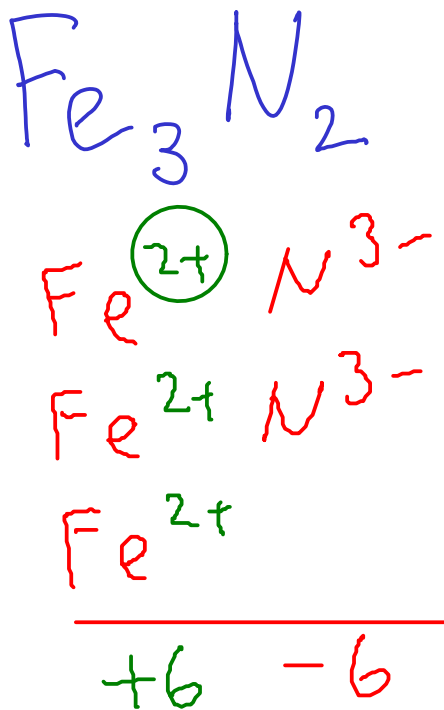


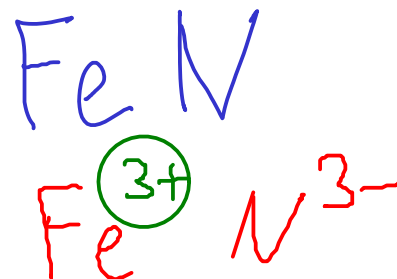
## TRANSITION METAL CATIONS

- So how do you know which cation you're dealing with? For now, you'll have to be told
- Either the chemical formula of an ionic compound or the name of an ionic compound can tell you what charge is on the transition metal cation.

Examples:



\* The iron in this compound has a +2 charge. We call it "iron(II)" (pronounced "iron two"). The compound is called "iron(II) nitride".



\* The iron in this compound has a +3 charge. We call it "iron(III)" (pronounced "iron three"). The compound is called "iron(III) nitride".

POLYATOMIC IONS

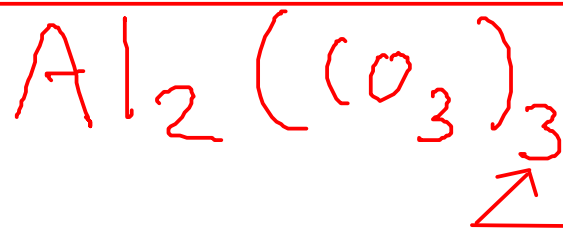
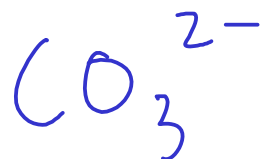
- Some MOLECULES can gain or lose electrons to form CATIONS or ANIONS. These are called POLYATOMIC IONS

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

Example:  $\text{CO}_3^{2-}$  : CARBONATE ION

\* Compare  
to  
 $\text{Al}_2\text{O}_3$

from  
 $\text{Al}^{3+}$   $\text{O}^{2-}$



\* 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

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

②

Polyatomic ions

- Memorize list.(see web site)

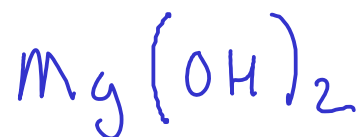
 $\text{C}_2\text{H}_3\text{O}_2^-$  : "acetate ion" $\text{SO}_4^{2-}$  : "sulfate ion" $\text{NO}_3^-$  : "nitrate ion" $\text{SO}_3^{2-}$  "sulfite ion" $\text{NO}_2^-$  : "nitrite ion"

\* 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

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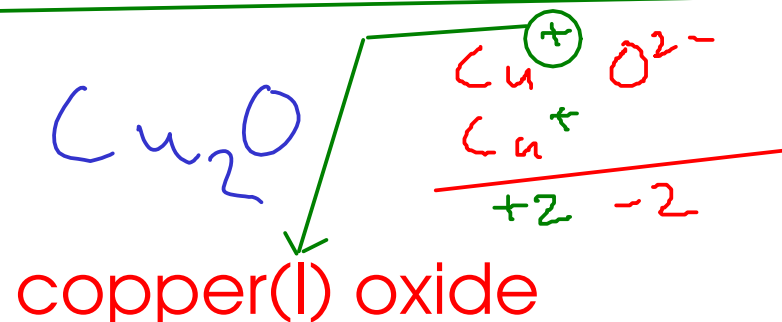
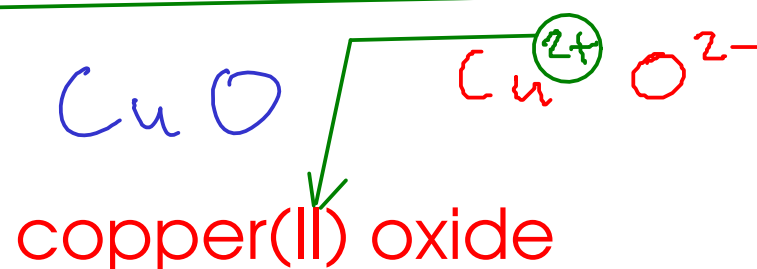
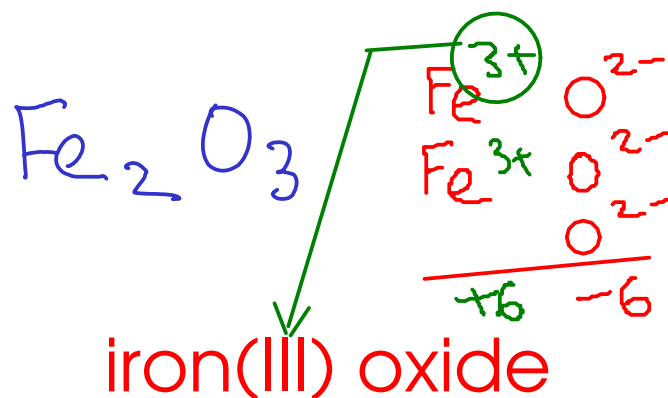


sodium sulfide

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beryllium bromide

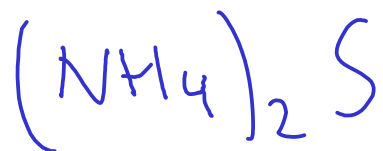


\* Remember to include the Roman numeral for CHARGE when you're writing transition metal compound names!

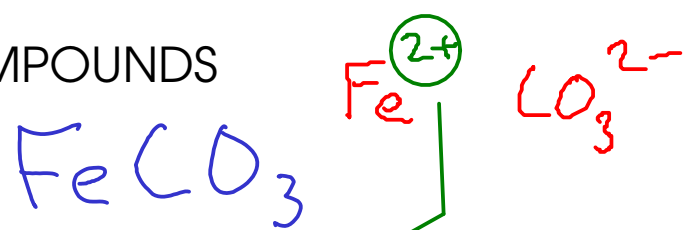
Page 63 (9th edition): Chart of polyatomic ions

Page 64 (10th edition)

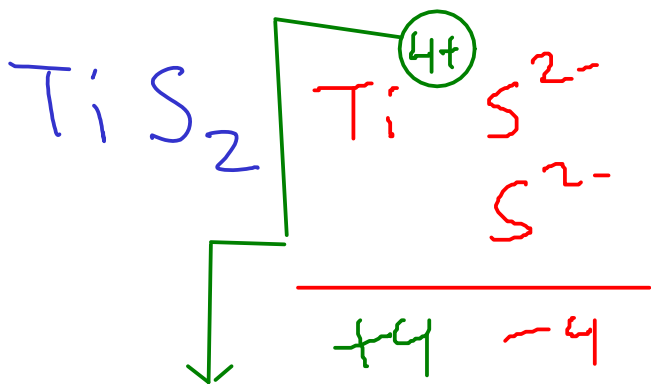
## NAMING IONIC COMPOUNDS



ammonium sulfide



iron(II) carbonate



titanium(IV) sulfide



barium phosphate



Spelling matters!

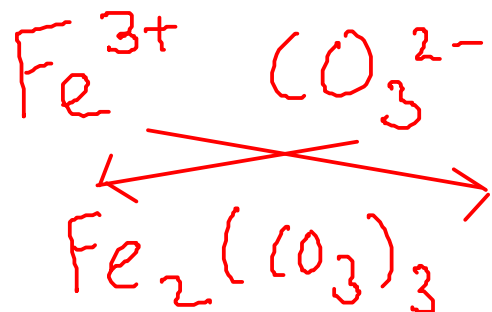
barium phosphide

## 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:

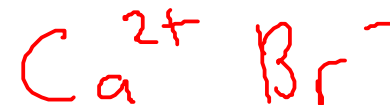
iron(III) carbonate



potassium sulfide

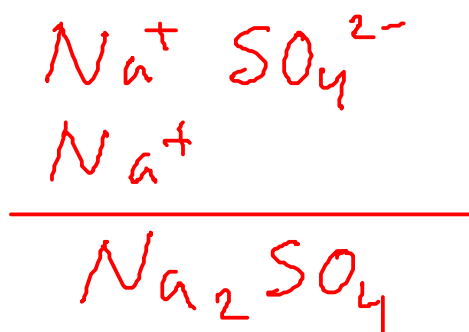


calcium bromide

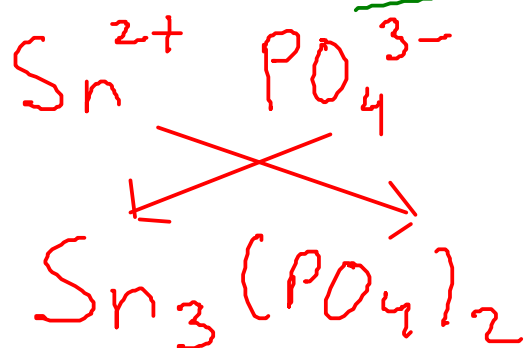


## DETERMINING IONIC FORMULAS

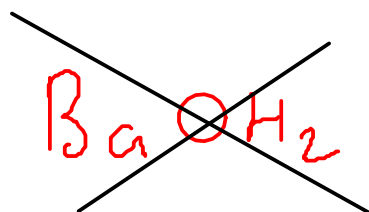
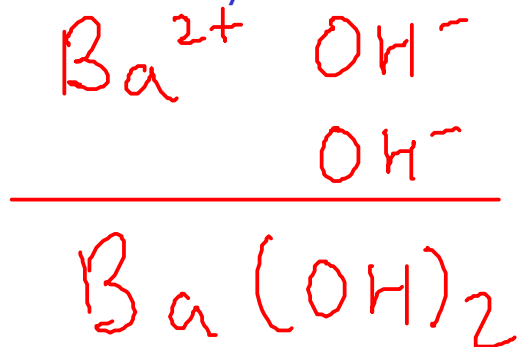
sodium sulfate



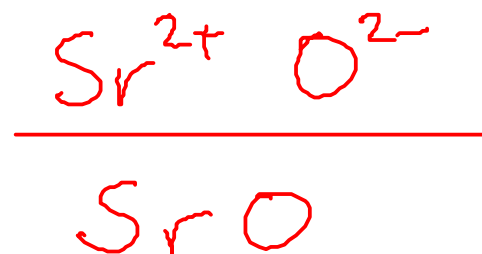
tin(II) phosphate



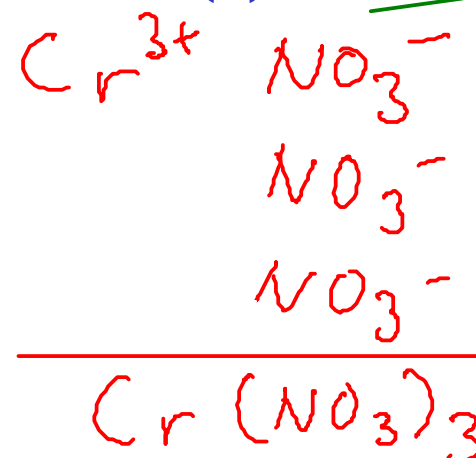
barium hydroxide



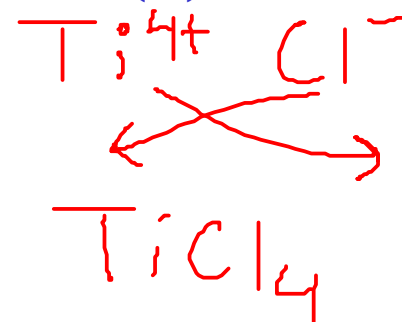
strontium oxide



chromium(III) nitrate



titanium(IV) chloride



Note: Remember the parenthesis when indicating more than one polyatomic ion ... especially for HYDROXIDE, CYANIDE, and HYPOCHLORITE !