1
Fuel
H
1.008
Hydrogen

Used as rocket fuel and in hydrogen cars and fusion
Hydrogen is the lightest element and makes up 73.9% of the universe's visible matter

2
Balloons
He
4.0026
Helium

Used in balloons and as inert atmosphere for
Helium has the lowest boiling point at 4.22K and becomes superfluid with zero viscosity

3
Batteries
Li
7.0
Lithium

Used in rechargeable batteries and mood
Lithium is the lightest metal that can float on water while violently reacting with it

4
Alloys
Be
9.0122
Beryllium

Used in aerospace alloys and nuclear reactors
Beryllium is 6 times stronger than steel but weighs only 25% as much, yet highly toxic

5
Ceramics
B
10.81
Boron

Used in ceramics, glass, and as neutron absorber
Boron is the hardest element but essential for plants and harder than most metals when pure

6
Steel
C
12.011
Carbon

Essential for all life and used in steel production
Carbon is highest for 2 hundred million compounds, melting point of 3823K, and over 500 allotropes

7
Fertilizer
N
14.007
Nitrogen

Used in fertilizers and as liquid nitrogen coolant
Nitrogen makes up 78% of Earth's atmosphere but is completely inert at room temperature

8
Breathing
O
15.999
Oxygen

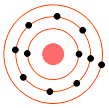
Essential for breathing and used in steel
Oxygen is Earth's most abundant element at 46% of crust mass and paramagnetic both gas and liquid

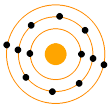
9
Toothpaste
F
18.998
Fluorine

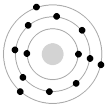
Used in toothpaste and water fluoridation
Fluorine is the most reactive element that can corrode glass and concrete on contact

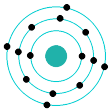
10
Lighting
Ne
20.18
Neon

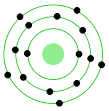
Used in neon signs and as inert gas in lighting
Neon produces the most intense light discharge creating the classic orange-red glow

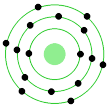
11
Salt
Na
22.99
Sodium

Used in table salt and street lighting
Sodium lamps are so efficient that one can outshine 100 incandescent bulbs combined

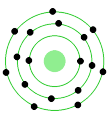
12
Flares
Mg
24.305
Magnesium

Used in flares, alloys, and as dietary supplement
Magnesium burns with 3000K white light so bright it can cause permanent eye damage

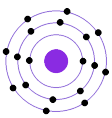
13
Cans
Al
26.982
Aluminum

Used in beverage cans, foil, and aircraft parts
Aluminum was worth more than gold until 1890s before efficient electrolytic extraction

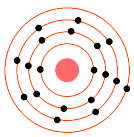
14
Chips
Si
28.085
Silicon

Used in computer chips, glass, and construction
Silicon makes up 27% of Earth's crust and enabled the entire computer age revolution

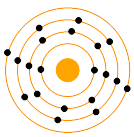
15
Matches
P
30.974
Phosphorus

Used in fertilizers, matches, and DNA
Phosphorus colored white glows green in darkness but is essential for life despite being toxic

16
Gunpowder
S
32.07
Sulfur

Used in rubber vulcanization and
Sulfur is second for forming 30+ allotropes and creates yellow crystals in volcanic regions

17
Disinfectant
Cl
35.45
Chlorine

Used in pool disinfection and PVC production
Chlorine has the highest electron affinity (349 kJ/mol) and was WWI's first poison gas

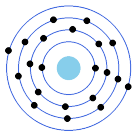
18
Inert
Ar
39.9
Argon

Used in welding and incandescent light bulbs
Argon was Earth's first isolated noble gas and makes up nearly 1% of our atmosphere

19
Soap
K
39.098
Potassium

Used in fertilizers and soap production
Potassium is so violently reactive it ignites spontaneously and must be stored in oil

20
Bones
Ca
40.08
Calcium

Used in concrete production and car
Calcium phosphate comprises 70% of bone mass giving vertebrates their rigid structure

21 Aerospace **Sc** 44.956

Scandium

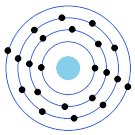


Used in aerospace alloys and baseball bats

Scandium is paradoxically rarer than many 'rare earth' elements despite being lighter

22 Implants **Ti** 47.867

Titanium

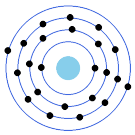


Used in aircraft, medical implants, and paints

Titanium has the highest strength-to-weight ratio of all metals at 45% lighter than steel

23 Pigments **V** 50.942

Vanadium

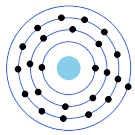


Used in steel alloys and as catalyst

Vanadium can exist in 5 different oxidation states creating rainbow-colored solutions

24 Plating **Cr** 51.996

Chromium

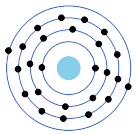


Used in stainless steel and chrome plating

Chromium gives rubies red and emeralds green color while being the hardest pure metal

25 Electrodes **Mn** 54.938

Manganese

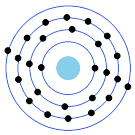


Used in steel production and battery electrodes

Manganese nodules carpet vast ocean floors containing trillions of tons of the element

26 Construction **Fe** 55.84

Iron

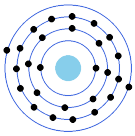


Used in construction, tools, and magnets

Iron comprises 32.1% of Earth's total mass with most concentrated in the molten core

27 Glass **Co** 58.933

Cobalt

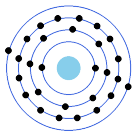


Used in magnets, catalysts, and blue glass

Cobalt blue glass has been prized for 4000 years and retains color at 1000°C heat

28 Currency **Ni** 58.693

Nickel

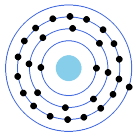


Used in coins, batteries, and stainless steel

Nickel-62 has the highest binding energy per nucleon at 8.8 MeV, making it the most stable isotope

29 Wiring **Cu** 63.55

Copper

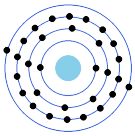


Used in electrical wiring and plumbing pipes

Copper naturally kills bacteria and viruses within hours making it self-sterilizing

30 Galvanizing **Zn** 65.4

Zinc

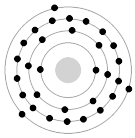


Used in galvanizing steel and brass alloys

Zinc deficiency causes loss of taste/smell and affects 2 billion people worldwide

31 LEDs **Ga** 69.723

Gallium

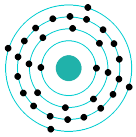


Used in semiconductors and LEDs

Gallium melts at 29.8°C in hand temperature but boils at 2400°C with the widest liquid range

32 Transistors **Ge** 72.63

Germanium

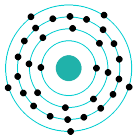


Used in fiber optics and transistors

Germanium was predicted by Mendeleev 15 years before discovery with exact properties

33 Preservatives **As** 74.922

Arsenic

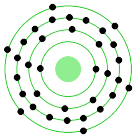


Used in wood preservatives and

Arsenic has been humanity's poison of choice for over 2000 years earning 'King of Poisons'

34 Photoconductors **Se** 78.97

Selenium

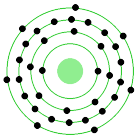


Used in photoconductors and glass coloring

Selenium deficiency causes fatal white muscle disease but it is toxic in excess amounts

35 Antiseptic **Br** 79.9

Bromine

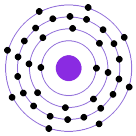


Used as antiseptic and in flame retardants

Bromine is the only liquid non-metal but it evaporates quickly from 1 mL to 3 liters of toxic gas

36 Windows **Kr** 83.8

Krypton

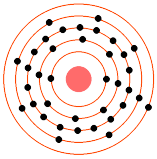


Used in energy-efficient windows and lasers

Krypton was used in ultra-bright airport runway lighting systems and old camera flashes

37 Clocks **Rb** 85.468

Rubidium

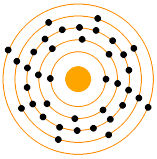


Used in atomic clocks and medical tracers

Rubidium ignites spontaneously in air and was used in early vacuum tubes for electronics

38 Fireworks **Sr** 87.62

Strontium

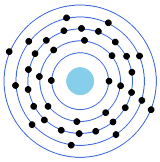


Used in fireworks and flares for red color

Strontium-90 fallout creates the brilliant red in fireworks but is dangerously radioactive

39 Cladding **Y** 88.906

Yttrium

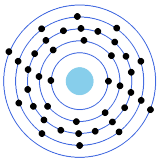


Used in lasers and as cancer treatment

Yttrium with barium carbon oxide or YBCO makes the highest temperature superconductors at

40 Ceramics **Zr** 91.22

Zirconium

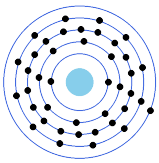


Used in nuclear reactors and ceramics

Zirconium is virtually immune to corrosion up to 1270K and used in nuclear reactors

41 Superalloys **Nb** 92.906

Niobium

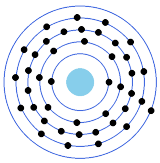


Used in jet engines and MRI scanners

Niobium is superconducting below 9K and was originally called columbium in America

42 Lubricants **Mo** 95.95

Molybdenum

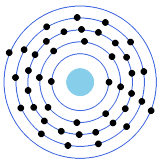


Used in steel alloys and high-temp lubricants

Molybdenum has the 6th highest melting point at 2896K and strengthens steel dramatically

43 Isotope **Tc** [96.906]

Technetium

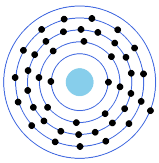


Used in medical imaging and as tracer

Technetium was the first artificially created element filling Mendeleev's predicted gap

44 Electronics **Ru** 101.1

Ruthenium

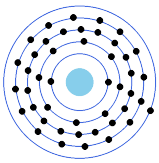


Used in electrical contacts and hard disks

Ruthenium is the scarcest platinum group metal

45 Jewelry **Rh** 102.91

Rhodium

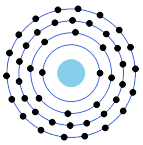


Used in catalytic converters and jewelry

Rhodium is the most expensive precious metal at about $250 per gram, rarer than gold

46 Dentistry **Pd** 106.42

Palladium

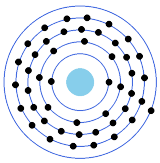


Used in catalytic converters and dentistry

Palladium can absorb 900 times its volume in hydrogen like a metallic sponge

47 Photography **Ag** 107.868

Silver

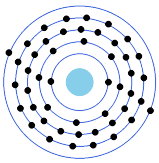


Used in jewelry, mirrors, and photography

Silver has the highest electrical conductivity of all elements at room temperature

48 Panels **Cd** 112.41

Cadmium

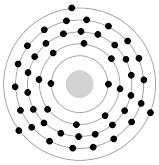


Used in batteries, pigments, and solar

Cadmium red paint was banned after causing severe poisoning in artists for decades

49 Displays **In** 114.818

Indium

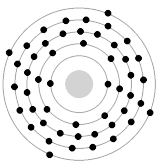


Used in semiconductors and LCD screens

Indium is softer than lead and can be scratched with a fingernail despite being metal

50 Soldering **Sn** 118.71

Tin

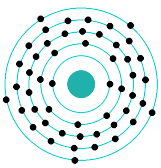


Used in solder, cans, and bronze alloys

Tin produces a distinctive 'tin cry' scream when bent due to crystal twinning

51 Flame-retardant **Sb** 121.76

Antimony

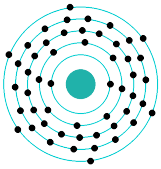


Used in flame retardants and semiconductors

Antimony makes Fluoroantimonic acid, the strongest, 10 quintillion times stronger than sulfuric acid

52 Solar **Te** 127.6

Tellurium

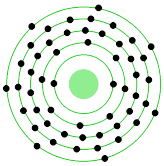


Used in solar panels and rubber vulcanization

Tellurium-128 has the longest known half-life at 2.2 septillion years - nearly stable

53 Medicine **I** 126.905

Iodine

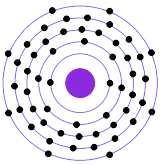


Used as antiseptic and in photography

Iodine deficiency affects 2 billion people causing goiter and developmental disability

54 Anesthesia **Xe** 131.29

Xenon

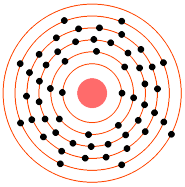


Used in ion drives and medical anesthesia

Xenon is the rarest gas with 90 grams per million kilograms of air

55 Timekeeping **Cs** 132.91

Cesium

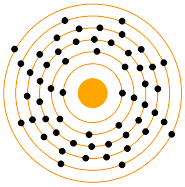


Used in atomic clocks and oil drilling

Caesium is the softest metal and its hydroxide is the strongest base ever discovered

56 Imaging **Ba** 137.33

Barium

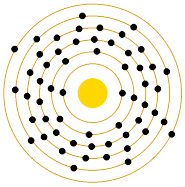


Used in X-ray imaging and drilling fluids

Barium compounds create brilliant green fireworks but are lethally toxic if ingested

57 Lighters **La** 138.91

Lanthanum

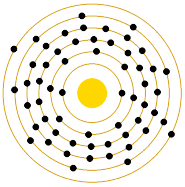


Used in lighter flints and camera lenses

Lanthanum remained undiscovered in 'pure' cerium samples for 83 years of confusion

58 Polishing **Ce** 140.12

Cerium

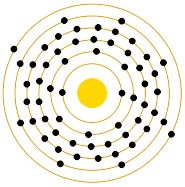


Used in catalysts and glass polishing

Cerium is the most abundant rare earth comprising 0.006% of Earth's crust mass

59 Engines **Pr** 140.91

Praseodymium

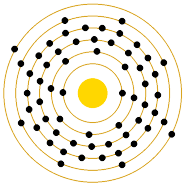


Used in aircraft engines and magnets

Praseodymium means 'green twin' creating emerald-green compounds and yellow metal

60 Speakers **Nd** 144.24

Neodymium

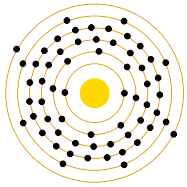


Used in powerful permanent magnets

Neodymium creates the strongest permanent magnets lifting 1000 times their own weight

61 Luminous **Pm** [144.91]

Promethium

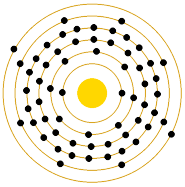


Used in nuclear batteries and research

Promethium is the only radioactive rare earth and powers space missions for decades

62 Reactors **Sm** 150.4

Samarium

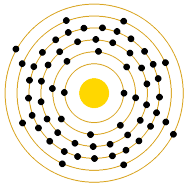


Used in magnets and cancer treatment

Samarium magnets work at 350°C and have the highest neutron absorption cross-section

63 Phosphors **Eu** 151.96

Europium

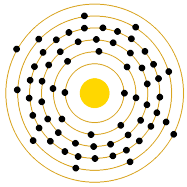


Used in red phosphors for TV screens

Europium is the softest rare earth and the most reactive, tarnishing rapidly in air

64 Contrast **Gd** 157.25

Gadolinium

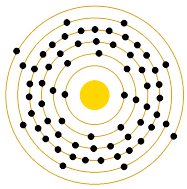


Used in MRI contrast agents and neutron

Gadolinium has the highest magnetic moment, capturing thermal neutrons like a magnet

65 Green **Tb** 158.93

Terbium

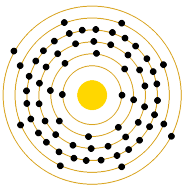


Used in green phosphors and magnets

Terbium shows strong magnetostrictive strength, changing shape powerfully under

66 Lasers **Dy** 162.5

Dysprosium

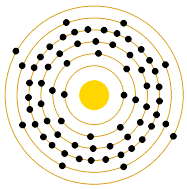


Used in lasers and hard disk drives

Dysprosium becomes strongly magnetic only below -180°C with highest magnetic strength

67 Devices **Ho** 164.93

Holmium

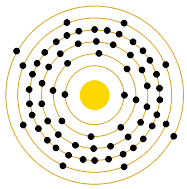


Used in magnets and medical devices

Holmium has the strongest magnetic field at 4.5 Tesla saturation, 90,000 times than

68 Fiber **Er** 167.26

Erbium

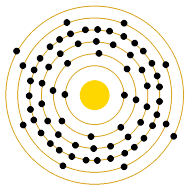


Used in fiber optic amplifiers and lasers

Erbium amplifies light in fiber optic cables enabling global internet communications

69 Sources **Tm** 168.93

Thulium

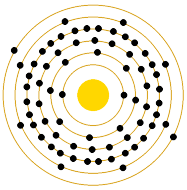


Used in X-ray sources and portable equipment

Thulium is the least abundant rare earth metal and possibly the most useless natural element

70 Sensors **Yb** 173.05

Ytterbium

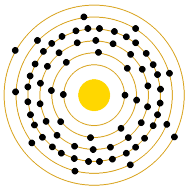


Used in lasers and stress gauges

Ytterbium expands by 26% during its phase transition, a powerful structural change among metals

71 Catalysis **Lu** 174.97

Lutetium

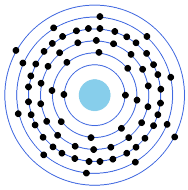


Used in catalysts and medical imaging

Lutetium is the hardest, densest rare earth and was the last lanthanide discovered

72 Cutting **Hf** 178.49

Hafnium

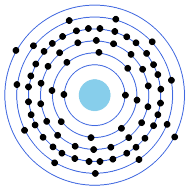


Used in tungsten carbide and nuclear reactors

Hafnium has nearly identical properties to zirconium due to lanthanide contraction

73 Capacitors **Ta** 180.95

Tantalum

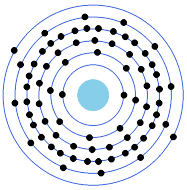


Used in electronics and surgical instruments

Tantalum is virtually immune to all acids except hydrofluoric at high temperatures

74 Filaments **W** 183.84

Tungsten

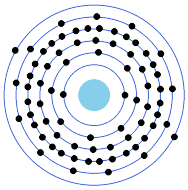


Used in light bulb filaments and X-ray tubes

Tungsten has the highest melting point at 3695K and tensile strength of all metals

75 Coatings **Re** 186.21

Rhenium

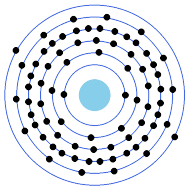


Used in catalysts and jet engine parts

Rhenium has the highest boiling point at 5869K and is the last stable element found

76 Contacts **Os** 190.2

Osmium

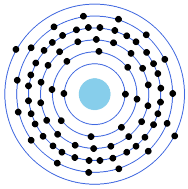


Used in fountain pen tips and electrical contacts

Osmium is the densest element at 22.6 g/cubic centimeter - a cubic centimeter weighs as a golf ball

77 Plugs **Ir** 192.22

Iridium

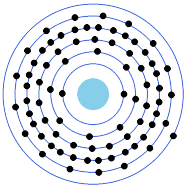


Used in spark plugs and cancer treatment

Iridium is the most corrosion-resistant element and 2nd densest element at 22.42

78 Refining **Pt** 195.08

Platinum

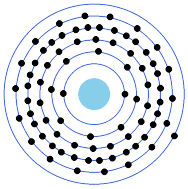


Used in jewelry, catalysts, and electronics

Platinum is 30 times rarer than gold and catalyzes 20% of all chemical processes

79 Bullion **Au** 196.97

Gold

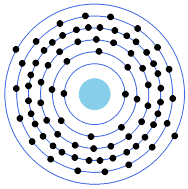


Used in jewelry, electronics, and dentistry

Gold is so chemically inert it never tarnishes and has been treasured for 6000 years

80 Switches **Hg** 200.59

Mercury

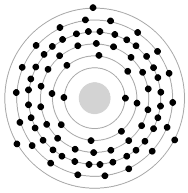


Used in thermometers, dental fillings, and

Mercury is the only metal liquid at room temperature and expands linearly with heat

81 Screens **Tl** 204.38

Thallium

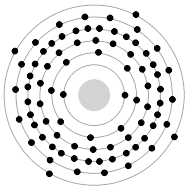


Used in electronics and medical imaging

Thallium is 10 times more toxic than lead and was once sold as rat poison

82 Radiation **Pb** 207

Lead

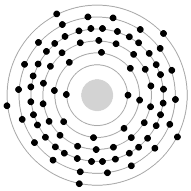


Used in car batteries, bullets, and radiation

Lead's toxicity may have contributed to the fall of Rome through poisoned water pipes

83 Cosmetics **Bi** 208.98

Bismuth

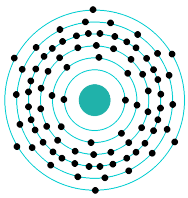


Used in medicine and cosmetics

Bismuth forms spectacular rainbow-colored oxide crystals and expands when solidifying

84 Antistatic **Po** [208.98]

Polonium

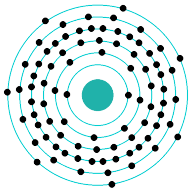


Used in antistatic devices and neutron sources

Polonium is 250 billion times more toxic than cyanide and the most radioactive natural element

85 Therapy **At** [209.99]

Astatine

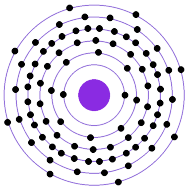


Used in medicine and scientific research

Astatine is Earth's rarest element with less than 1 gram existing at any time

86 Tracing **Rn** [222.02]

Radon

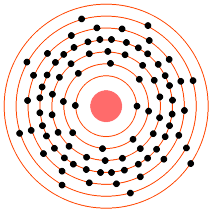


Used as tracer gas and in dating

Radon gas is the only radioactive gas that causes 21,000 lung cancer deaths annually in the US

87 Experiments **Fr** [223.02]

Francium

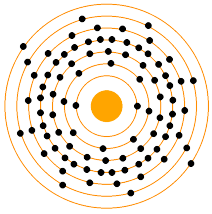


Used in research and atomic clocks

Francium has the largest atomic radii, shortest half-life of 22 min at $7 per nanogram and the most

88 Treatment **Ra** [226.03]

Radium

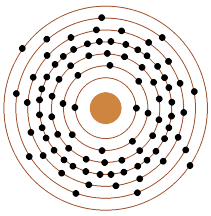


Used in cancer treatment and luminous paints

Radium was worth more than gold and glowed green due to intense radioactive decay

89 Radiotherapy **Ac** [227.03]

Actinium

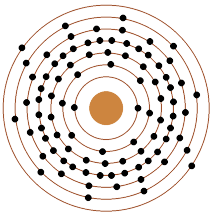


Used in cancer treatment and neutron sources

Actinium glows blue-white in darkness and is 150 times more radioactive than radium

90 Mantles **Th** [232.04]

Thorium

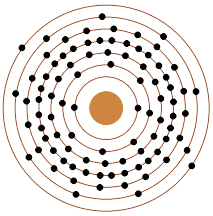


Used in gas mantles and nuclear fuel

Thorium is 3 times more abundant than uranium and could power civilization for millennia

91 Dating **Pa** [231.04]

Protactinium

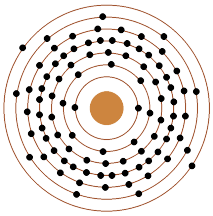


Used in nuclear research and dating

Protactinium is one of the rarest elements, with only about 125 grams found in nature

92 Weapons **U** [238.03]

Uranium

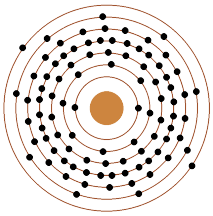


Used in nuclear fuel and weapons

Uranium-235's 1 gram releases energy equal to burning 3 tons of coal completely

93 Detectors **Np** [237.05]

Neptunium

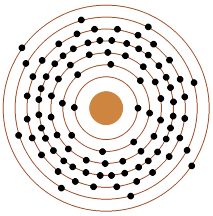


Used in smoke detectors and research

Neptunium was the first transuranium element created and is named after planet Neptune

94 Power **Pu** [244.06]

Plutonium

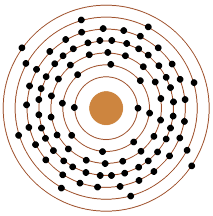


Used in nuclear weapons and power

Plutonium feels warm due to radioactive decay and is illegal for civilians to possess

95 Alarms **Am** [243.06]

Americium

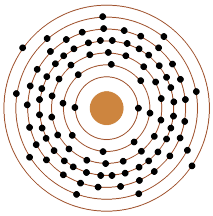


Used in smoke detectors and neutron sources

Americium is the only man-made element available to the public in stores

96 Missions **Cm** [247.07]

Curium

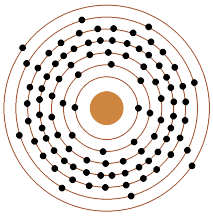


Used in research and space missions

Curium glows purple-blue in darkness due to intense radioactivity and rapid decay

97 Cyclotron **Bk** [247.07]

Berkelium

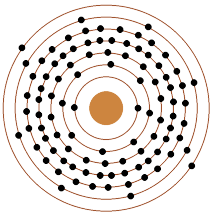


Used in research and as electron source

Berkelium was first synthesized at UC Berkeley using the 60-inch cyclotron in 1949

98 Starters **Cf** [251.08]

Californium

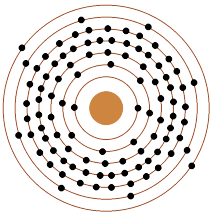


Used in research and neutron sources

Californium costs $27 million per gram and is used to start nuclear reactors

99 Research **Es** [252.08]

Einsteinium

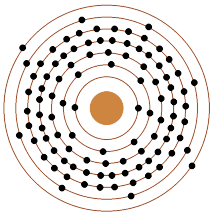


Used in research and medical applications

Einsteinium was discovered in hydrogen bomb debris from the first H-bomb test in 1952

100 Research **Fm** [257.1]

Fermium

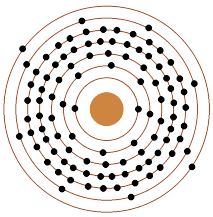


Used in research only

Fermium was found in H-bomb fallout like einsteinium and named after physicist Enrico Fermi

101 Research **Md** [258.1]

Mendelevium

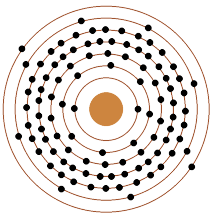


Used in research only

Mendelevium was the first element created one atom at a time using particle accelerators

102 Research **No** [259.1]

Nobelium

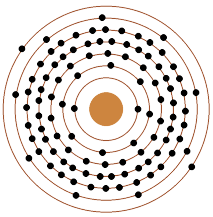


Used in research only

Nobelium discovery was disputed for decades with Soviet, American, and Swedish claims

103 Research **Lr** [266.12]

Lawrencium

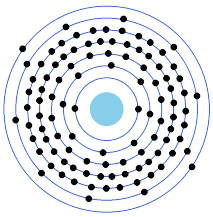


Used in research only

Lawrencium completes the actinide series and was synthesized at Berkeley in 1961

104 Research **Rf** [267.12]

Rutherfordium

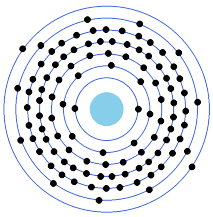


Used in research only

Rutherfordium was claimed by both Soviet and American teams causing naming disputes

105 Research **Db** [268.13]

Dubnium

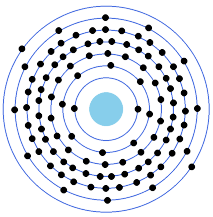


Used in research only

Dubnium was named after Dubna, Russia where Soviet scientists first claimed discovery

106 Research **Sg** [269.13]

Seaborgium

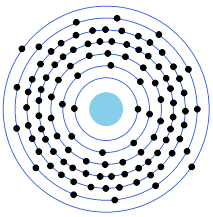


Used in research only

Seaborgium honors Glenn Seaborg, the only living person to have an element named for them

107 Research **Bh** [270.13]

Bohrium

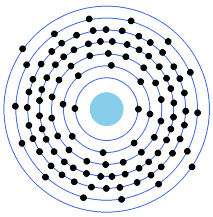


Used in research only

Bohrium was named after Niels Bohr who developed quantum mechanical model of atoms

108 Research **Hs** [269.13]

Hassium

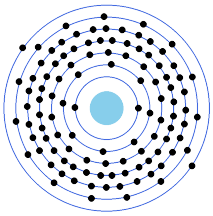


Used in research only

Hassium was named after Hesse, Germany where GSI laboratory first synthesized it

109 Research **Mt** [277.15]

Meitnerium

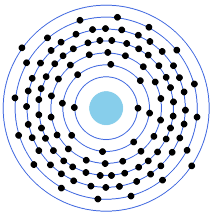


Used in research only

Meitnerium honors Lise Meitner who theorised nuclear fission

110 Research **Ds** [282.17]

Darmstadtium

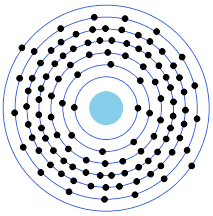


Used in research only

Darmstadtium was named after Darmstadt, the latest city to receive elemental recognition

111 Research **Rg** [282.17]

Roentgenium

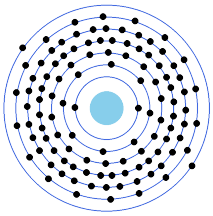


Used in research only

Roentgenium honors X-ray discoverer Wilhelm Röntgen though it doesn't emit X-rays

112 Research **Cn** [286.18]

Copernicium

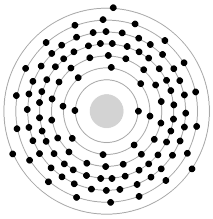


Used in research only

Copernicium was named after Copernicus who placed the Sun at the solar system's center

113 Research **Nh** [286.18]

Nihonium

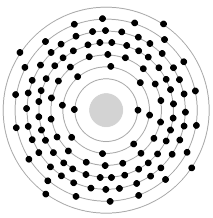


Used in research only

Nihonium was named after Japan (Nihon) where RIKEN laboratory first synthesized it in 2004

114 Research **Fl** [290.19]

Flerovium

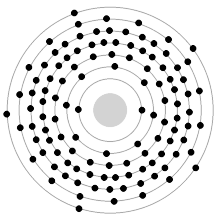


Used in research only

Flerovium honors Soviet physicist Flyorov who founded heavy element research in USSR

115 Research **Mc** [290.2]

Moscovium

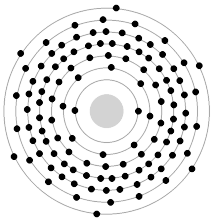


Used in research only

Moscovium was named after Moscow where Russian scientists contributed to superheavy research

116 Research **Lv** [293.21]

Livermorium

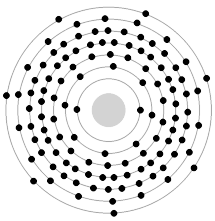


Used in research only

Livermorium honors Lawrence Livermore Laboratory's contributions to superheavy

117 Research **Ts** [294.21]

Tennessine

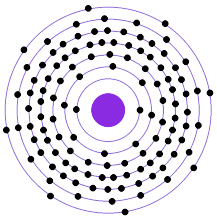


Used in research only

Tennessine was named after Tennessee, discovered most recently in 2010 at Oak Ridge

118 Research **Og** [295.22]

Oganesson



Used in research only

Oganesson is the heaviest and most radioactive element with the shortest 0.7ms half-life