

# Chemistry Primer

## I. Atoms and Molecules

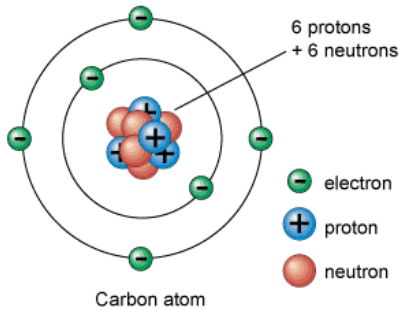
### A. Introduction – all matter is a mixture of the 92 naturally occurring elements.

1 H 1.008																	2 He 4.0026
3 Li 6.941	4 Be 9.0122											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 32.06	17 Cl 35.453	18 Ar 39.948
19 K 39.098	20 Ca 40.078	21 Sc 44.956	22 Ti 47.887	23 V 50.942	24 Cr 51.996	25 Mn 54.938	26 Fe 55.845	27 Co 58.933	28 Ni 58.693	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 101.07	46 Pd 106.32	47 Ag 107.87	48 Cd 112.41	49 In 114.82	50 Sn 118.71	51 Sb 121.76	52 Te 127.6	53 I 126.905	54 Xe 131.29
55 Cs 132.91	56 Ba 137.33	57-70 * Lu 174.967	71 Hf 178.49	72 Ta 180.948	73 W 183.84	74 Re 186.207	75 Os 190.23	76 Ir 192.22	77 Pt 195.084	78 Au 196.967	79 Hg 200.59	80 Tl 204.38	81 Pb 207.2	82 Bi 208.98	83 Po 209	84 At 210	85 Rn 222
87 Fr 223	88 Ra 226	89-102 ** Lr 260	103 Rf 261	104 Db 262	105 Sg 263	106 Bh 264	107 Hs 265	108 Mt 266	109 Uun 267	110 Uuu 268	111 Uub 269	112 Uuq 270	113 Uuq 271	114 Uuq 272	115 Uuq 273	116 Uuq 274	117 Uuq 275

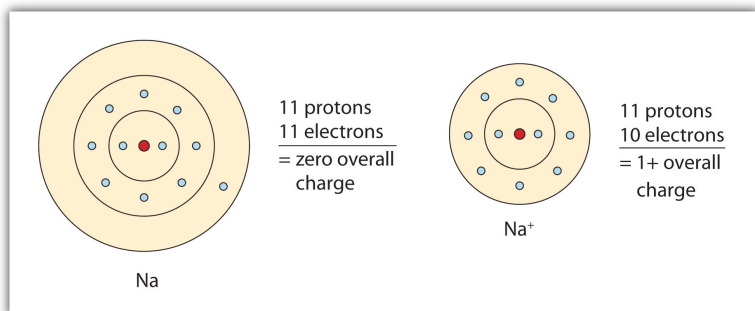
\* Lanthanide series

57 La 138.91	58 Ce 140.12	59 Pr 140.91	60 Nd 144.24	61 Pm 144.91	62 Sm 150.36	63 Eu 151.96	64 Gd 157.25	65 Tb 158.93	66 Dy 162.50	67 Ho 164.93	68 Er 167.26	69 Tm 168.93	70 Yb 173.04
89 Ac 227	90 Th 232.04	91 Pa 231.04	92 U 238.03	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

\*\* Actinide series



II. Ions and Oxidation – electrons are arranged around the nucleus in orbits that determine how strongly any particular electron is held there.

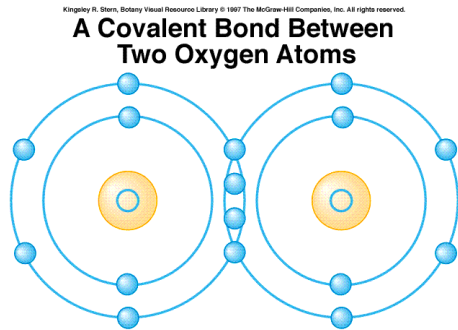


	1A	
H <sup>+</sup>		2A
Li <sup>+</sup>		
Na <sup>+</sup>	Mg <sup>2+</sup>	
K <sup>+</sup>	Ca <sup>2+</sup>	
Rb <sup>+</sup>	Sr <sup>2+</sup>	

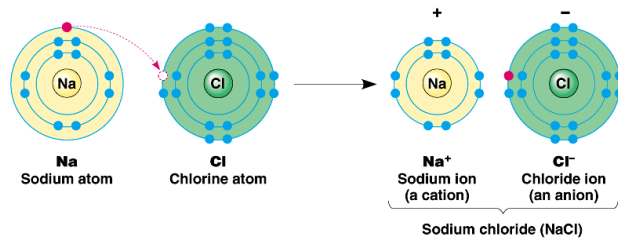
					8A
	3A	4A	5A	6A	7A
			N <sup>3-</sup>	O <sup>2-</sup>	F <sup>-</sup>
	Al <sup>3+</sup>		P <sup>3-</sup>	S <sup>2-</sup>	Cl <sup>-</sup>
				Se <sup>2-</sup>	Br <sup>-</sup>
					I <sup>-</sup>

III. Chemical Bonds – there are 4 different ways that molecules can interact with each other.

1. Covalent Bonds - when 2 atoms have similar affinities for electrons, they share the electrons between them.

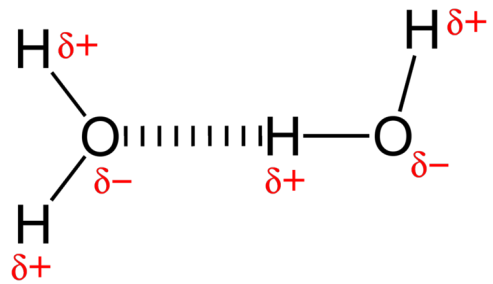
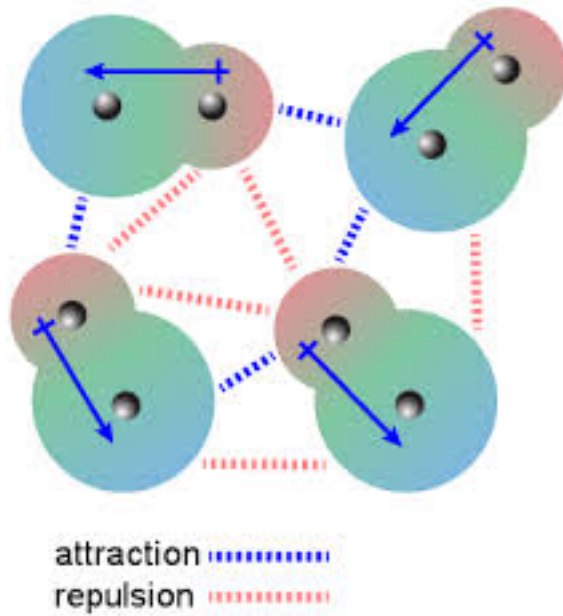


2. Ionic “Bonds” - when electrons are shared unevenly between 2 atoms



### 3. Polar interactions/Hydrogen bonds

Polar interactions form between 2 molecules for a temporary bond.



4. Van der Waals forces

IV. Energy – cooking/baking is the breaking and formation of bonds, which requires an input of energy.

A. Heat and molecular movement

Kinetic energy – energy of motion

Potential energy – energy of position

B. Bond energy – energy that hold molecules together



V. Phases of Matter

1. Solids

2. Liquids

3. Gasses

4. Other phases of matter

5. Food and states of matter

