

CHEMICAL BOND

- FORCE OF ATTRACTION THAT HOLDS TWO ATOMS TOGETHER

Chemical bonding:

The joining together of atoms to _____

- New substance has _____ from the original substance
- Atoms in family _____ valence electrons. Outer shell is considered full so will not bond with other atoms at all.
- Helium has 2 valence electrons and does not bond because outer shell is full with 2 (first shell holds only 2)

Example:

- Atoms with 6 valence electrons needs 2 more
- It will either gain _____ electrons from another atom
- Atoms with 2 valence electrons (Magnesium) will lose 2 electrons so the shell _____ shell and it is full

Chemical formula:

- Shorthand method for writing a _____
- Ex: CO_2 $C_6H_{12}O_6$
- _____ tell you how many atoms are _____ in the compound or molecule

Section 2 Types of chemical bonds

- Ionic bonds
Force of attraction between atoms that have _____ (ions)
- When an atom loses or gains an electron, it is called an _____
Ionic bonds are bonds between a _____ --
- If lose electrons, become _____ (cation)
- If gain electron, become _____ (anion)
- _____ solids at room temp
- Sea salt, plaster of paris, seashells
- High _____ points
- Breaks apart if hit with a hammer
- Do not _____ in names
- Compounds overall charge _____
- Add enough atoms in _____
- Na (_____) $\rightarrow Na^+$ and Cl (takes in electron) $\rightarrow Cl^-$

- NaCl (overall charge is zero) _____
- Mg (_____) \rightarrow Mg^{2+} and Cl (takes in electron) \rightarrow Cl^-
 $Mg^{2+} + Cl^-$ must add a _____ to chlorine so overall charge is zero $2+$, $2-$
 $MgCl_2$ magnesium chloride

Naming ionic compounds

The name of the positive ion comes first, then the _____ - ion

- If negative ion is a single element, it _____
Forms 3-D repeating pattern of crystal lattice
- Each negative ion is bordered by a positive one
- When removing electrons from outer shell, very _____ is needed if there are only one or two valence electrons (family 1 and 2) Therefore, _____ very reactive
Family 1 and 2 (metals) tend to form positive ions
- Family 1 and 2 (metals) tend to lose electrons
Family 6 and 7 (non-metals) tend to form negative ions (gain electrons)
Even though individual ions are charged, overall compound is neutral
- Electrostatic attraction, Opposite charges attract
- Na^+ Cl^- $NaCl$
When reactive non-metals gain electrons, energy is released
- The easier it is to gain electrons (family 17) the more energy is released
- Negative ions end in "-ide" Ex: sodium chloride $NaCl$, Potassium bromide KBr

Covalent bonds

- Force of attraction between nuclei of atoms and electrons shared by the atoms
Molecular compound- Formed from covalently bonded atoms
- Composed of molecules
Covalent compound formulas can be written

• Use _____ the number of atoms

- | | |
|---------------|--------------|
| • one mono- | six hexa- |
| • two di- | seven hepta- |
| • three tri- | eight octa- |
| • four tetra- | nine nona- |
| • five penta- | ten deca- |

- CO_2 carbon dioxide (di=2)
- CO carbon monoxide (mono =1)

- N_2O _____ monoxide
- H_2O dihydrogen monoxide _____!!
- P_2O_5 diphosphorous _____

- Low _____ points
- Brittle in a solid state
- _____
- Non-metals to _____

Covalent compounds:

- Plastics, carbon compounds (_____) including hydrocarbons (_____), proteins

Molecules are the smallest unit that a covalent compound can be broken down and still be that same compound

- Simplest molecules are diatomic (_____--)
- Diatomic elements are found combined in nature together
- (N, O, and all halogens - _____)

Electron dot diagram

- Show valence electrons
- Show covalent sharing of electrons

Metallic bond

- Force of attraction between nuclei of a charged metal and _____
Metals _____ -
- Lose electrons become positive charged
- Have enough electrons _____ about to cancel out positive charge (electron energy levels overlap)
_____ (since electrons are free to "swim" about, when hit, does not break apart)
- _____
- Good conductors (_____)
- High _____