NAMING IONIC COMPOUNDS

$(NH_4)_2S$

ammonium sulfide

$FeCO_3$

Fe^{2+} CO_3^{2-}

+2 -2

iron(II) carbonate

TiS_2

Ti^{4+} S^{2-} S^{2-}

+4 -4

titanium(IV) sulfide

$Ba_3(PO_4)_2$

barium phosphate

Spelling matters!

Ba_3P_2

barium phosphide

$Ca(NO_3)_2$

calcium nitrate

*p130- table of polyatomic ions

DETERMINING THE FORMULA OF AN IONIC COMPOUND FROM THE NAME

- The name of an ionic compound is made of the names of the CATION and ANION in the compound.

- To get the FORMULA, you must figure out the SMALLEST RATIO of cation to anion that makes the charges balance out

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Examples:

iron(III) carbonate

Fe^{3+} CO_3^{2-}

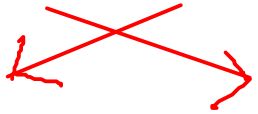
Fe^{3+} CO_3^{2-}

CO_3^{2-}

$Fe_2(CO_3)_3$

potassium sulfide

K^+ S^{2-}



K_2S

calcium bromide

Ca^{2+} Br^-

Br^-

$CaBr_2$

DETERMINING IONIC FORMULAS

sodium sulfate

$Na^+ \quad SO_4^{2-}$

Na^+

Na_2SO_4

tin(II) phosphate

$Sn^{2+} \quad PO_4^{3-}$

$Sn_3(PO_4)_2$

barium hydroxide

$Ba^{2+} \quad OH^-$

OH^-

$Ba(OH)_2$

strontium oxide

$Sr^{2+} \quad O^{2-}$

SrO

chromium(III) nitrate

$Cr^{3+} \quad NO_3^-$

$Cr(NO_3)_3$

titanium(IV) chloride

$Ti^{4+} \quad Cl^-$

Cl^-

Cl^-

Cl^-

$TiCl_4$

~~$BaOH_2$~~

chromium(III) nitride

$Cr^{3+} \quad N^{3-}$

CrN

titanium(IV) oxide

$Ti^{4+} \quad O^{2-}$

O^{2-}

TiO_2

Be careful with polyatomic ions that don't end in a subscript (like hydroxide and cyanide) - you need to put the ion in parenthesis to indicate more than one of these ions!

MOLECULAR COMPOUNDS

- There are several kinds of molecular compound. We will learn to name two simple but important classes

1 BINARY MOLECULAR COMPOUNDS

- molecular compounds containing only two elements

2 ACIDS

- molecular compounds that dissolve in water to release H^+ ions
- corrosive to metals (react with many to produce hydrogen gas)
- contact hazard: can cause chemical burns to eyes and skin
- sour taste
- turn litmus indicator RED
- two kinds of acids:

1 BINARY ACIDS

usually Group VIIA

- contain hydrogen and one other element

2 OXYACIDS

- contain hydrogen, OXYGEN, and another element

BINARY MOLECULAR COMPOUNDS

- Named based on the elements they contain, plus prefixes to indicate the number of atoms of each element in each molecule

(1) FIRST ELEMENT

- Add a GREEK PREFIX to the name of the element.
- Omit the "MONO-" (1) prefix if there is only one atom of the first element

(2) SECOND ELEMENT

- Add a GREEK PREFIX to the STEM NAME of the element
- Add the suffix "-ide" (as if you were naming an anion)
- DO NOT omit the "mono-" prefix if there is only one atom of the second element

SEE COURSE WEB SITE FOR A LIST OF GREEK PREFIXES!

BINARY MOLECULAR COMPOUNDS

Examples:

BF_3
boron trifluoride

Cl_2O_7
dichlorine hept(a)oxide

CO
carbon monoxide

CO_2
carbon dioxide

H_2O dihydrogen monoxide (we call it water...)

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carbon tetrachloride
CCl_4

iodine trichloride
ICl_3

dinitrogen tetrafluoride
N_2F_4

$MgCl_2$: magnesium chloride. (NOT magnesium dichloride) ... Magnesium chloride is an ionic compound and is named using that system. (Hint: Compounds that start with a metal are usually ionic!)