Periodic Table of the Elements

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

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]

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
	mec 2	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

Lanthanides	57 138.9055 La Lanthanum 6.146 5.5769 920 3464 (m) 187 §hex $^2D_{3/2}$ 1.10 [Xe] $5d^1$ $6s^2$ +3	58 140.116 Ce Cerium 6.689 5.5387 798 3360 (m) 182 FCC $^1G°_4$ 1.12 [Xe] $4f^1$ $5d^1$ $6s^2$ +3,4	59 140.90765 Pr Praseodymium 6.64 5.473 931 3290 (m) 182 §hex $^4I°_{9/2}$ 1.13 [Xe] $4f^3$ $6s^2$ +3,4	60 144.24 Nd Neodymium 7.01 5.5250 1021 3100 (m) 181 §hex $^5I_4$ 1.14 [Xe] $4f^4$ $6s^2$ +3	61 (145) Pm Promethium 7.264 5.582 1100 3000 (m) 183 HCP $^6H°_{5/2}$ - [Xe] $4f^5$ $6s^2$ +3	62 150.36 Sm Samarium 7.353 5.6437 1072 1803 (m) 180 §hex $^7F_0$ 1.17 [Xe] $4f^6$ $6s^2$ +2,3	63 151.964 Eu Europium 5.244 5.6704 822 1527 (m) 180 BCC $^8S°_{7/2}$ - [Xe] $4f^7$ $6s^2$ +2,3	64 157.25 Gd Gadolinium 7.901 6.1498 1313 3250 (m) 180 HCP $^9D°_2$ 1.20 [Xe] $4f^7$ $5d^1$ $6s^2$ +3	65 158.92534 Tb Terbium 8.219 5.8638 1356 3230 (m) 177 HCP $^6H°_{15/2}$ - [Xe] $4f^9$ $6s^2$ +3,4	66 162.500 Dy Dysprosium 8.551 5.9389 1412 2567 (m) 178 HCP $^5I_8$ 1.22 [Xe] $4f^{10}$ $6s^2$ +3	67 164.93032 Ho Holmium 8.795 6.0215 1474 2700 (m) 176 HCP $^4I°_{15/2}$ 1.23 [Xe] $4f^{11}$ $6s^2$ +3	68 167.259 Er Erbium 9.066 6.1077 1497 2868 (m) 176 HCP $^3H_6$ 1.24 [Xe] $4f^{12}$ $6s^2$ +3	69 168.93421 Tm Thulium 9.321 6.1843 1545 1950 (m) 176 HCP $^2F°_{7/2}$ 1.25 [Xe] $4f^{13}$ $6s^2$ +2,3	70 173.04 Yb Ytterbium 6.57 6.2542 819 1196 (m) 176 FCC $^1S_0$ - [Xe] $4f^{14}$ $6s^2$ +2,3	71 174.967 Lu Lutetium 9.841 5.4259 1663 3402 (m) 174 HCP $^2D_{3/2}$ 1.27 [Xe] $4f^{14}$ $5d^1$ $6s^2$ +3
Actinides	89 (227) Ac Actinium 10.07 5.17 1050 3200 - FCC $^2D_{3/2}$ 1.1 [Rn] $6d^1$ $7s^2$ +3	90 232.0381 Th Thorium 11.724 6.3067 1750 4820 (m) 179 FCC $^3F_2$ 1.3 [Rn] $6d^2$ $7s^2$ +4	91 231.0359 Pa Protactinium 15.37 5.89 1572 4000 (m) 163 §tetra $^4K_{11/2}$ 1.5 [Rn] $5f^2$ $6d^1$ $7s^2$ +4,5	92 238.0289 U Uranium 19.05 6.1941 1135 3927 (m) 156 BCP $^5L°_6$ 1.38 [Rn] $5f^3$ $6d^1$ $7s^2$ +3,4,5,6	93 (237) Np Neptunium 20.45 6.2657 644 4000 (m) 155 SO $^6L°_{11/2}$ 1.36 [Rn] $5f^4$ $6d^1$ $7s^2$ +3,4,5,6	94 (244) Pu Plutonium 19.816 6.0260 640 3230 (m) 159 §mono. $^7F_0$ 1.28 [Rn] $5f^6$ $7s^2$ +3,4,5,6	95 (243) Am Americium - 5.9738 1176 2011 (m) 173 HCP $^8S°_{7/2}$ 1.3 [Rn] $5f^7$ $7s^2$ +3,4,5,6	96 (247) Cm Curium 13.51 5.9914 1345 3110 (m) 174 HCP $^9D°_2$ 1.3 [Rn] $5f^7$ $6d^1$ $7s^2$ +3	97 (247) Bk Berkelium 14.78 6.1979 1050 - (m) 170 hex $^6H°_{15/2}$ 1.3 [Rn] $5f^9$ $7s^2$ +3,4	98 (251) Cf Californium 15.1 6.2817 900 - - hex $^5I_8$ 1.3 [Rn] $5f^{10}$ $7s^2$ +3	99 (252) Es Einsteinium - 6.42 860 - - - $^4I°_{15/2}$ 1.3 [Rn] $5f^{11}$ $7s^2$ +3	100 (257) Fm Fermium - 6.50 1527 - - - $^3H_6$ 1.3 [Rn] $5f^{12}$ $7s^2$ +3	101 (258) Md Mendelevium - 6.58 827 - - - $^2F°_{7/2}$ 1.3 [Rn] $5f^{13}$ $7s^2$ +2,3	102 (259) No Nobelium - 6.65 827 - - - $^1S_0$ 1.3 [Rn] $5f^{14}$ $7s^2$ +2,3	103 (262) Lr Lawrencium - 4.9 ? 1627 - - - $^2P°_{1/2}$? - [Rn] $5f^{14}$ $5d^1$ $7s^2$ $7p$? +3

Notes:
- Density units are g/cm^3 for solids and g/L or kg/cm^3 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

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