Naming Compounds

① Look up the names of both symbols

Ex.) Na_2SO_4

Sodium sulfate

② Write the full name of first element (or ion) listed

- if it is a metal w/ more than one charge listed, include Roman numeral.

③ Write the second element's name, but drop ending and add -ide.

OR

Write the full name of polyatomic ion

Ex.) $FeCl_3$ ($+3 \; -3 = 0$)

Iron(III) chloride

$Pb^{+4}S^{-2}_2$

Lead(IV) Sulfide

$Cu(NO_3)_2$ (NO_3^{-1})

Copper(II) nitrate

$Ba_3(PO_4)_2$

Barium phosphate

Formulas + Math

Writing Formulas

① Find the symbols for the 2 parts of the formula

"+" and "−"

always listed first

second name

- Table S (element name)
- Table E (polyatomic ions ... -ite or -ate)

② Write the symbols w/ charges

Ex.) Calcium chloride

Ca^{+2} Cl^{-}

③ Swap + Drop (make overall charge zero)

Ca^{+2} Cl^{-} → $CaCl_2$

④ Reduce subscripts to lowest ratio

Ex.) Tin (IV) oxide

Sn^{+4} O^{-2} Sn_2O_4 $\xrightarrow{\text{Reduce}}$ SnO_2

Roman numerals = Charge

Gram Formula Mass - mass of one mole of a substance

★ From the periodic table

Ex.) Na - 22.99 g

NaOH - 22.99g + 16.00g + 1.01g = 39g

$Ba_3(PO_4)_2$ Ba - 3
P - 2
O - 8

Converting between moles & mass

2.0 mole Fe = ? g

$$2.0 \text{ mol Fe} \times \frac{55.85 \text{ g}}{1 \text{ mol}} = 111.7 \text{ g} \sim 110$$

15.0g O_2 = ? mol

$$15.0 \text{ g } O_2 \times \frac{1 \text{ mol}}{32.00 \text{ g}} = .469 \text{ mol}$$

% Composition - TABLE T

$$\% = \frac{\text{Mass of part}}{\text{Mass of whole}} \times 100$$

Cl ← part

$CaCl_2$ ← whole

What is the % comp. of Cl in $CaCl_2$?

$$\% = \frac{\text{mass Cl}}{\text{mass } CaCl_2} \times 100$$

Hydrates - ionic compound w/ H_2O molecules attached

Ex.) $CuSO_4 \cdot 5H_2O$

Find % H_2O in hydrate.

$$\% = \frac{\text{Mass of } 5H_2O}{\text{Mass of } CuSO_4 \cdot 5H_2O}$$

- heating a hydrate removes H_2O

Mass of hydrate before heating − Mass of hydrate after heating = Mass of H_2O

Empirical vs. Molecular

Empirical Formula - lowest ratio (subscripts reduced)

Molecular Formula - gives exact # of atoms of each element

$C_6H_{12}O_6$	CH_2O
Molecular	Empirical

Converting to Molecular Formula from EF

- Molecular formula is a multiple of empirical formula

Em. Form - $NO_2 \times 2$

Mol. Form - N_2O_4

- Molecular Formula Mass is a multiple of empirical formula mass.

Ex.) EF - CH_4 and a molar mass of 48g.
Find molecular formula.

CH_4 - 16g $\quad \frac{48g}{16g} = 3$ $\quad (CH_4) \times 3 = C_3H_{12}$