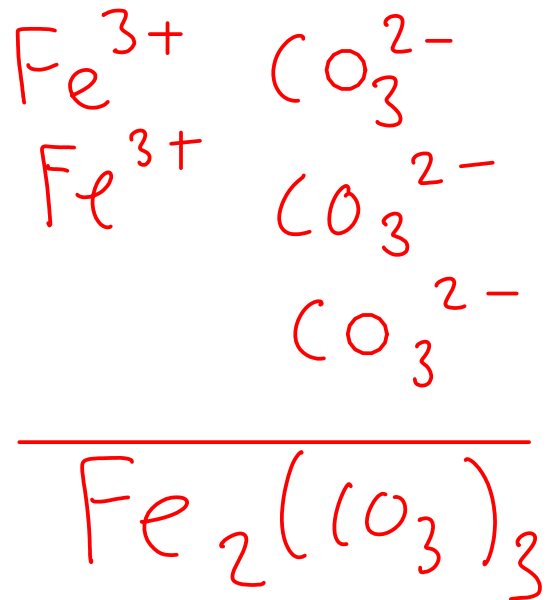


## DETERMINING THE FORMULA OF AN IONIC COMPOUND FROM THE NAME

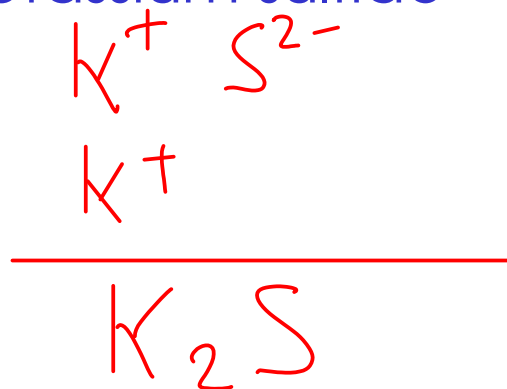
- The name of an ionic compound is made of the names of the CATION and ANION in the compound.
- To get the FORMULA, you must figure out the SMALLEST RATIO of cation to anion that makes the charges balance out

Examples:

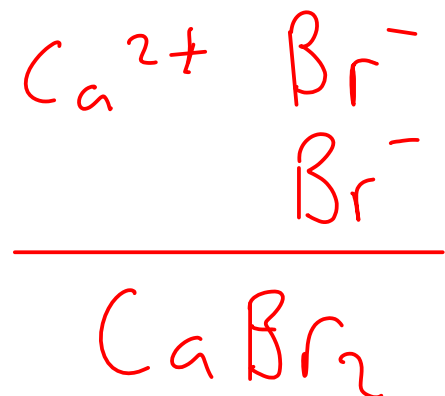
iron(III) carbonate



potassium sulfide

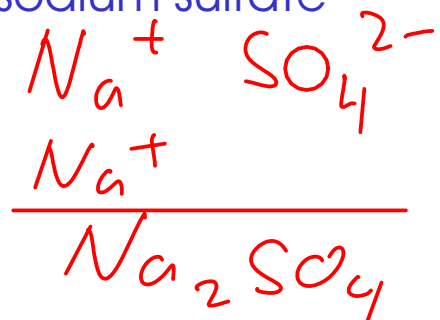


calcium bromide

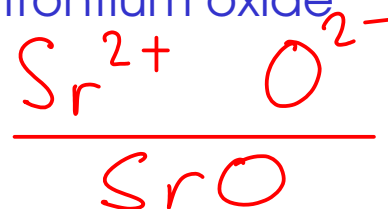


## DETERMINING IONIC FORMULAS

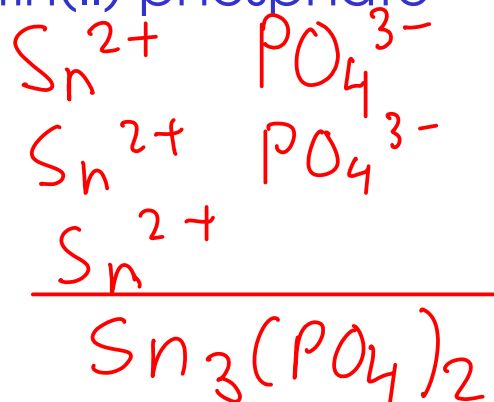
sodium sulfate



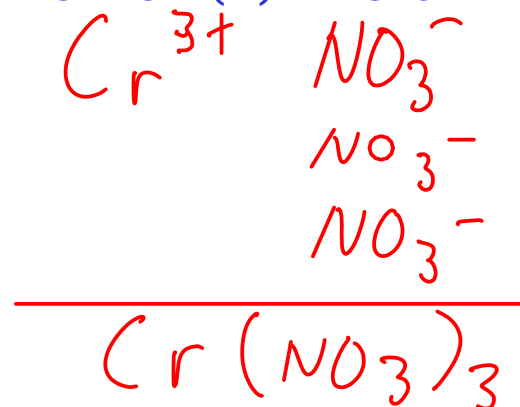
strontium oxide



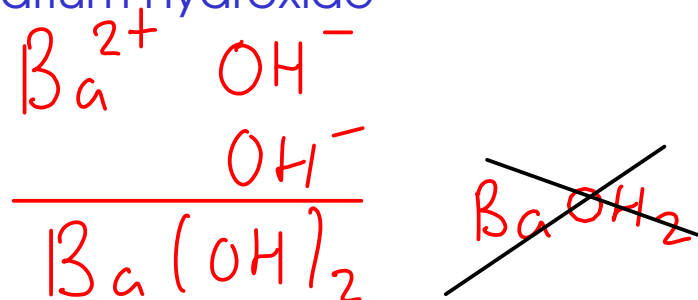
tin(II) phosphate



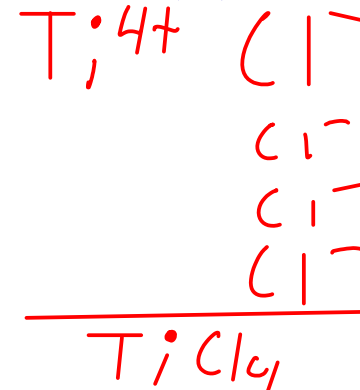
chromium(III) nitrate



barium hydroxide



titanium(IV) chloride

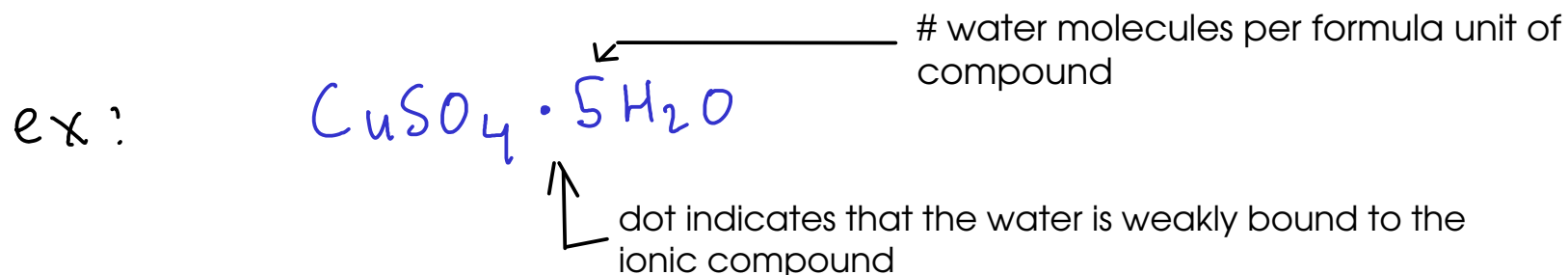


Note: Be careful when writing formulas of HYDROXIDES, CYANIDES, and HYPOCHLORITES ... These polyatomics don't end in their own subscript, but you must still put them in parenthesis to add your own!

## HYDRATES

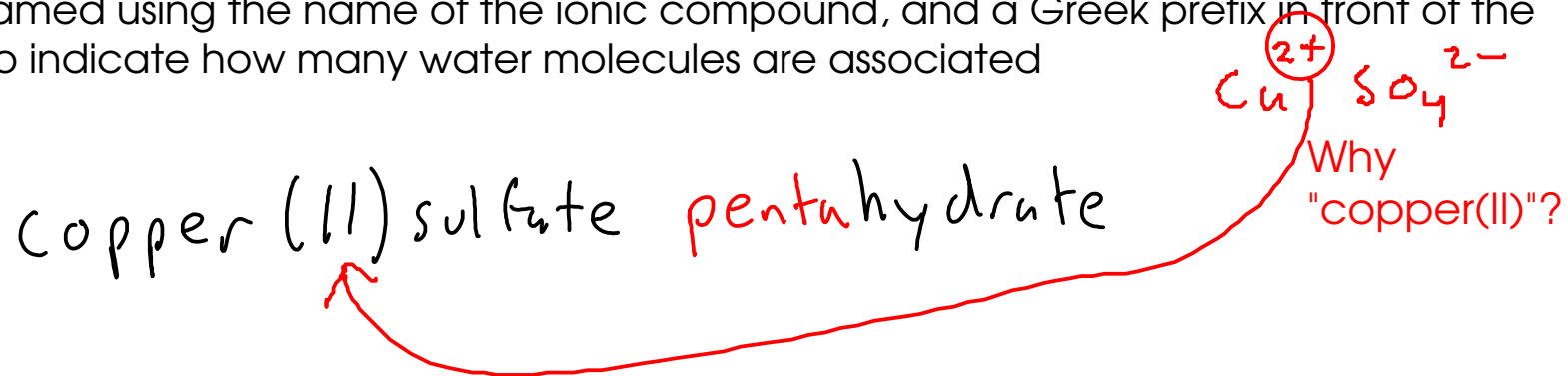
- many ionic compounds are formed by crystallizing the compound from water. Sometimes, this causes water molecules to become part of the crystal structure.

- 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.



- 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



## 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

- contain hydrogen and one other element

#### ② OXYACIDS

- contain hydrogen, OXYGEN, and another element

Usually from  
Group VIIA

## 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!  
THESE ARE THE SAME PREFIXES USED FOR THE HYDRATES!

## BINARY MOLECULAR COMPOUNDS

Examples:

$\text{BF}_3$   
boron  
trifluoride

$\text{Cl}_2\text{O}_7$   
dichlorine  
hept(a)oxide

$\text{CO}$   
carbon  
monoxide

$\text{CO}_2$   
carbon  
dioxide

\*Note: metalloids like boron behave chemically like nonmetals do.

---

carbon tetrachloride



dihydrogen monoxide



dinitrogen tetrafluoride



## ACIDS

## ① BINARY ACIDS

- named after the element (other than hydrogen) they contain
- common binary acids include a Group VIIA element
- named: "Hydro-" + STEM NAME OF ELEMENT+ "-ic acid"

Four  
common  
binary  
acids

$\text{HF}$  : hydrofluoric acid \* dissolves glass!

$\text{HCl}$  : hydrochloric acid \* most common binary acid!

$\text{HBr}$  : hydrobromic acid

$\text{HI}$  : hydroiodic acid

## ② OXYACIDS

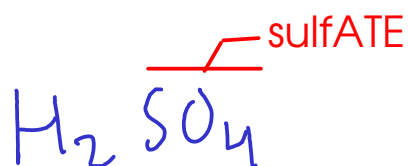
- Easy to think about as HYDROGEN IONS combined with POLYATOMIC IONS

- These acids are not true ionic compounds, but they interact with water to PRODUCE ions!

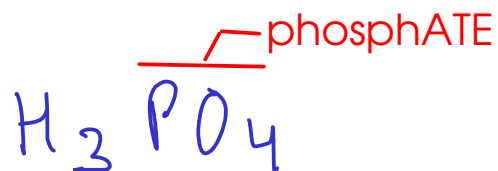
- named based on the polyatomic ion they contain, with an ending change:

① - ions ending in -ATE form acids ending in -IC

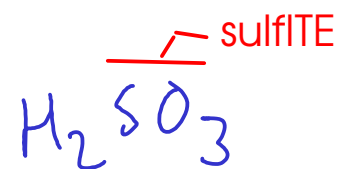
② - ions ending in -ITE form acids ending in -OUS



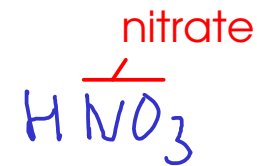
sulfuric  
acid



phosphoric  
acid



sulfurous  
acid



nitric  
acid