

POLYATOMIC IONS

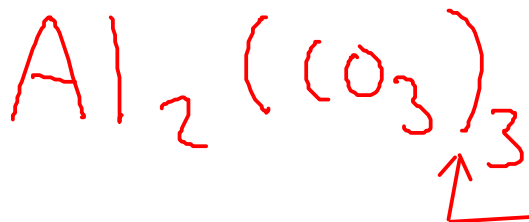
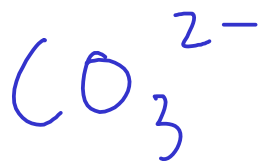
- Some MOLECULES can gain or lose electrons to form CATIONS or ANIONS. These are called POLYATOMIC IONS

- Polyatomic ions form ionic compounds in the same way that single-element ions do.

Example: CO_3^{2-} : CARBONATE ION

* Compare
to
 Al_2O_3

from
 Al^{3+} O^{2-}



* Use parenthesis when an ionic compound's formula contains more than one of a polyatomic ion.

See the web site or page 63 - table 2.5 (9th ed) or table 2.6 (10th ed) - for a list of common polyatomic ions!

NAMES OF IONS

- To properly discuss ions and ionic compounds, we have to know how to name them!

CATIONS

3 kinds:

① Main group cations (metals that take only one charge when forming ions)

- The element's name is the same as the ion's name!



② Transition metal cations (from metals that can form several cations)

- The CHARGE of the cation must be given. Use a ROMAN NUMERAL after the element name to indicate charge!



③ Polyatomic cations

- Memorize list.



ANIONS

2 kinds

①

Main-group nonmetals

- Use the STEM NAME of the element, then add "-ide" suffix

 N^{3-} : "nitride" ion P^{3-} : "phosphide ion" S^{2-} : sulfide ion O^{2-} : "oxide ion" F^{-} : "fluoride ion"

②

Polyatomic ions

- Memorize list.(see web site)

 $\text{C}_2\text{H}_3\text{O}_2^-$: "acetate ion" SO_4^{2-} : "sulfate ion" NO_3^- : "nitrate ion" SO_3^{2-} "sulfite ion" NO_2^- : "nitrite ion"

* Polyatomic ions ending in "-ate" and "-ite" suffixes always contain oxygen! "-ate" ions have more oxygen atoms than their "-ite" counterparts.

NAMING IONIC COMPOUNDS

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

Examples:



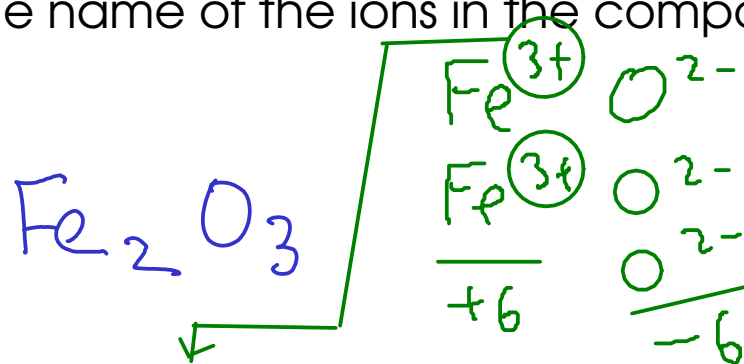
magnesium hydroxide



sodium sulfide



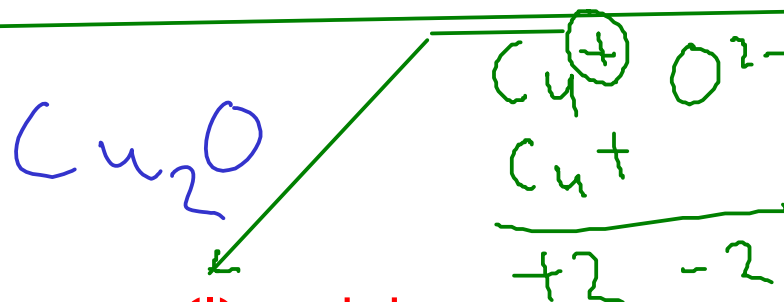
beryllium bromide



iron(III) oxide



copper(II) oxide



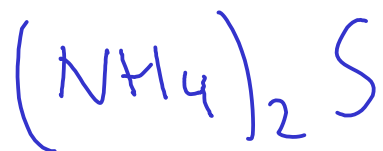
copper(I) oxide

* Remember to include the Roman numeral for CHARGE when you're writing transition metal compound names!

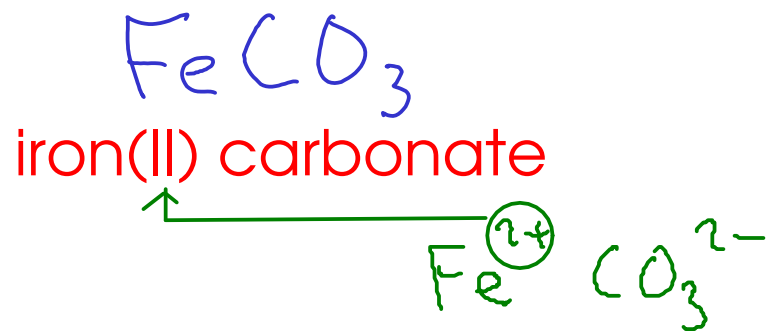
Page 63 (9th edition): Chart of polyatomic ions

Page 64 (10th edition)

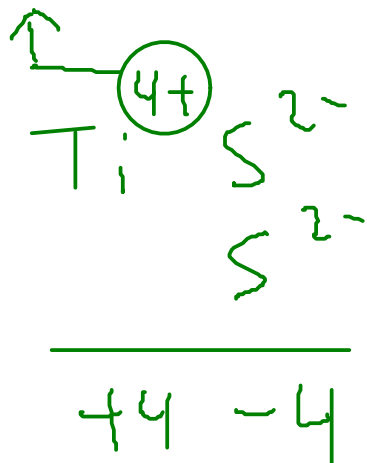
NAMING IONIC COMPOUNDS



ammonium sulfide



titanium(IV) sulfide



barium phosphate

Spelling
matters!



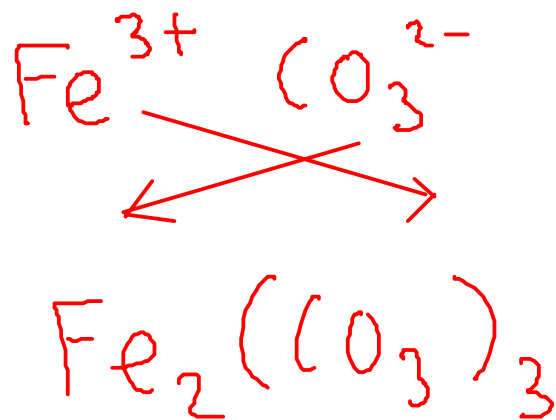
barium phosphide

DETERMINING THE FORMULA OF AN IONIC COMPOUND FROM THE NAME

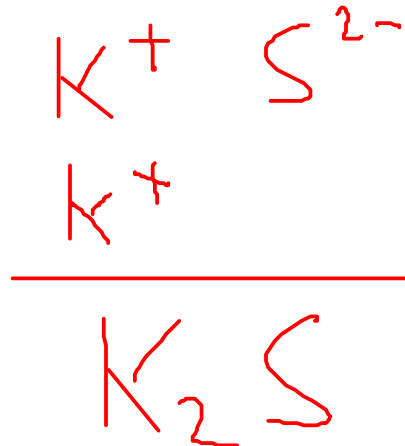
- The name of an ionic compound is made of the names of the CATION and ANION in the compound.
 - To get the FORMULA, you must figure out the SMALLEST RATIO of cation to anion that makes the charges balance out
-

Examples:

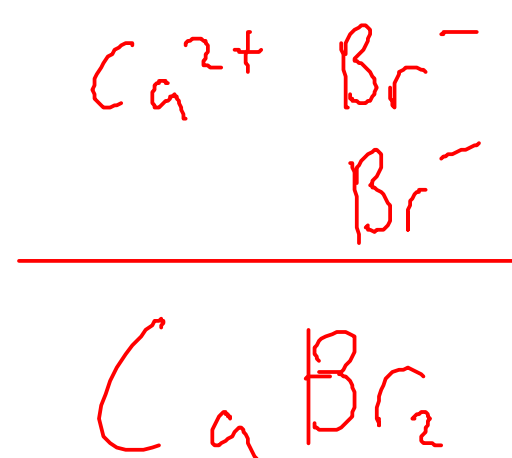
iron(III) carbonate



potassium sulfide

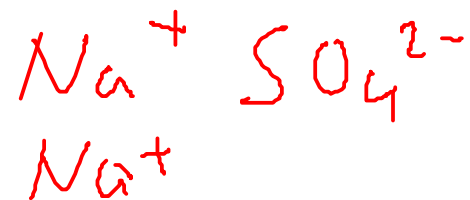


calcium bromide

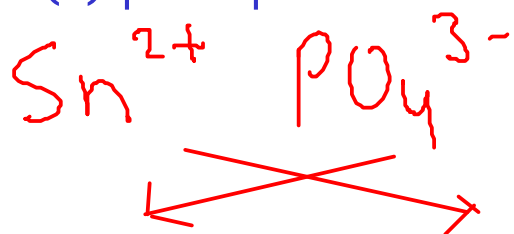


DETERMINING IONIC FORMULAS

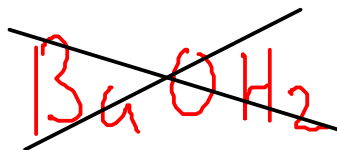
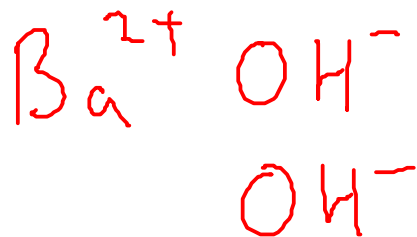
sodium sulfate



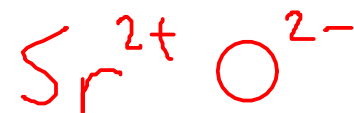
tin(II) phosphate



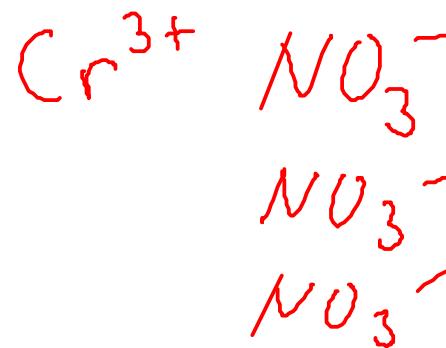
barium hydroxide



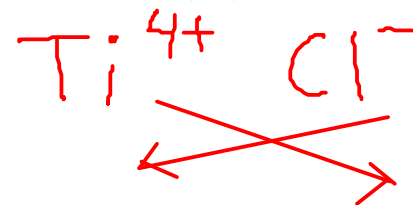
strontium oxide



chromium(III) nitrate



titanium(IV) chloride



Don't forget parenthesis when writing multiple HYDROXIDE, CYANIDE, or HYPOCHLORITE ions!