Annotated periodic table of the elements

*Group names^*

1	Hydrogen & the alkali metals	14	Crystallogens
2	Alkaline earth metals	15	Pnictogens
11	Coinage metals	16	Chalcogens
12	Volatile metals	17	Halogens
13	Icosagens	18	Helium group

^Groups 3 to 10 are named after their first members i.e. Group 3 is the Scandium Group

Most common oxidation state/s; electronegativity (Allred-Rochow)

Atomic number and symbol

Atomic weight and name

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	1 +1 H 2.20 1.008 Hydrogen																	2 He 4.003 Helium
2	3 +1 Li 0.98 6.94 Lithium	4 +2 Be 1.57 9.012 Beryllium											5 +3 B 2.04 10.81 Boron	6 ±4 C 2.55 12.01 Carbon	7 −3, +5 N 3.04 14.01 Nitrogen	8 −2 O 3.44 16.00 Oxygen	9 −1 F 3.98 19.00 Fluorine	10 Ne 20.18 Neon
3	11 +1 Na 0.93 22.99 Sodium	12 +2 Mg 1.31 24.31 Magnesium											13 +4 Al 1.61 26.98 Aluminium	14 +4 Si 1.9 28.09 Silicon	15 −3, +5 P 2.19 30.97 Phosphorus	16 −2, +6 S 2.58 32.06 Sulfur	17 −1 Cl 3.16 35.45 Chlorine	18 Ar 39.95 Argon
4	19 +1 K 0.82 39.10 Potassium	20 +2 Ca 1.00 40.08 Calcium	21 +3 Sc 1.36 44.96 Scandium	22 +4 Ti 1.54 47.87 Titanium	23 +5 V 1.63 50.94 Vanadium	24 +3 Cr 1.66 52.00 Chromium	25 +2 Mn 1.55 54.94 Manganese	26 +3, 2 Fe 1.83 55.85 Iron	27 +2 Co 1.88 85.47 Cobalt	28 +3 Ni 1.91 85.47 Nickel	29 +2 Cu 1.91 63.55 Copper	30 +2 Zn 1.65 65.38 Zinc	31 +3 Ga 1.81 69.72 Gallium	32 +4 Ge 2.01 72.63 Germanium	33 ±3 As 2.18 74.92 Arsenic	34 +6 Se 2.55 78.97 Selenium	35 −1 Br 2.96 79.90 Bromine	36 0 Kr 3.0 83.80 Krypton
5	37 +1 Rb 0.82 85.47 Rubidium	38 +2 Sr 0.95 87.62 Strontium	39 +3 Y 1.22 88.91 Yttrium	40 +4 Zr 1.33 91.22 Zirconium	41 +5 Nb 1.6 92.91 Niobium	42 +6 Mo 2.16 95.95 Molybdenum	43 +7 Tc 1.9 [97.91] Technetium	44 +3, 4 Ru* 2.2 101.07 Ruthenium	45 +3 Rh* 2.28 102.91 Rhodium	46 +2 Pd* 2.2 106.42 Palladium	47 +1 Ag 1.93 107.87 Silver	48 +2 Cd 1.69 112.41 Cadmium	49 +3 In 1.78 114.82 Indium	50 +4 Sn 1.96 118.71 Tin	52 ±3 Sb 2.05 121.76 Antimony	53 +4 Te 2.1 127.60 Tellurium	54 −1 I 2.66 126.90 Iodine	55 0 Xe 2.6 131.29 Xenon
6	55 +1 Cs 0.79 132.91 Caesium	56 +2 Ba 0.89 137.33 Barium	57 to 70	71 +3 Lu 1.27 174.97 Lutetium	72 +4 Hf 1.3 178.49 Hafnium	73 +5 Ta 1.5 180.95 Tantalum	74 +6 W 2.36 183.94 Tungsten	75 +7 Re 1.9 186.21 Rhenium	76 +4 Os* 2.2 190.23 Osmium	77 +4 Ir* 2.2 192.22 Iridium	78 +4 Pt* 2.28 195.08 Platinum	79 +3 Au* 2.54 107.87 Gold	80 +2 Hg 2.00 200.59 Mercury	81 +1 Tl 1.62 204.38 Thallium	82 +2 Pb 1.87 208.2 Lead	83 +3 Bi 2.02 208.98 Bismuth	84 +2, 4 Po 2.0 [208.98] Polonium	85 ±1 At 2.2 [209.99] Astatine	86 0 Rn 2.2 [222.02] Radon
7	87 +1 Fr >0.79 (223) Francium	88 +2 Ra 0.90 (226) Radium	89 to 102	103 +3 Lr 1.3 [266] Lawrencium	104 +4 Rf [267] Rutherfordium	105 +5 Db [268.13] Dubnium	106 +6 Sg [271.13] Seaborgium	107 +7 Bh [270.13] Bohrium	108 +8 Hs [277.15] Hassium	109 Mt [278.16] Meitnerium	110 Ds [281.17] Darmstadtium	111 Rg [281.16] Roentgenium	112 +2 Cn [285.18] Copernicium	113 Nh [286.19] Nihonium	114 Fl [289.19] Flerovium	115 Mc [289.19] Moscovium	116 Lv [293.20] Livermorium	117 Ts [294.21] Tennessine	118 Og [294.21] Oganesson

	3													
	57 +3 La 1.10 138.91 Lanthanum	58 +3 Ce 1.12 140.12 Cerium	59 +3 Pr 1.13 140.91 Praseodymium	60 +3 Nd 1.14 144.24 Neodymium	61 +3 Pm 1.13 [144.91] Promethium	62 +3 Sm 1.17 150.36 Samarium	63 +3 Eu 1.2 151.96 Europium	64 +3 Gd 1.20 157.25 Gadolinium	65 +3 Tb 1.1 158.93 Terbium	66 +3 Dy 1.22 162.50 Dysopromium	67 +3 Ho 1.23 164.93 Holmium	68 +3 Er 1.24 167.26 Erbium	69 +3 Tm 1.25 168.93 Thulium	70 +3 Yb 1.1 173.05 Ytterbium
	89 +3 Ac 1.1 [227.03] Actinium	90 +4 Th 1.3 232.04 Thorium	91 +5 Pa 1.5 231.04 Protactinium	92 +6 U 1.38 238.03 Uranium	93 +5 Np 1.36 [237.05] Neptunium	94 +4 Pu 1.28 [244.06] Plutonium	95 +3 Am 1.13 [243.06] Americium	96 +3 Cm 1.28 [247.07] Curium	97 +3 Bk 1.3 [247.07] Berkelium	98 +3 Cf 1.3 [251.08] Californium	99 +3 Es 1.3 [252.08] Einsteinium	100 +3 Fm 1.3 [257.01] Fermium	101 +3 Md 1.3 [258.10] Mendelevium	102 +2 No 1.3 [259.10] Nobelium

Radioactive

Oganesson is likely to be either a metalloid or a post-transition metal

CLASS COUNTERPARTS

Metals		Nonmetals
Active	*Pre-transition*	Corrosive
	Rare earth	
	Actinide	
Transition		Intermediate
Frontier		Metalloid
Noble (Ru–Pd; Os–Au)		Noble gas

Metals || Nonmetals

Active metals

Pre-transition metals
Light, reactive, mostly of low mechanical strength, melting and boiling points. The group 1 members are easily cut with a knife. Only Be, Mg and Al have any structural uses. Most form basic oxides (Be and Al are amphoteric).

Rare earths
Closely resemble Ca, Sr and Ba, but many are heavier, and they form mostly pale-coloured compounds. Similar to one another, esp. La to Lu (aka the lanthanides), and hard to separate for that reason. Abundant but widely dispersed; commercially viable concentrations are rare. Oxides are strongly to moderately basic. Sc, Yb and Lu exhibit weak amphoterism.

Actinides
Soft, dense and reactive metals, those from Es onwards are synthetic. Early actinides (Th–Am) show some similarities to transition metals and have basic, amphoteric, or acidic oxides; late actinides are more like lanthanides. Many actinides form coloured compounds.

Transition metals
Moderate to high density metals, with high melting and boiling points; many have high hardness and mechanical strength. Those from Rf onwards are synthetic. Chemically show variable valency and strong tendency to form coordination and colored compounds. Oxides are basic, amphoteric or acidic, depending on oxidation state.

Noble metals
Resistant to corrosion and oxidation, unlike base metals such as Fe, Ni, Cu and Zn. Commonly found together in native form. Good catalytic properties. Very weakly electropositive; insoluble oxides.

Frontier metals
Soft (or brittle), low strength, and with melting points lower than transition metals. Crystalline structures tend to show directional bonding, with generally greater complexity or fewer nearest neighbours than other metals. All used or trialed as soft metal lubricants. Most are chemically weak; a minority are moderately electropositive. Characterised, to varying degrees, by covalent bonding tendencies, amphoterism, and anionic species such as zincates, stannates, and bismuthates.

Metalloids
Metallic looking; brittle; fair electrical conductors. All known in semiconducting forms. Moderate ionisation energies (750−1,000 kJ/mol), and electronegativity values (1.9–2.2). Mostly behave chemically as non-metals. Can form alloys with metals. Amphoteric or weakly acidic oxides.

Intermediate nonmetals
H and N are colorless gases; C, P*, and Se are metallic looking solids while S is yellow. The latter four are brittle but all known in malleable, pliable or ductile forms. Moderate to high ionisation energies; low to high electron affinities; moderate to high electronegativity values; relatively poor to moderately strong oxidising agents; tend to form covalent or metallic to near-metallic compounds with metals. Their oxides are acidic, or neutral (H_2O, CO, NO, N_2O).

* as *black P,* the most stable form in ambient conditions

Group 3
This starts as Sc-Y-, and then bifurcates into a La branch i.e. -La-Ac, and a Lu branch i.e. -Lu-Lr. Trends going down Sc-Y- and the:

- La branch, resemble those of groups 1–2
- Lu branch, more resemble those of groups 4–10.

Corrosive nonmetals
O, F, and Cl are, respectively, colorless, pale yellow, and pale yellow-green gases; Br is red-brown liquid; I is a metallic looking solid. Chemically tend to have to high ionisation energies, electron affinities, and electronegativity values, and be relatively strong oxidising agents. Manifestations include oxygen's major association with the ubiquitous processes of corrosion and combustion, and the intrinsically corrosive nature of the non-metallic halogens. All five tend to form predominately ionic compounds with metals. Their oxides are acidic.

Noble gases
Colorless, odorless, non-flammable gases with very low chemically reactivity. The first noble gas compound, of approximate composition $XePtF_6$, was not prepared until 1962. More than half-a-thousand noble gas compounds were synthesised in the ensuing half-century. Compounds of He, Ne, and Ar, in ambient conditions, are not known

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