bémont
Boils at approx. 1737°C, melts at 700°C

Notes:

Radium is a brilliant white metal that blackens when exposed to air. It is used in cancer therapy and luminescent paint. Concentrated radium glows in the dark and gives off heat.

RADON

Atomic symbol: Rn
Atomic weight: (222.0176)
Atomic number: 86
Electron configuration: 2-8-18-32-18-8
Oxidation states: +0
State of matter: gas
Noble gas
Discovered in 1900 by R.B. Owens and E. Rutherford
Boils at -62°C, melts at -71°C

Notes:

Radon is a colorless, odorless, tasteless, inert, monatomic gas. It is a radioactive element that

gives off a soft yellow to orange red light when in a solid state. It is often used to initiate chemical reactions.

RHENIUM

Atomic symbol: Re
Atomic weight: 186.207
Atomic number: 75
Electron configuration: 2-8-18-32-13-12
Oxidation states: +4, +6, +7
State of matter: solid
Heavy metal- ductile
Discovered in 1925 by Ida & Walter Noddack and Otto Carl Berg
Boils at 5627°C, melts at 3180°C

Notes:

Rhenium is a black to silver-gray metal. It is one of the densest elements. The metal and its alloys are used in fountain pen points, high temperature thermocouples, catalysts, electrical contact points, instrument bearing points, and in electrical components.

RHODIUM

Atomic symbol: Rh
Atomic weight: 102.90550
Atomic number: 45
Electron configuration: 2-8-18-16-1
Oxidation states: 3
State of matter: solid
Heavy metal, ductile
Discovered in 1803 by William Hyde Wollaston
Boils at 3272°C, melts at 1966°C

Notes:

Rhodium is a silvery white, soft, ductile, malleable metal. Its primary use is as an alloying agent for hardening platinum. It is not corroded or tarnished in the atmosphere at room temperature, and it is highly resisted to attack by acids.

RUBIDIUM

Atomic symbol: Rb
Atomic weight: 85.4678
Atomic number: 37
Electron configuration: 2-8-18-8-1
Oxidation states: +1
State of matter: solid
Light metal

Element Properties

Discovered in 1861 by Robert Bunsen and Gustav Kirchhoff

Boils at 688°C, melts at 38.9°C

Notes:

Rubidium is the second most reactive metal—it is lustrous and silver-white in color. It rapidly tarnishes when exposed to air. Rubidium can spontaneously ignite in the presence of air and reacts violently with water.

RUTHENIUM

Atomic symbol: Ru

Atomic weight: 101.7

Atomic number: 44

Electron configuration: 2-8-18-15-1

Oxidation states: +3

State of matter: solid

Heavy metal, ductile

Discovered in 1844 by Karl Karlovich Klaus

Boils at 3900°C, melts at 2250°C

Notes:

Ruthenium is a lustrous silver-gray, hard metal that does not react with acids and is not oxidized by air in the cold. It looks similar to platinum but is harder, more brittle, and much more rare. Upon heating it combines readily with oxygen. It is useful in hardening platinum and palladium as an alloy. Ruthenium is found among the fission outputs of uranium and plutonium in nuclear reactors. Ruthenium has four allotropic forms. The metal doesn't tarnish in air at normal temperatures and resists attack by many strong acids.

SCANDIUM

Atomic symbol: Sc

Atomic weight: 44.955910

Atomic number: 21

Electron configuration: 2-8-9-2

Oxidation states: +3

State of matter: solid

Heavy metal, brittle

Discovered in 1879 by Lars Fredrick Nilson

Boils at 2832°C, melts at 1539°C

Notes:

Scandium is a rare earth metal widely dispersed in nature. It has very few uses, and its low density and high melting point suggest applications as an alloying agent for devices requiring lightweight

metals. Scandium emits strong gamma radiation with an 85-day half-life. The chemistry of this element is similar to aluminum and titanium.

SELENIUM

Atomic symbol: Se

Atomic weight: 78.96

Atomic number: 34

Electron configuration: 2-8-18-6

Oxidation states: +4, +6, -2

State of matter: solid

Non-metal

Discovered in 1818 by Jöns Jacob Berzelius

Boils at 685°C, melts at 50 or 217°C

Notes:

Selenium exists in many allotropic forms—amorphous, crystalline or red, and gray or metallic. It occurs in both amorphous and gray states, which is why it has two melting points. It is very similar in both chemical and physical properties to sulfur and tellurium. It can convert light directly into electricity and thus makes a good element for solar cells. Selenium can also convert AC power to DC, and therefore makes a good rectifier.

SILICON

Atomic symbol: Si

Atomic weight: 28.0855

Atomic number: 14

Electron configuration: 2-8-14

Oxidation states: +2, ±4

State of matter: solid

Non-metal

Discovered in 1818 by Jöns Jacob Berzelius

Boils at 2355°C, melts at 1415°C

Notes:

Silicon is black-gray and a poor conductor of electricity. It is never found free always combined with oxygen. The two principal combinations of silicon are silicon dioxide, which is found as flint, quartz, sand, sandstone, agate and amethyst and silicate rocks. These rocks range from garnet to asbestos.

SILVER

Atomic symbol: Ag

Atomic weight: 107.8682

Atomic number: 47

Electron configuration: 2-8-18-18-1

Element Properties

Oxidation states: 1

State of matter: solid

Heavy metal, ductile

Discovered in ancient times

Boils at 2212°C, melts at 960.8°C

Notes:

Silver is a white, precious metal, more malleable and ductile than any other metal except for gold. It is the best conductor of heat and electricity. It is very rare, and the largest percentage of silver is found in lead sulfide. Silver bearing ores are called argentiferous. The biggest demand for silver comes from photography because silver is used in film.

SODIUM

Atomic symbol: Na

Atomic weight: 22.989768

Atomic number: 11

Electron configuration: 2-8-1

Oxidation states: +1

State of matter: solid

Light metal

Discovered in 1807 by Sir Humphry Davy

Boils at 883°C, melts at 97.8°C

Notes:

Sodium is a light silvery-white metal, lustrous when freshly cut, but tarnishes when exposed to air, becoming dull and gray. It is too active to be found in nature, and reacts vigorously with water, exploding upon contact with a large chunk. Most metallic sodium is used in the manufacture of tetraethyl lead, an alternative for gas. Other uses are the manufacture of a variety of organic chemicals, and the reduction of titanium metal. It is also a good electron source for photoelectric cells and cyclotrons.

STRONTIUM

Atomic symbol: Sr

Atomic weight: 87.62

Atomic number: 38

Electron configuration: 2-8-18-8-2

Oxidation states: +2

State of matter: solid

Light metal

Discovered in 1808 by Sir Humphrey Davy

Boils at 1384°C, melts at 769°C

Notes:

Strontium is a silvery white metal that rapidly becomes yellow when exposed to air. To prevent this oxidation it is stored in kerosene. It is ductile and malleable and can easily conduct current. The heat radioactive strontium emits due to radioactive decay can be used to generate small amounts of electricity. When finely divided, it spontaneously ignites in the presence of air.

SULFUR

Atomic symbol: S

Atomic weight: 32.066

Atomic number: 16

Electron configuration: 2-8-6

Oxidation states: +4, +6, -2

State of matter: solid

Non-metal

Discovered in ancient times

Boils at 444.7°C, melts at 112.8°C

Notes:

Because sulfur is the least reactive non-metal at room temperature, much occurs free in nature. Chemically combined, sulfur is found as sulfide ores, sulfate ores, in petroleum, and in organic matter. Sulfur has three allotropic forms, rhombic sulfur- stable at room temperature, monoclinic sulfur- which is stable between 95.6°C and its melting point, and amorphous sulfur- a plastic rubbery form. All forms slowly revert back to the rhombic form if allowed to stand at room temperature. Its uses are the making of sulfur dioxide, sulfuric acid, matches, black gunpowder, insecticides, and sulfa drugs. Much is used in vulcanizing rubber.

TANTALUM

Atomic symbol: Ta

Atomic weight: 180.9479

Atomic number: 73

Electron configuration: 2-8-18-32-11-2

Oxidation states: +5

State of matter: solid

Heavy metal, ductile

Discovered in 1802 by Anders Gustaf Ekeberg

Boils at 5425°C, melts at 2996°C

Notes:

Element Properties

Tantalum is a silver-gray, very hard, malleable, ductile metal. Its properties are similar to that of the element niobium. Some uses for this rare metal are electrolytic capacitors and corrosion resistant chemical equipment.

TELLURIUM

Atomic symbol: Te
Atomic weight: 127.60
Atomic number: 52
Electron configuration: 2-8-18-18-6
Oxidation states: +4, +6, -2
State of matter: solid
Non-metal
Discovered in 1782 by Franz Joseph Müller von Reichenstein
Boils at 989.9°C, melts at 449.8°C

Notes:

Tellurium is a semi-metallic element that physically and chemically resembles selenium. Tellurium exists in two forms: a silvery-white brittle, crystalline solid that has a metallic luster, and an amorphous powder that is dark gray to brown. It burns in air and oxygen with a blue-green flame.

TERBIUM

Atomic symbol: Tb
Atomic weight: 158.92534
Atomic number: 65
Electron configuration: 2-8-18-27-8-2
Oxidation states: +3
State of matter: solid
Heavy metal, brittle
Discovered in 1843 by Carl Gustaf Mossander
Boils at 3041°C, melts at 1360°C

Notes:

Terbium has a silver-white color.

THALLIUM

Atomic symbol: Tl
Atomic weight: 204.3833
Atomic number: 81
Electron configuration: 2-8-18-32-18-3
Oxidation states: +1, +3
State of matter: solid
Heavy metal, low melting
Discovered in 1861 by sir William Crookes
Boils at 1457°C, melts at 303.5°C

Notes:

Thallium is a bluish-white, very soft, inelastic, easily fusible, heavy metal. It oxidizes superficially in air, becoming dull. It is poisonous and has few uses. There are two known crystalline forms.

THORIUM

Atomic symbol: Th
Atomic weight: 232.0381
Atomic number: 90
Electron configuration: 2-8-18-32-18-10-2
Oxidation states: +4
State of matter: solid
Heavy metal, ductile
Discovered in 1828 by Jöns Jacob Berzelius
Boils at about 4000°C, melts at about 1700°C

Notes:

Thorium is a grayish-white, lustrous, radioactive metal that is somewhat ductile and malleable. When exposed to air it turns gray or black.

TIN

Atomic symbol: Sn
Atomic weight: 118.710
Atomic number: 50
Electron configuration: 2-8-18-18-4
Oxidation states: ++2, +4
State of matter: solid
Heavy metal, low-melting
Discovered in ancient times
Boils at 2260°C, melts at 231.88°C

Notes:

Tin is silver white, lustrous, soft, very malleable, and ductile metal. It is slightly tenacious, easily powdered, and comes in the form of bars, foil, powder, shot, etc. It is most widely used for solder, metal used for bearings and plating steel cans for food containers. It is nontoxic, and exists in two allotropic forms—white and gray tin. Gray tin changes to white tin when heated to 55.8°F and more rapidly at 212°F. The reverse happens at low temperatures.

TITANIUM

Atomic symbol: Ti
Atomic weight: 47.88
Atomic number: 22
Electron configuration: 2-8-10-2

Element Properties

Oxidation states: +2, +3, +4

State of matter: solid

Heavy metal, brittle

Discovered in 1795 by Martain Heinrich Klaproth

Boils at 3260°C, melts at 1675°C

Notes:

Titanium is a dark gray lustrous metal that constitutes 0.6% of the Earth's crust. It is very light and strong, and fairly corrosion resistant. Its use as a structural metal is increasing. It is extremely reactive with both oxygen and nitrogen. Its principal uses are as special gears and tools.

TUNGSTEN

Atomic symbol: W

Atomic weight: 183.85

Atomic number: 74

Electron configuration: 2-818-32-12-2

Oxidation states: +6

State of matter: solid

Heavy metal, ductile

Discovered in 1783 by Juan José and Fausto

Elhuyar

Boils at 5927°C, melts at 3410°C

Notes:

Tungsten is a steel gray to tin-white metal. It is used in steel because of its strength. It has a second name of Wolfram, and has a nickel white to grayish luster.

Uranium

Atomic symbol: U

Atomic weight: 238.0289

Atomic number: 92

Electron configuration: 2-8-18-32-12-2

Oxidation states: +3, +4, +5, +6

State of matter: solid

Heavy metal, ductile

Discovered in 1789 by Martin Heinrich Klaproth

Boils at 3818°C, melts at 3410°C

Notes:

Uranium is a silver-white, lustrous, radioactive, malleable, ductile metal. It is the heaviest naturally occurring element. Uranium is an important nuclear fuel. One pound of uranium renders about the same amount of energy as three million pounds of coal. Uranium-238, after being absorbed by neutrons and undergoing

negative beta decay, becomes the element plutonium.

VANADIUM

Atomic symbol: V

Atomic weight: 50.9415

Atomic number: 23

Electron configuration: 2-8-11-2

Oxidation states: +2, +3, +4, +5

State of matter: solid

Heavy metal, brittle

Discovered in 1801 by Andrès Manuel de Rio

Boils at 3000°C, melts at 1890°C

Notes:

Vanadium is a light gray or white lustrous powder, it does not tarnish in air and not affected by moisture at ordinary temperatures. It is quite rare. When alloyed with steel and iron, high strength structural steel and wear resistant cast iron can be produced.

XENON

Atomic symbol: Xe

Atomic weight: 131.29

Atomic number: 54

Electron configuration: 2-8-18-18-8

Oxidation states: +0

State of matter: gas

Noble gas

Discovered in 1898 by Sir William Ramsay and

Morris W. Travers

Boils at -107.1°C, melts at -111.9°C

Notes:

Xenon is a colorless, odorless, tasteless relatively inert, monatomic gas. It is heavy and extremely rare. It is inert, meaning it does not react with other elements and has an octet atomic structure. Xenon flash lamps are used to activate ruby lasers. It is the first noble gas to combine with other elements, which was discovered in 1962 by Neil Bartlet, which was previously thought to be impossible.

YTTERBIUM

Atomic symbol: Yb

Atomic weight: 173.04

Atomic number: 70

Electron configuration: 2-8-18-32-8-2

Oxidation states: +2, +3

State of matter: solid

Heavy metal, brittle

Atlantic Equipment Engineers

24 Industrial Ave, Upper Saddle River, NJ

☎ 201.828.9400 ✉ info@micronmetals.com

www.micronmetals.com

Element Properties

Discovered in 1878 by J.C.G de Marignac

Boils at 1193°C, melts at 824°C

Notes:

Ytterbium has few commercial uses, it is ductile and white in color, and has two allotropic forms.

YTTRIUM

Atomic symbol: Y

Atomic weight: 88.90585

Atomic number: 39

Electron configuration: 2-8-18-9-2

Oxidation states: +3

State of matter: solid

Heavy metal, brittle

Discovered in 1794 by Johan Gadolin

Boils at 3337°C, melts at 1529°C

Notes:

Yttrium is an iron gray, lustrous, and darkens when exposed to light. It is used for red phosphorous in televisions. It is ductile and fairly reactive. Yttrium is the first rare earth element discovered, and can occur as a byproduct of nuclear fission. It is an important element in the high tech superconductor yttrium barium copper oxide.

ZINC

Atomic symbol: Zn

Atomic weight: 65.39

Atomic number: 30

Electron configuration: 2-8-18-2

Oxidation states: +2

State of matter: solid

Heavy metal, low melting

Discovered in the 13th century

Boils at 907°C, melts at 419°C

Notes:

Zinc is a bluish white lustrous metal, stable in dry air. On exposure to moist air, it becomes covered with a white coating of basic carbonate. It is used extensively in galvanized iron. It is also used as an ingredient in alloys such as bronze, brass, Babbitt metal, German silver, and special alloys for die casting, household utensils, building materials and automotive equipment.

ZIRCONIUM

Atomic symbol: Zr

Atomic weight: 91.224

Atomic number: 40

Electron configuration: 2-8-18-10-2

Oxidation states: +4

State of matter: solid

Heavy metal, brittle

Discovered in 1824 by Jöns Jacob Berzelius

Boils at 3578°C, melts at 1852°C

Notes:

Zirconium is a bluish-black amorphous powder, or a grayish-white lustrous metal. It is characteristically found in s-type stars. Pure zirconium is a valuable structural material for atomic reactors because of its low nuclear cross-section and high corrosion and heat resistance. It is also used as an ingredient of priming or explosive mixtures, flashlight powders, a deoxidizer in metallurgy, and in flash bulbs.