

PERIODIC TABLE OF THE ELEMENTS

17 Halogens 1.01 1 Hydrogen H +1	16 Noble Gases 4.00 2 Helium He	15 14.01 7 Nitrogen N -3	14 12.01 6 Carbon C +4	13 10.81 5 Boron B +3	12 65.39 30 Zinc Zn +2	11 63.55 29 Copper Cu +1 +2	10 65.35 29 Copper Cu +1 +2	9 58.93 27 Cobalt Co +2 +3	8 55.85 26 Iron Fe +2 +3	7 54.94 25 Manganese Mn +2 +4 +7	6 52.00 24 Chromium Cr +2 +3 +6	5 50.94 23 Vanadium V +2 +3 +5	4 47.88 22 Titanium Ti +2 +3 +4	3 44.96 21 Scandium Sc +3	2 9.01 4 Beryllium Be +2	1 6.94 3 Lithium Li +1
17 Halogens 35.45 17 Chlorine Cl -1	16 Noble Gases 39.95 18 Argon Ar	15 30.97 15 Phosphorus P -3	14 28.09 14 Silicon Si +4	13 26.98 13 Aluminum Al +3	12 65.39 30 Zinc Zn +2	11 63.55 29 Copper Cu +1 +2	10 65.35 29 Copper Cu +1 +2	9 58.93 27 Cobalt Co +2 +3	8 55.85 26 Iron Fe +2 +3	7 54.94 25 Manganese Mn +2 +4 +7	6 52.00 24 Chromium Cr +2 +3 +6	5 50.94 23 Vanadium V +2 +3 +5	4 47.88 22 Titanium Ti +2 +3 +4	3 44.96 21 Scandium Sc +3	2 9.01 4 Beryllium Be +2	1 6.94 3 Lithium Li +1
17 Halogens 79.90 35 Bromine Br -1	16 Noble Gases 83.80 36 Krypton Kr	15 74.92 33 Arsenic As -3	14 72.64 32 Germanium Ge +4	13 69.72 31 Gallium Ga +3	12 65.39 30 Zinc Zn +2	11 63.55 29 Copper Cu +1 +2	10 65.35 29 Copper Cu +1 +2	9 58.93 27 Cobalt Co +2 +3	8 55.85 26 Iron Fe +2 +3	7 54.94 25 Manganese Mn +2 +4 +7	6 52.00 24 Chromium Cr +2 +3 +6	5 50.94 23 Vanadium V +2 +3 +5	4 47.88 22 Titanium Ti +2 +3 +4	3 44.96 21 Scandium Sc +3	2 9.01 4 Beryllium Be +2	1 6.94 3 Lithium Li +1
17 Halogens 126.91 53 Iodine I -1	16 Noble Gases 131.29 54 Xenon Xe	15 121.75 51 Antimony Sb -3 +5	14 118.71 50 Tin Sn +2 +4	13 114.82 49 Indium In +3	12 112.41 48 Cadmium Cd +2	11 107.87 47 Silver Ag +1	10 106.92 46 Palladium Pd +2 +4	9 102.91 45 Rhodium Rh +3 +4	8 101.07 44 Ruthenium Ru +2 +3 +4	7 101.07 44 Ruthenium Ru +2 +3 +4	6 101.07 44 Ruthenium Ru +2 +3 +4	5 101.07 44 Ruthenium Ru +2 +3 +4	4 101.07 44 Ruthenium Ru +2 +3 +4	3 101.07 44 Ruthenium Ru +2 +3 +4	2 101.07 44 Ruthenium Ru +2 +3 +4	1 101.07 44 Ruthenium Ru +2 +3 +4
17 Halogens 208.98 83 Bismuth Bi -3 +5	16 Noble Gases 209 84 Polonium Po +2 +4	15 208.98 83 Bismuth Bi -3 +5	14 207.20 82 Lead Pb +2 +4	13 204.38 81 Thallium Tl +1 +3	12 200.59 80 Mercury Hg +1 +2	11 196.97 79 Gold Au +1 +3	10 195.08 78 Platinum Pt +2 +4	9 192.22 77 Iridium Ir +3 +4	8 190.2 76 Osmium Os +2 +3 +4	7 186.21 75 Rhenium Re +7	6 183.85 74 Tungsten W +6	5 180.95 73 Tantalum Ta +5	4 178.49 72 Hafnium Hf +4	3 173.05 71 Rutherfordium Rf +4	2 173.05 71 Rutherfordium Rf +4	1 173.05 71 Rutherfordium Rf +4
17 Halogens 223 86 Astatine At -1	16 Noble Gases 222 86 Radon Rn	15 208.98 83 Bismuth Bi -3 +5	14 207.20 82 Lead Pb +2 +4	13 204.38 81 Thallium Tl +1 +3	12 200.59 80 Mercury Hg +1 +2	11 196.97 79 Gold Au +1 +3	10 195.08 78 Platinum Pt +2 +4	9 192.22 77 Iridium Ir +3 +4	8 190.2 76 Osmium Os +2 +3 +4	7 186.21 75 Rhenium Re +7	6 183.85 74 Tungsten W +6	5 180.95 73 Tantalum Ta +5	4 178.49 72 Hafnium Hf +4	3 173.05 71 Rutherfordium Rf +4	2 173.05 71 Rutherfordium Rf +4	1 173.05 71 Rutherfordium Rf +4
17 Halogens 238 88 Francium Fr +1	16 Noble Gases 238 88 Radon Rn	15 208.98 83 Bismuth Bi -3 +5	14 207.20 82 Lead Pb +2 +4	13 204.38 81 Thallium Tl +1 +3	12 200.59 80 Mercury Hg +1 +2	11 196.97 79 Gold Au +1 +3	10 195.08 78 Platinum Pt +2 +4	9 192.22 77 Iridium Ir +3 +4	8 190.2 76 Osmium Os +2 +3 +4	7 186.21 75 Rhenium Re +7	6 183.85 74 Tungsten W +6	5 180.95 73 Tantalum Ta +5	4 178.49 72 Hafnium Hf +4	3 173.05 71 Rutherfordium Rf +4	2 173.05 71 Rutherfordium Rf +4	1 173.05 71 Rutherfordium Rf +4

Atomic Mass — 63.55 29 — Atomic Number
 Copper — Element Name
 Cu — Element Symbol
 +1 +2 — Common Ionic Charge(s)

No shading
 Light shading
 Bold Italic
 Shaded Atomic Number

solid at room temperature
 gas at room temperature
 liquid at room temperature
 man-made (synthetic) element

140.12 58 Cerium Ce +3 +4	140.91 59 Praseodymium Pr +3 +4	144.24 60 Neodymium Nd +3	151.96 63 Europium Eu +2 +3	157.25 64 Gadolinium Gd +3	162.50 66 Dysprosium Dy +3	164.93 67 Holmium Ho +3	167.26 68 Erbium Er +3	168.93 69 Thulium Tm +3	173.04 70 Ytterbium Yb +3	174.97 71 Lutetium Lu +3
232.04 90 Thorium Th +4	231.04 91 Protactinium Pa +4 +5	238.03 92 Uranium U +6 +4	(243) 95 Americium Am +3	(247) 96 Curium Cm +3	(249) 98 Californium Cf +3	(254) 99 Einsteinium Es +3	(255) 100 Fermium Fm +3	(256) 101 Mendelevium Md +3	(257) 103 Nobelium No +3	(257) 103 Lawrencium Lr

Lanthanide Series

Actinide Series

Activity Series

METALS

Decreasing Activity

↑

NONMETALS

Activity Series

acetate	CH ₃ COO ⁻¹	chlorite	ClO ₂ ⁻¹	oxalate	C ₂ O ₄ ⁻²	88.02
acetate	C ₂ H ₃ O ₂ ⁻¹	chromate	CrO ₄ ⁻²	perchlorate	ClO ₄ ⁻¹	99.45
ammonium	NH ₄ ⁺¹	cyanide	CN ⁻¹	permanganate	MnO ₄ ⁻¹	118.94
benzoate	C ₆ H ₅ O ₂ ⁻¹	dichromate	Cr ₂ O ₇ ⁻²	phosphate	PO ₄ ⁻³	94.97
bicarbonate	HCO ₃ ⁻¹	dihydrogen phosphate	H ₂ PO ₄ ⁻¹	silicate	SiO ₃ ⁻²	76.09
bisulfate	HSO ₄ ⁻¹	glutamate	C ₅ H ₇ NO ₄ ⁻¹	stearate	C ₁₇ H ₃₅ CO ₂ ⁻¹	283.53
bisulfide	HS ⁻¹	hydroxide	OH ⁻¹	sulfate	SO ₄ ⁻²	96.06
bisulfite	HSO ₃ ⁻¹	hypochlorite	ClO ⁻¹	sulfite	SO ₃ ⁻²	80.06
borate	BO ₃ ⁻³	iodate	IO ₃ ⁻¹	tetraborate	B ₄ O ₇ ⁻²	155.24
bromate	BrO ₃ ⁻¹	monohydrogen phosphate	HPO ₄ ⁻²	thiocyanate	SCN ⁻¹	58.08
carbonate	CO ₃ ⁻²	nitrate	NO ₃ ⁻¹	thiosulfate	S ₂ O ₃ ⁻²	112.12
chlorate	ClO ₃ ⁻¹	nitrite	NO ₂ ⁻¹	tripolyphosphate	P ₃ O ₁₀ ⁻⁵	252.91

SOLUBILITY OF COMMON COMPOUNDS IN WATER

The term soluble here means > 0.1 mol/L at 25°C.

Negative Ions (Anions)	Positive Ions (Cations)	Solubility of Compounds
All	Alkali ions: Li ⁺ , Na ⁺ , K ⁺ , Rb ⁺ , Cs ⁺ , Fr ⁺	Soluble
All	Hydrogen ion: H ⁺	Soluble
All	Ammonium ion: NH ₄ ⁺	Soluble
Nitrate, NO ₃ ⁻	All	Soluble
Chloride, Cl ⁻ or Bromide, Br ⁻ or Iodide, I ⁻	All others	Soluble
	Ag ⁺ , Pb ²⁺ , Cu ⁺	Low Solubility
Sulphate, SO ₄ ²⁻	All others	Soluble
	Ag ⁺ , Ca ²⁺ , Sr ²⁺ , Ba ²⁺ , Pb ²⁺	Low Solubility
Sulphide, S ²⁻	Alkali ions, H ⁺ , NH ₄ ⁺ , Be ²⁺ , Mg ²⁺ , Ca ²⁺ , Sr ²⁺ , Ba ²⁺	Soluble
	All others	Low Solubility
Hydroxide, OH ⁻	Alkali ions, H ⁺ , NH ₄ ⁺ , Sr ²⁺	Soluble
	All others	Low Solubility
Phosphate, PO ₄ ³⁻ or Carbonate, CO ₃ ²⁻ or Sulphite, SO ₃ ²⁻	Alkali ions, H ⁺ , NH ₄ ⁺	Soluble
	All others	Low Solubility

1																
2.1	2											13	14	15	16	17
H												2.0	2.5	3.0	3.5	4.0
1.0	1.5											B	C	N	O	F
Li	Be											1.5	1.8	2.1	2.5	3.0
0.9	1.5	3	4	5	6	7	8	9	10	11	12	Al	Si	P	S	Cl
Na	Mg											1.6	1.8	2.0	2.4	2.8
0.8	1.0	1.3	1.5	1.6	1.6	1.5	1.8	1.8	1.8	1.9	1.6	1.6	1.8	2.0	2.4	2.8
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br
0.8	1.0	1.2	1.4	1.6	1.8	1.9	2.2	2.2	2.2	1.9	1.7	1.7	1.8	1.9	2.1	2.5
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I
0.7	0.9	1.1 - 1.2	1.3	1.5	1.7	1.9	2.2	2.2	2.2	2.4	1.9	1.8	1.8	1.9	2.0	2.2
Cs	Ba	La - Lu	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At
0.7	0.9	1.1 - 1.7														
Fr	Ra	Ac - No														