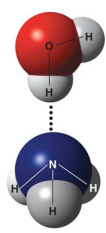


The Chemical Context of Life: Atoms, Bonding, Molecules



- Today's Topics:
- Atomic Structure and bonding
 - Periodic Table
 - Ionic Bonds
 - Covalent Bonds

Sept 2, 2011

Matter

Elements

Made up of **only One** type of atom

Compounds

Two or more types of atoms bonded together in a fixed ratio

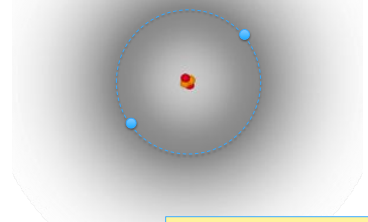
Now a
NEW SUBSTANCE



Figure 2.2 Sodium Chlorine Sodium Chloride

Electron Cloud

Helium

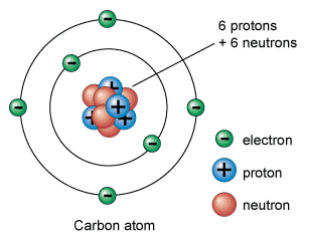


Atoms differ by the number of protons and electrons

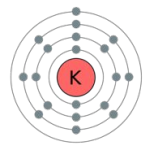
Periodic Table of the Elements

1	IA	H	IIA																	0	He			
2		Li	Be											IIIA	B	IVA	C	VIA	N	O	VIIA	F	VIIIA	Ne
3		Na	Mg	IIIB	IVB	VB	VIB	VIB	VIB	VII	VIII	IX	X	XIB		Al	Si	P	S	Cl	Ar			
4		K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr					
5		Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe					
6		Cs	Ba	*La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn					
7		Fr	Ra	+Ac	Rf	Ha	Sg	Nh	Hs	Mt	110	111	112	113										
				* Lanthanide Series																				
				Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu							
				+ Actinide Series																				
				Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr							

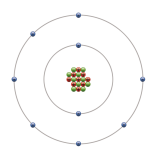
Electrons are arranged in SHELLS



Potassium:
1 outer shell electron



Fluorine:
7 outer shell electrons



- The **periodic table of the elements** shows the electron distribution for all the elements

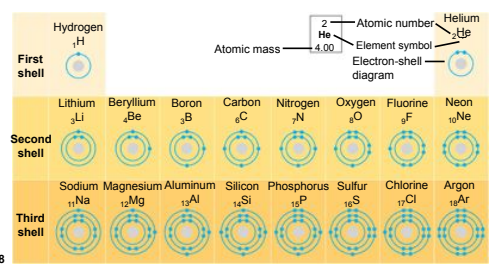
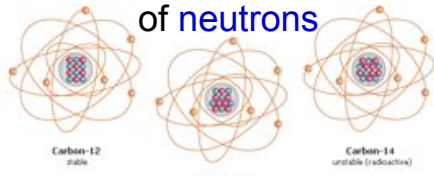


Figure 2.8

Isotopes differ in the number of neutrons

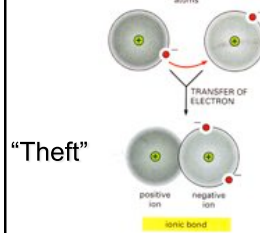


Are these isotopes charged?
Do they have different chemical bonding properties?

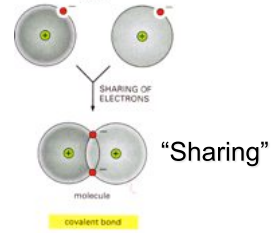
^{12}C	99%
^{13}C	1%
^{14}C	tiny bit

Bonding:

Ionic Bonding



Covalent Bonding



When atoms have very different Electronegativities, form an Ionic Bond

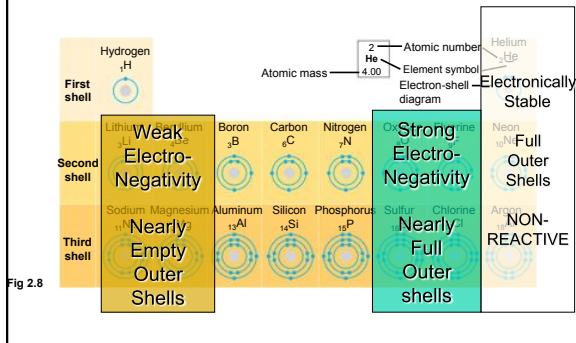


Fig 2.8

Ionic Bonding

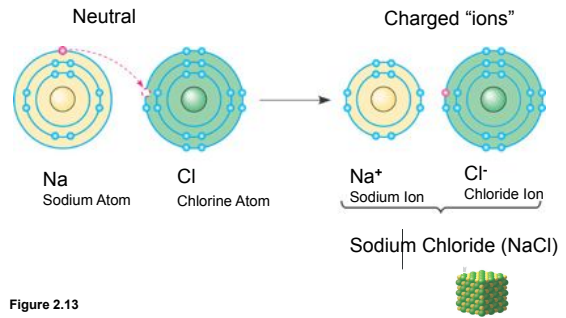


Figure 2.13

What are some other ionic compounds?

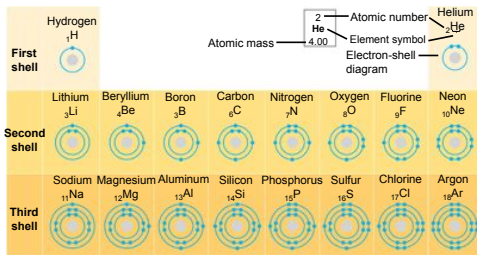


Figure 2.8

Covalent Bonds

Form between atoms of similar electronegativity

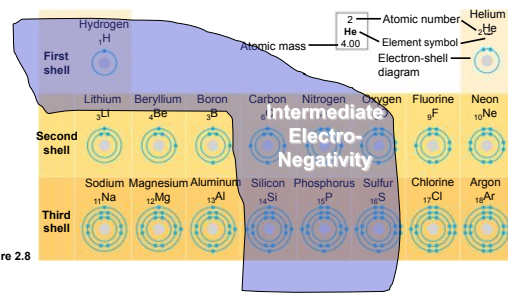


Figure 2.8

