Periodic Table of the Elements

vertex42

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Atomic Number
Symbol
Name
*Density [Note]
*Melting Point (°C)
Atomic radius (pm)[Note]

†Atomic Weight
†Ground-State Level
*Electronegativity (Pauling)
†Ionization Energy (eV)
*Boiling Point (°C)
Crystal Structure [Note]
†Electron Configuration
Possible Oxidation States [Note]

GROUP 1 IA	2 IIA	3 IIIB	4 IVB	5 VB	6 VIB	7 VIIB	8 VIII	9 VIII	10 VIII	11 IB	12 IIB	13 IIIA	14 IVA	15 VA	16 VIA	17 VIIA	18 VIIIA
1 1.00794 $^2S_{1/2}$ 2.2 **H** Hydrogen 0.0899 13.5984 -259.14 -252.87 (v) 37 - $1s^1$ +1,-1																	2 4.002602 $^1S_0$ - **He** Helium 0.1785 24.5874 - -268.93 (v) 32 - $1s^2$ 0
2	3 6.941 $^2S_{1/2}$ 0.98 **Li** Lithium 0.535 5.3917 180.54 1342 (m) 152 BCC [He] $2s^1$ +1	4 9.012182 $^1S_0$ 1.57 **Be** Beryllium 1.848 9.3227 1287 2470 (m) 112 HCP [He] $2s^2$ +2										5 10.811 $^2P°_{1/2}$ 2.04 **B** Boron 2.46 8.2980 2075 4000 (v) 82 rhom. [He] $2s^2 2p^1$ +3	6 12.0107 $^3P_0$ 2.55 **C** Carbon 2.26 11.2603 3550 4027 (v) 77 hex [He] $2s^2 2p^2$ +2,4,-4	7 14.0067 $^4S°_{3/2}$ 3.04 **N** Nitrogen 1.251 14.5341 -210.1 -195.79 (v) 75 - [He] $2s^2 2p^3$ +2,3,4,5,-2,-3	8 15.9994 $^3P_2$ 3.44 **O** Oxygen 1.429 13.6181 -218.3 -182.9 (v) 73 - [He] $2s^2 2p^4$ -2	9 18.9984032 $^2P°_{3/2}$ 3.98 **F** Fluorine 1.696 17.4228 -219.6 -188.12 (v) 71 - [He] $2s^2 2p^5$ -1	10 20.1797 $^1S_0$ - **Ne** Neon 0.9 21.5645 -248.59 -246.08 (v) 69 - [He] $2s^2 2p^6$ 0
3	11 22.989770 $^2S_{1/2}$ 0.93 **Na** Sodium 0.968 5.1391 97.72 883 (m) 186 BCC [Ne] $3s^1$ +1	12 24.3050 $^1S_0$ 1.31 **Mg** Magnesium 1.738 7.6462 650 1090 (m) 160 HCP [Ne] $3s^2$ +2										13 26.981538 $^2P°_{1/2}$ 1.61 **Al** Aluminum 2.7 5.9858 660.32 2519 (m) 143 FCC [Ne] $3s^2 3p^1$ +3	14 28.0855 $^3P_0$ 1.90 **Si** Silicon 2.33 8.1517 1414 2900 (v) 111 cubic [Ne] $3s^2 3p^2$ +2,4,-4	15 30.97361 $^4S°_{3/2}$ 2.19 **P** Phosphorus 1.823 10.4867 44.2 280.5 (v) 106 § [Ne] $3s^2 3p^3$ +3,4,5,-3	16 32.065 $^3P_2$ 2.58 **S** Sulfur 1.96 10.3600 115.21 444.72 (v) 102 FCO [Ne] $3s^2 3p^4$ +2,4,6,-2	17 35.453 $^2P°_{3/2}$ 3.16 **Cl** Chlorine 3.214 12.9676 -101.5 -34.04 (v) 99 - [Ne] $3s^2 3p^5$ +1,3,5,7,-1	18 39.948 $^1S_0$ - **Ar** Argon 1.784 15.7596 -189.3 -185.8 (v) 97 - [Ne] $3s^2 3p^6$ 0
4	19 39.0983 $^2S_{1/2}$ 0.82 **K** Potassium 0.856 4.3407 63.38 759 (m) 227 BCC [Ar] $4s^1$ +1	20 40.078 $^1S_0$ 1.00 **Ca** Calcium 1.55 6.1132 842 1484 (m) 197 FCC [Ar] $4s^2$ +2	21 44.955910 $^2D_{3/2}$ 1.36 **Sc** Scandium 2.985 6.5615 1541 2830 (m) 162 HCP [Ar] $3d^1 4s^2$ +3	22 47.867 $^3F_2$ 1.54 **Ti** Titanium 4.507 6.8281 1668 3287 (m) 147 HCP [Ar] $3d^2 4s^2$ +2,3,4	23 50.9415 $^4F_{3/2}$ 1.63 **V** Vanadium 6.11 6.7462 1910 3407 (m) 134 BCC [Ar] $3d^3 4s^2$ +2,3,4,5	24 51.9961 $^7S_3$ 1.66 **Cr** Chromium 7.14 6.7665 1907 2671 (m) 128 BCC [Ar] $3d^5 4s^1$ +2,3,6	25 54.938049 $^6S_{5/2}$ 1.55 **Mn** Manganese 7.47 7.4340 1246 2061 (m) 127 §cubic [Ar] $3d^5 4s^2$ +2,3,4,6,7	26 55.845 $^5D_4$ 1.83 **Fe** Iron 7.874 7.9024 1538 2861 (m) 126 BCC [Ar] $3d^6 4s^2$ +2,3	27 58.933200 $^4F_{9/2}$ 1.88 **Co** Cobalt 8.9 7.8810 1495 2927 (m) 125 HCP [Ar] $3d^7 4s^2$ +2,3	28 58.6934 $^3F_4$ 1.91 **Ni** Nickel 8.908 7.6398 1455 2913 (m) 124 FCC [Ar] $3d^8 4s^2$ +2,3	29 63.546 $^2S_{1/2}$ 1.90 **Cu** Copper 8.92 7.7264 1084.62 2927 (m) 128 FCC [Ar] $3d^{10} 4s^1$ +1,2	30 65.409 $^1S_0$ 1.65 **Zn** Zinc 7.14 9.3942 419.53 907 (m) 134 §hex [Ar] $3d^{10} 4s^2$ +2	31 69.723 $^2P°_{1/2}$ 1.81 **Ga** Gallium 5.904 5.9993 29.76 2204 (m) 135 §BCO [Ar] $3d^{10} 4s^2 4p^1$ +3	32 72.64 $^3P_0$ 2.01 **Ge** Germanium 5.323 7.8994 938.3 2820 (v) 122 §cubic [Ar] $3d^{10} 4s^2 4p^2$ +2,4	33 74.92160 $^4S°_{3/2}$ 2.18 **As** Arsenic 5.727 9.7886 817 614 (v) 119 rhom. [Ar] $3d^{10} 4s^2 4p^3$ +3,5,-3	34 78.96 $^3P_2$ 2.55 **Se** Selenium 4.819 9.7524 221 685 (v) 116 §hex [Ar] $3d^{10} 4s^2 4p^4$ +2,4,6,-2	35 79.904 $^2P°_{3/2}$ 2.96 **Br** Bromine 3.12 11.8138 -7.3 59 (v) 114 BCO [Ar] $3d^{10} 4s^2 4p^5$ +1,5,-1	36 83.798 $^1S_0$ 3 **Kr** Krypton 3.75 13.9996 -157.36 -153.22 (v) 110 - [Ar] $3d^{10} 4s^2 4p^6$ 0
5	37 85.4678 $^2S_{1/2}$ 0.82 **Rb** Rubidium 1.532 4.1771 39.31 688 (m) 248 BCC [Kr] $5s^1$ +1	38 87.62 $^1S_0$ 0.95 **Sr** Strontium 2.63 5.6949 777 1382 (m) 215 FCC [Kr] $5s^2$ +2	39 88.90585 $^2D_{3/2}$ 1.22 **Y** Yttrium 4.472 6.2173 1526 3345 (m) 180 HCP [Kr] $4d^1 5s^2$ +3	40 91.224 $^3F_2$ 1.33 **Zr** Zirconium 6.511 6.6339 1855 4409 (m) 160 HCP [Kr] $4d^2 5s^2$ +4	41 92.90638 $^6D_{1/2}$ 1.60 **Nb** Niobium 8.57 6.7589 2477 4744 (m) 146 BCC [Kr] $4d^4 5s^1$ +3,5	42 95.94 $^7S_3$ 2.16 **Mo** Molybdenum 10.28 7.0924 2623 4639 (m) 139 BCC [Kr] $4d^5 5s^1$ +2,3,4,5,6	43 ☢ (98) 1.9 **Tc** Technetium 11.5 7.28 2157 4265 (m) 136 HCP [Kr] $4d^5 5s^2$ +4,7	44 101.07 $^5F_5$ 2.20 **Ru** Ruthenium 12.37 7.3605 2334 4150 (m) 134 HCP [Kr] $4d^7 5s^1$ +2,3,4,6,8	45 102.90550 $^4F_{9/2}$ 2.28 **Rh** Rhodium 12.45 7.4589 1964 3695 (m) 134 FCC [Kr] $4d^8 5s^1$ +2,3,4	46 106.42 $^1S_0$ 2.20 **Pd** Palladium 12.023 8.3369 1554.9 2963 (m) 137 FCC [Kr] $4d^{10}$ +2,4	47 107.8682 $^2S_{1/2}$ 1.93 **Ag** Silver 10.49 7.5762 961.78 2162 (m) 144 FCC [Kr] $4d^{10} 5s^1$ +1	48 112.411 $^1S_0$ 1.69 **Cd** Cadmium 8.65 8.9938 321.07 767 (m) 151 §hex [Kr] $4d^{10} 5s^2$ +2	49 114.818 $^2P°_{1/2}$ 1.78 **In** Indium 7.31 5.7864 156.6 2072 (m) 167 §tetra. [Kr] $4d^{10} 5s^2 5p^1$ +3	50 118.710 $^3P_0$ 1.96 **Sn** Tin 7.31 7.3439 231.93 2602 (v) 141 §tetra. [Kr] $4d^{10} 5s^2 5p^2$ +2,4	51 121.760 $^4S°_{3/2}$ 2.05 **Sb** Antimony 6.697 8.6084 630.63 1587 (v) 138 §rhom. [Kr] $4d^{10} 5s^2 5p^3$ +3,5,-3	52 127.60 $^3P_2$ 2.10 **Te** Tellurium 6.24 9.0096 449.51 988 (v) 135 hex [Kr] $4d^{10} 5s^2 5p^4$ +2,4,6,-2	53 126.90447 $^2P°_{3/2}$ 2.66 **I** Iodine 4.94 10.4513 113.7 184.3 (v) 133 BCO [Kr] $4d^{10} 5s^2 5p^5$ +1,5,7,-1	54 131.293 $^1S_0$ 2.60 **Xe** Xenon 5.9 12.1298 -111.8 -108 (v) 130 - [Kr] $4d^{10} 5s^2 5p^6$ 0
6	55 132.90545 $^2S_{1/2}$ 0.79 **Cs** Cesium 1.879 3.8939 28.44 671 (m) 265 BCC [Xe] $6s^1$ +1	56 137.327 $^1S_0$ 0.89 **Ba** Barium 3.51 5.2117 727 1870 (m) 222 BCC [Xe] $6s^2$ +2	Lanthanide Series	72 178.49 $^3F_2$ 1.3 **Hf** Hafnium 13.31 6.8251 2233 4603 (m) 159 HCP [Xe] $4f^{14} 5d^2 6s^2$ +4	73 180.9479 $^4F_{3/2}$ 1.5 **Ta** Tantalum 16.65 7.5496 3017 5458 (m) 146 BCC [Xe] $4f^{14} 5d^3 6s^2$ +5	74 183.84 $^5D_0$ 2.36 **W** Tungsten 19.25 7.8640 3422 5555 (m) 139 BCC [Xe] $4f^{14} 5d^4 6s^2$ +2,3,4,5,6	75 186.207 $^6S_{5/2}$ 1.9 **Re** Rhenium 21.02 7.8335 3186 5596 (m) 137 HCP [Xe] $4f^{14} 5d^5 6s^2$ +2,4,6,7,-1	76 190.23 $^5D_4$ 2.2 **Os** Osmium 22.61 8.4382 3033 5012 (m) 135 HCP [Xe] $4f^{14} 5d^6 6s^2$ +2,3,4,6,8	77 192.217 $^4F_{9/2}$ 2.2 **Ir** Iridium 22.65 8.9670 2466 4428 (m) 136 FCC [Xe] $4f^{14} 5d^7 6s^2$ +2,3,4,6	78 195.078 $^3D_3$ 2.28 **Pt** Platinum 21.09 8.9588 1768.3 3825 (m) 139 FCC [Xe] $4f^{14} 5d^9 6s^1$ +2,4	79 196.96655 $^2S_{1/2}$ 2.54 **Au** Gold 19.3 9.2255 1064.18 2856 (m) 144 FCC [Xe] $4f^{14} 5d^{10} 6s^1$ +1,3	80 200.59 $^1S_0$ 2 **Hg** Mercury 13.534 10.4375 -38.83 356.73 (m) 151 §rhom. [Xe] $4f^{14} 5d^{10} 6s^2$ +1,2	81 204.3833 $^2P°_{1/2}$ 1.62 **Tl** Thallium 11.85 6.1082 304 1473 (m) 170 HCP [Hg] $6p^1$ +1,3	82 207.2 $^3P_0$ 2.33 **Pb** Lead 11.34 7.4167 327.46 1749 (m) 175 FCC [Hg] $6p^2$ +2,4	83 208.98038 $^4S°_{3/2}$ 2.02 **Bi** Bismuth 9.78 7.2855 271.3 1564 (v) 146 §rhom. [Hg] $6p^3$ +3,5	84 ☢ (209) 2.0 **Po** Polonium 9.196 8.414 254 962 - §cubic [Hg] $6p^4$ +2,4	85 ☢ (210) 2.2 **At** Astatine - - 302 - - - [Hg] $6p^5$ +1,3,5,7,-1	86 ☢ (222) - **Rn** Radon 9.73 10.7485 -71 -61.7 (v) 145 - [Hg] $6p^6$ 0
7	87 ☢ (223) $^2S_{1/2}$ 0.7 **Fr** Francium - 4.0727 - - - - [Rn] $7s^1$ +1	88 ☢ (226) $^1S_0$ 0.9 **Ra** Radium 5 5.2784 700 1737 - BCC [Rn] $7s^2$ +2	Actinide Series	104 ☢ (261) $^3F_2$? **Rf** Rutherfordium 6.0 ? [Rn] $5f^{14} 6d^2 7s^2$? +4	105 ☢ (262) **Db** Dubnium	106 ☢ (266) **Sg** Seaborgium	107 ☢ (264) **Bh** Bohrium	108 ☢ (277) **Hs** Hassium	109 ☢ (268) **Mt** Meitnerium	110 ☢ (281) **Ds** Darmstadtium	111 ☢ (272) **Rg** Roentgenium	112 ☢ (285) **Cn** Copernicium	113 ☢ **Uut** Ununtrium	114 ☢ (289) **Uuq** Ununquadium	115 ☢ **Uup** Ununpentium	116 ☢ (292) **Uuh** Ununhexium	117 ☢ **Uus** Ununseptium	118 ☢ **Uuo** Ununoctium

Phase at STP

Gas Liquid Solid Synthetic

Categories

Alkali Metals	Noble Gas
Alkaline Earth Metals	Halogens
Transition Metals	Non Metals
Rare Earth Metals	
Poor Metals	Metalloids

†Common Constants

Source: physics.nist.gov

Absolute Zero		-273.15 °C	Gravitation Constant	G	6.67428×10^{-11} $m^3 kg^{-1} s^{-2}$
Atomic Mass Unit	m_u	1.660539×10^{-27} kg	Molar Gas Constant	R	8.314472 J mol^{-1} K^{-1}
Avogadro Constant		6.022142×10^{23} mol^{-1}	Molar Volume (Ideal Gas)		0.02241410 m^3/mol
Base of Natural Logarithms	e	2.718281828	PI	p	3.14159265358979
Boltzmann constant	k	1.380650×10^{-23} J/K	Planck Constant	h	6.626069×10^{-34} J s
Electron Mass	m_e	$9.10938215 \times 10^{-31}$ kg	Proton-Electron Mass Ratio	m_e/m_p	1836.15267247
	mec2	0.5110 MeV	Rydberg Constant	R_∞	10 973 732 m^{-1}
Electron Radius (Classical)	r0	$2.8179403 \times 10^{-15}$ m		$R_\infty c$	3.289842×10^{15} Hz
Electron Volt	eV	1.602176×10^{-19} J		$R_\infty hc$	13.6057 eV
Elementry Charge	e	1.602176×10^{-19} C	Second Radiation Constant	ch/k	0.01438769 m K
Faraday Constant	F	96 485.3399 C/mol	Speed of Light in a Vacuum	c	299 792 458 m/s
fine-structure constant	α	0.0072973525	Speed of sound in air at STP		343.2 m/s
First Radiation Constant	$2\pi hc^2$	$3.7417749 \times 10^{-16}$ W m^2	Standard Pressure		101 325 Pa

Notes:
- Density units are g/cm³ for solids and g/L or kg/cm³ at 0° Celsius for gases
- Atomic Weight based on ^{12}C
- ( ) indicate mass number of most stable isotope
- Common Oxidation States in bold
- Electron Config. based on IUPAC guidelines
- § indicates crystal structure is unusual or may require explanation
- (m) Metallic radius, (v) Covalent radius

Lanthanides	57 138.9055 $^2D_{3/2}$ 1.10 **La** Lanthanum 6.146 5.5769 920 3464 (m) 187 §hex [Xe] $5d^1 6s^2$ +3	58 140.116 $^1G°_4$ 1.12 **Ce** Cerium 6.689 5.5387 798 3360 (m) 182 FCC [Xe] $4f^1 5d^1 6s^2$ +3,4	59 140.90765 $^4I°_{9/2}$ 1.13 **Pr** Praseodymium 6.64 5.473 931 3290 (m) 182 §hex [Xe] $4f^3 6s^2$ +3,4	60 144.24 $^5I_4$ 1.14 **Nd** Neodymium 7.01 5.5250 1021 3100 (m) 181 §hex [Xe] $4f^4 6s^2$ +3	61 ☢ (145) $^6H°_{5/2}$ - **Pm** Promethium 7.264 5.582 1100 3000 (m) 183 HCP [Xe] $4f^5 6s^2$ +3	62 150.36 $^7F_0$ 1.17 **Sm** Samarium 7.353 5.6437 1072 1803 (m) 180 §hex [Xe] $4f^6 6s^2$ +2,3	63 151.964 $^8S°_{7/2}$ - **Eu** Europium 5.244 5.6704 822 1527 (m) 180 BCC [Xe] $4f^7 6s^2$ +2,3	64 157.25 $^9D°_2$ 1.20 **Gd** Gadolinium 7.901 6.1498 1313 3250 (m) 180 HCP [Xe] $4f^7 5d^1 6s^2$ +3	65 158.92534 $^6H°_{15/2}$ - **Tb** Terbium 8.219 5.8638 1356 3230 (m) 177 HCP [Xe] $4f^9 6s^2$ +3,4	66 162.500 $^5I_8$ 1.22 **Dy** Dysprosium 8.551 5.9389 1412 2567 (m) 178 HCP [Xe] $4f^{10} 6s^2$ +3	67 164.93032 $^4I°_{15/2}$ 1.23 **Ho** Holmium 8.795 6.0215 1474 2700 (m) 176 HCP [Xe] $4f^{11} 6s^2$ +3	68 167.259 $^3H_6$ 1.24 **Er** Erbium 9.066 6.1077 1497 2868 (m) 176 HCP [Xe] $4f^{12} 6s^2$ +3	69 168.93421 $^2F°_{7/2}$ 1.25 **Tm** Thulium 9.321 6.1843 1545 1950 (m) 176 HCP [Xe] $4f^{13} 6s^2$ +2,3	70 173.04 $^1S_0$ - **Yb** Ytterbium 6.57 6.2542 819 1196 (m) 176 FCC [Xe] $4f^{14} 6s^2$ +2,3	71 174.967 $^2D_{3/2}$ 1.27 **Lu** Lutetium 9.841 5.4259 1663 3402 (m) 174 HCP [Xe] $4f^{14} 5d^1 6s^2$ +3
Actinides	89 ☢ (227) $^2D_{3/2}$ 1.1 **Ac** Actinium 10.07 5.17 1050 3200 - FCC [Rn] $6d^1 7s^2$ +3	90 ☢ 232.0381 $^3F_2$ 1.3 **Th** Thorium 11.724 6.3067 1750 4820 (m) 179 FCC [Rn] $6d^2 7s^2$ +4	91 ☢ 231.0359 $^4K_{11/2}$ 1.5 **Pa** Protactinium 15.37 5.89 1572 4000 (m) 163 §tetra [Rn] $5f^2 6d^1 7s^2$ +4,5	92 ☢ 238.0289 $^5L°_6$ 1.38 **U** Uranium 19.05 6.1941 1135 3927 (m) 156 BCP [Rn] $5f^3 6d^1 7s^2$ +3,4,5,6	93 ☢ (237) **Np** Neptunium 20.45 6.2657 644 4000 (m) 155 SO [Rn] $5f^4 6d^1 7s^2$ +3,4,5,6	94 ☢ (244) **Pu** Plutonium 19.816 6.0260 640 3230 (m) 159 §mono. [Rn] $5f^6 7s^2$ +3,4,5,6	95 ☢ (243) **Am** Americium - 5.9738 1176 2011 (m) 173 HCP [Rn] $5f^7 7s^2$ +3,4,5,6	96 ☢ (247) $^9D°_2$ 1.3 **Cm** Curium 13.51 5.9914 1345 3110 (m) 174 HCP [Rn] $5f^7 6d^1 s^2$ +3	97 ☢ (247) $^6H°_{15/2}$ 1.3 **Bk** Berkelium 14.78 6.1979 1050 - (m) 170 hex [Rn] $5f^9 7s^2$ +3,4	98 ☢ (251) $^5I_8$ 1.3 **Cf** Californium 15.1 6.2817 900 - - hex [Rn] $5f^{10} 7s^2$ +3	99 ☢ (252) $^4I°_{15/2}$ 1.3 **Es** Einsteinium - 6.42 860 - - - [Rn] $5f^{11} 7s^2$ +3	100 ☢ (257) $^3H_6$ 1.3 **Fm** Fermium - 6.50 1527 - - - [Rn] $5f^{12} 7s^2$ +3	101 ☢ (258) $^2F°_{7/2}$ 1.3 **Md** Mendelevium - 6.58 827 - - - [Rn] $5f^{13} 7s^2$ +2,3	102 ☢ (259) $^1S_0$ 1.3 **No** Nobelium - 6.65 827 - - - [Rn] $5f^{14} 7s^2$ +2,3	103 ☢ (262) $^2P°_{1/2}$? - **Lr** Lawrencium - 4.9 ? 1627 - - - [Rn] $5f^{14} 7s^2 7p$? +3

References:
†Nist.gov, *Wolfram.com (Mathematic),
CRC Handbook of Chemistry and Physics
81st Edition, 2000-2001, and others

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