

## Periodic Table of the Elements

1 H 1.008																2 He 4.003	
3 Li 6.941	4 Be 9.012											5 B 10.811	6 C 12.011	7 N 14.007	8 O 15.999	9 F 18.998	10 Ne 20.180
11 Na 22.990	12 Mg 24.305											13 Al 26.982	14 Si 28.086	15 P 30.974	16 S 32.066	17 Cl 35.453	18 Ar 39.948
19 K 39.098	20 Ca 40.078	21 Sc 44.956	22 Ti 47.88	23 V 50.942	24 Cr 51.996	25 Mn 54.938	26 Fe 55.847	27 Co 58.933	28 Ni 58.69	29 Cu 63.546	30 Zn 65.39	31 Ga 69.723	32 Ge 72.61	33 As 74.922	34 Se 78.96	35 Br 79.904	36 Kr 83.80
37 Rb 85.468	38 Sr 87.62	39 Y 88.906	40 Zr 91.224	41 Nb 92.906	42 Mo 95.94	43 Tc (98)	44 Ru 101.07	45 Rh 102.91	46 Pd 106.42	47 Ag 107.87	48 Cd 112.41	49 In 114.82	50 Sn 118.71	51 Sb 121.75	52 Te 127.60	53 I 126.90	54 Xe 131.29
55 Cs 132.91	56 Ba 137.33	57 La* 138.91	72 Hf 178.49	73 Ta 180.95	74 W 183.85	75 Re 186.21	76 Os 190.23	77 Ir 192.22	78 Pt 195.08	79 Au 196.97	80 Hg 200.59	81 Tl 204.38	82 Pb 207.2	83 Bi 208.98	84 Po (209)	85 At (210)	86 Rn (222)
87 Fr (223)	88 Ra (226)	89 Ac** (227)	104 Rf (267)	105 Db (268)	106 Sg (269)	107 Bh (270)	108 Hs (277)	109 Mt (278)	110 Ds (281)	111 Rg (282)	112 Cn (285)	113 Nh (286)	114 Fl (289)	115 Mc (289)	116 Lv (293)	117 Ts (294)	118 Og (294)

*	58 Ce 140.12	59 Pr 140.91	60 Nd 144.24	61 Pm (145)	62 Sm 150.36	63 Eu 151.96	64 Gd 157.25	65 Tb 158.92	66 Dy 162.50	67 Ho 164.93	68 Er 167.26	69 Tm 168.93	70 Yb 173.04	71 Lu 174.97
**	90 Th 232.04	91 Pa 231.04	92 U 238.03	93 Np 237.05	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)

$$PV = nRT$$

$$R = 8.314 \frac{\text{J}}{\text{mol} \cdot \text{K}}$$

$$K = ^\circ\text{C} + 273.15$$

$$760 \text{ torr} \equiv 1 \text{ atm}$$

$$R = 0.08206 \frac{\text{L} \cdot \text{atm}}{\text{mol} \cdot \text{K}}$$

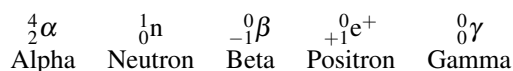
$$1 \text{ mole} = 6.022 \times 10^{23}$$

$$\text{Molarity (M)} = \frac{\text{moles solute}}{\text{liters solution}}$$

$$K_p = K_c(RT)^{\Delta n}$$

$$\text{quadratic formula: } x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

### Subatomic Particles



### Kinetics

$$\text{rate} = \frac{\Delta \text{Concentration}}{\Delta \text{time}}$$

$$t_{1/2} = \frac{\ln(2)}{k} = \frac{0.693}{k} \text{ (1st order only)}$$

$$\ln\left(\frac{k_2}{k_1}\right) = \frac{E_a}{R} \left(\frac{1}{T_1} - \frac{1}{T_2}\right)$$

### Integrated Rate Laws

$$0^{th}: [A]_t = -kt + [A]_0$$

$$1^{st}: \ln([A]_t) = -kt + \ln([A]_0)$$

$$[A]_t = [A]_0 \cdot e^{-kt}$$

$$2^{nd}: \frac{1}{[A]_t} = kt + \frac{1}{[A]_0}$$

### Thermodynamic Properties of Water (H<sub>2</sub>O)

$$\Delta H_{\text{fusion}} = 6.02 \frac{\text{kJ}}{\text{mol}}$$

$$\Delta H_{\text{vaporization}} = 40.7 \frac{\text{kJ}}{\text{mol}}$$

$$K_f = 1.862 \frac{^\circ\text{C}}{\text{m}}$$

$$K_b = 0.512 \frac{^\circ\text{C}}{\text{m}}$$

$$\text{H}_2\text{O} = 18.02 \frac{\text{grams}}{\text{mole}}$$