NAMING IONIC COMPOUNDS

- The name of the compound is based on the name of the ions in the compound
- Cation first, anion second

Examples:

$Mg(OH)_2$

magnesium hydroxide

Na_2S

sodium sulfide

$BeBr_2$

beryllium bromide

Fe_2O_3

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

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

O^{2-}

+6 −6

iron(III) oxide

CuO

Cu^{2+} O^{2-}

+2 −2

copper(II) oxide

Cu_2O

Cu^{+} O^{2-}

Cu^{+}

+2 −2

copper(I) oxide

Page 63 (9th edition): Chart of polyatomic ions

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

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^+

K_2S

calcium bromide

Ca^{2+} Br^-

Br^-

$CaBr_2$

DETERMINING IONIC FORMULAS

sodium sulfate

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

Na^+

Na_2SO_4

strontium oxide

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

SrO

tin(II) phosphate

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

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

Sn^{2+}

$Sn_3(PO_4)_2$

chromium(III) nitrate

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

NO_3^-

NO_3^-

$Cr(NO_3)_3$

barium hydroxide

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

OH^-

$Ba(OH)_2$

~~$BaOH_2$~~

titanium(IV) chloride

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

Cl^-

Cl^-

Cl^-

$TiCl_4$

Remember: To indicate more than one polyatomic ion, you MUST use parenthesis!

HYDRATES

- many ionic compounds are formed by crystallizing the compound from water. Sometimes, this causes water molecules to become part of the crystal structure.

- This water is present in a definite ratio to the ions in the compound. Can be removed by heating, but will NOT evaporate if the compound is left standing.

ex: $CuSO_4 \cdot 5H_2O$

water molecules per formula unit of compound

dot indicates that the water is weakly bound to the ionic compound

- many DESSICANTS are hydrates that have had their water molecules driven off. They will slowly reabsorb water from the air (and keep the environment in a dessicator at a low humidity)

- Hydrates are named using the name of the ionic compound, and a Greek prefix in front of the word "hydrate" to indicate how many water molecules are associated

Cu^{2+} SO_4^{2-}

copper (II) sulfate pentahydrate

Why "copper(II)"?