

PERIODIC TABLE OF THE ELEMENTS

1 H 1.0	2 He 4.0	3 Li 6.9	4 Be 9.0	5 B 10.8	6 C 12.0	7 N 14.0	8 O 16.0	9 F 19.0	10 Ne 20.2	11 Na 23.0	12 Mg 24.3	13 Al 27.0	14 Si 28.1	15 P 31.0	16 S 32.1	17 Cl 35.5	18 Ar 39.9	19 K 39.1	20 Ca 40.1	21 Sc 45.0	22 Ti 47.9	23 V 50.9	24 Cr 52.0	25 Mn 54.9	26 Fe 55.8	27 Co 58.9	28 Ni 58.7	29 Cu 63.5	30 Zn 65.4	31 Ga 69.7	32 Ge 72.6	33 As 74.9	34 Se 79.0	35 Br 79.9	36 Kr 83.8	37 Rb 85.5	38 Sr 87.6	39 Y 88.9	40 Zr 91.2	41 Nb 92.9	42 Mo 95.9	43 Tc (98)	44 Ru 101.1	45 Rh 102.9	46 Pd 106.4	47 Ag 107.9	48 Cd 112.4	49 In 114.8	50 Sn 118.7	51 Sb 121.8	52 Te 127.6	53 I 126.9	54 Xe 131.3	55 Cs 132.9	56 Ba 137.3	57 La* 138.9	72 Hf 178.5	73 Ta 180.9	74 W 183.9	75 Re 186.2	76 Os 190.2	77 Ir 192.2	78 Pt 195.1	79 Au 197.0	80 Hg 200.6	81 Tl 204.4	82 Pb 207.2	83 Bi 209.0	84 Po (209)	85 At (210)	86 Rn (222)	87 Fr (223)	88 Ra 226.0	89 Ac† 227.0	104 Unq (261)	105 Unp (262)	106 Unh (263)	107 Uns (262)	108 Uno (265)	109 Une (267)
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Activity Series

Metal	Oxidation reaction
Potassium	$K \rightarrow K^+ + e^-$
Sodium	$Na \rightarrow Na^+ + e^-$
Magnesium	$Mg \rightarrow Mg^{2+} + 2e^-$
Aluminum	$Al \rightarrow Al^{3+} + 3e^-$
Zinc	$Zn \rightarrow Zn^{2+} + 2e^-$
Iron	$Fe \rightarrow Fe^{2+} + 2e^-$
Hydrogen	$H_2 \rightarrow 2H^+ + 2e^-$
Copper	$Cu \rightarrow Cu^{2+} + 2e^-$
Silver	$Ag \rightarrow Ag^+ + e^-$
Mercury	$Hg \rightarrow Hg^{2+} + 2e^-$
Platinum	$Pt \rightarrow Pt^{2+} + 2e^-$
Gold	$Au \rightarrow Au^{3+} + 3e^-$

most reactive/least stable

58 Ce 140.1	59 Pr 140.9	60 Nd 144.2	61 Pm (145)	62 Sm 150.4	63 Eu 152.0	64 Gd 157.3	65 Tb 158.9	66 Dy 162.5	67 Ho 164.9	68 Er 167.3	69 Tm 168.9	70 Yb 173.0	71 Lu 175.0	90 Th 232.0	91 Pa (231)	92 U 238.0	93 Np (237)	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (260)
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least reactive/most stable

Charges of some Common Monatomic ions

H 1+ 1-																	
Li 1+	Be 2+													N 3-	O 2-	F 1-	
Na 1+	Mg 2+												Al 3+			Cl 1-	
K 1+	Ca 2+	Sc 3+	Ti 3+ 4+	V 3+ 4+	Cr 2+ 3+	Mn 2+ 3+	Fe 2+ 3+	Co 2+ 3+	Ni 2+ 4+	Cu 1+ 2+	Zn 2+					Br 1-	
Rb 1+	Sr 2+									Pd 2+ 4+	Ag 1+	Cd 2+		Sn 2+ 4+		I 1-	
Cs 1+	Ba 2+									Pt 2+ 4+	Au 1+ 3+	Hg 2+ *		Pb 2+ 4+			
Fr 1+	Ra 2+																

Please note that many of the metals shown here can have more possibilities than I can show here. Vanadium, for example, can be 2+, 3+, 4+ or 5+. I have only shown the more common charges.

*Mercury can be 1+ in the polyatomic ion Hg_2^{2+} .

Electronegativity Values of Selected Elements

Metallic Elements			Nonmetallic Elements			
Li (1.0)	Be (1.5)	H (2.1)	C (2.5)	N (3.0)	O (3.5)	F (4.0)
Na (1.0)	Mg (1.2)	Al (1.5)	P (2.1)	S (2.5)	Cl (3.0)	
K (0.9)	Ca (1.0)	Sc (1.3)	Se (2.4)	Br (2.8)		

Electronegativity

Difference

0-0.4 (non-metals)

0.5 or more (non metals)

Metal + non-metal

Bond type

Non polar covalent

Polar Covalent

Ionic

Gas Laws

$$PV=nRT$$

$$K=273+^{\circ}C \quad 760 \text{ mm Hg} = 760 \text{ torr} = 1 \text{ atm}$$

$$R= 0.08206 \text{ L atm mol}^{-1}\text{K}^{-1}$$

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

Solubility Rules

1. All compounds containing Na^+ , K^+ , or NH_4^+ ions are soluble in water.
2. All nitrates (NO_3^-) are soluble in water.
3. Most chlorides (Cl^-), and sulfates (SO_4^{2-}) are soluble. Some important exceptions are silver chloride (AgCl), barium sulfate (BaSO_4), and lead sulfate (PbSO_4) which are insoluble.
4. Most carbonates (CO_3^{2-}), phosphates (PO_4^{3-}), sulfides (S^{2-}), and hydroxides (OH^-) are insoluble in water. Important exceptions are those of Na^+ , K^+ , and NH_4^+ , as well as barium hydroxide, $\text{Ba}(\text{OH})_2$.

Avogadro's Number: 6.02×10^{23}

$$6.02 \times 10^{23} \text{ molecules} = 1 \text{ mole}$$