Nomenclature

The process of writing a chemical name + formula.

Background:

Ion: an atom that has gained or lost e⁻ & is now charged.

gain e⁻ = negative charge

lose e⁻ = positive charge

Octet Rule = atoms want 8 valence e⁻

IA	IIA		IIIA	IVA	VA	VIA	VIIA	VIIIA
1 val e⁻	2 val e⁻	Grp B 2 vale⁻	3 val e⁻	4 val e⁻	5 val e⁻	6 val e⁻	7 val e⁻	8 val e⁻
lose 1 e⁻	lose 2 e⁻	X	lose 3 e⁻	gain or lose 4 e⁻	gain 3 e⁻	gain 2 e⁻	gain 1 e⁻	
1+	2+		3+	4+ / 4−	3−	2−	1−	

Binary Ionic Compounds – metal + nonmetal – based on charges

K^{1+} S^{2-} K_2S potassium sulfide

↖ subscript (multiplier)

$2+ \quad 1+ \; 2- = 0$

$Mg_3^{2+}\ P_2^{3-}$ $Mg^{6+}\ P^{6-} = 0$ Mg_3P_2 magnesium phosphide

$Cr^{4+}\ O_2^{2-}$ $Cr^{4+}\ O^{4-} = 0$ CrO_2 chromium(IV) oxide

Hint:

cation +

anion –

To name them use name of metal followed by the anion name of the non-metal.
The anion form adds -ide to the ending.

Ionic compounds with a polyatomic ion. * USE CHARGES!

Hydroxide OH^{1-}

Chlorate ClO_3^{1-}

Sulfate SO_4^{2-}

nitrate NO_3^{1-}

phosphate PO_4^{3-}

Carbonate CO_3^{2-}

ammonium NH_4^{1+}

acetate $C_2H_3O_2^{1-}$

cyanide CN^{1-}

peroxide O_2^{2-}

permaganate MnO_4^{1-}

$Sr^{2+} (C_2H_3O_2)_2^{1-} \rightarrow Sr(C_2H_3O_2)_2$

Strontium acetate

$NH_4^{1+} \quad PO_4^{3-} \longrightarrow (NH_4)_3(PO_4)$

ammonium phosphate

Binary molecular compounds - nonmetal + nonmetal Do NOT use charges—

you must use the name as directions

Sulfur dioxide

SO_2

CO carbon monoxide

use prefixes to indicate quantity

N_2Br dinitrogen monobromide

Acids

Hydrogen must be present!!

Binary

H + nonmetal

hydro____ic acid

$HF(aq)$ hydrofluoric acid

$H_2S(aq)$ hydrosulfuric acid (H^{1+}, S^{2-})

Oxyacid Ternary *Polyatomic ion present

H + polyatomic ion

ide / ate → ends with ic

ite → ends with ous

Hydro

Acid disease

ate ic ite ous

$H_2SO_4(aq)$ Sulfuric acid

$HC_2H_3O_2(aq)$ acetic acid

Types of Chemical Reactions

Synthesis or Direct Combination

Single + Single → compound

Single + compound → 1 product

Single Replacement

Single element + compound → new compound + released element

"like replaces like" $AB + D \rightarrow AD + B$

Double Replacement

Compound A + compound B → AC + BD

$AD + BC$

if one of these 2 is solid it is called a precipitate (ppt)

Decomposition $AB \rightarrow A + B$

Combustion $X + O_2(g) \rightarrow XO$

hydrocarbon + $O_2(g) \rightarrow H_2O + CO_2$

C_xH_y