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Chemistry Notes

Chapter 2-Elements

- Element: Simplest type of matter; composed of only one kind of atom.
  - Cannot be broken down into a simpler substance.
- Compound: Composed of one or more elements that are chemically bonded together.
  - Always made up of the same number and type of element.
- Mixture: Two or more substances (either elements or compounds) that are physically mixed.
  - Can vary in composition

Chapter 2.2

- Law of Conservation of Mass: Total mass does not change.
  - Matter is not created nor destroyed
    - 180 g of glucose + 192 g oxygen = 264 g carbon dioxide + 108 g water
      - 372 g = 372 g
- Definite Composition: Composition of a compound does not change.
- % Mass of an Element: mass of the element divided by the mass of the compound multiplied by one hundred
- Law of Multiple Proportions: When two or more elements combine they do so in whole number ratios; the ratios can be different.

Recitation

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Periodic Table-Predicting Ions

- Gain or lose electrons to be like the nearest noble gas (column 18)

Compounds

- Ionic:
  - Coulomb's law: energy is proportional to the charge of 1st ion times the charge of 2nd ion divided by distance.
    - Higher charges more strongly attracted
    - Smaller the ion, the more strongly attracted they are.
- Forming Ionic Compounds:
  - Neutral: Has no charge
  - Positive = Negative
  - Formula Unit: smallest collection of ions that is neutral.
    - Ex: Ca (+2) O (-2) =CaO
    - Ex: K (+1) S (-2) = 2K (+2) S (-2) = K_2S
    - Ex: Al (+3) O (-2) = 2Al (+6) 3O (-6) = Al_2O_3
    - Pp: As (-3) Ca (+2) = 2As (-6) 3Ca (+6) = As_2Ca_3
- Naming Ionic Compounds:
  - Cation (+), anion(-)
  - Name of cation, name of anion with ending changed to ide
    - Ex: $MgCl_2$

        - Magnesium Chloride
    - Ex: K_2O
        - Potassium Oxide
    - Formula for : Calcium Sulfide
        - Ca (+2) S (-2) = CaS
- Metals with more than one charge
    - Transition Metals
        - Told what the charge is
            - Ex: Fe^{+3} Cl^{-1} = Fe (+3) 3Cl (-3) = $FeCl_3$
    - Must indicate charge in name
        - Put charge after name in parenthesis using roman numerals
            - Ex: $FeCl_3$ = iron (III) chloride
                - Parenthesis always tells you the charge not the number of ions!!!!
            - Ex: VCl_2 = V (?) 2Cl (-2) = V (+2) 2Cl (-2) = Vanadium (II) chloride
        - Use "ic" and "ous" endings. (table 2.4)
            - Iron = +3 or +2
                - Higher charge = "ic"
                - Lower charge = "ous"
            - (latin)
                - Ferric = Fe (+3)
                - Ferrous = Fe (+2)

Polyatomic Ions-Table 2.5 DO NOT MEMORIZE

- A group of atoms with a charge
    - Work the same way as monoatomic ions
        - When using them in a name, do NOT change the name of polyatomic ion.
    - Ex: Compound formed from ammonium and bromide
        - NH_4(+1) Br(-1) = NH_4Br
    - Formula for: Aluminum Nitrate
        - Al (+3) NO_3(-1) = Al (+3) $3NO_3$ (-3) = Al $(NO_3)_3$

Acids

- Binary Acids
    - Hydrogen + Non metal
    - Hydro, name of non-metal changed to "ic", acid
    - HCl
        - Hydrochloric Acid
    - H_2S
        - Hydrosulfuric Acid
- Oxy Acids
    - Hydrogen + Polyatomic Ion
    - Name of polyatomic ion changed
        - To "ic" if ending is "ate"
        - To "ous" if ending is "ite"
    - H_2SO_4
        - Sulfuric Acid
    - HNO_2
        - Nitrous Acid