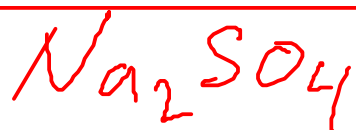
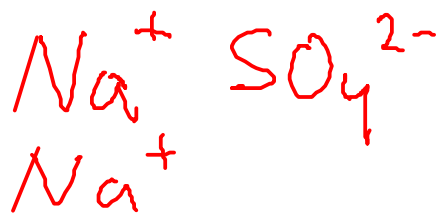
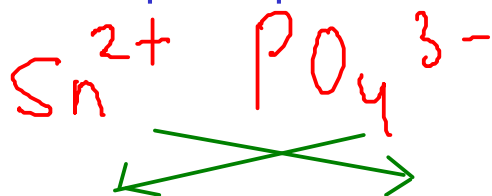


DETERMINING IONIC FORMULAS

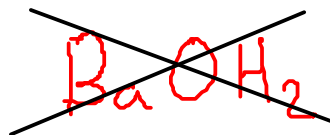
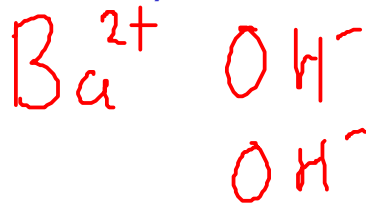
sodium sulfate



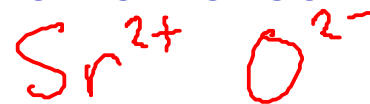
tin(II) phosphate



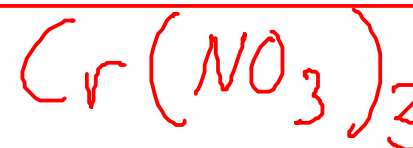
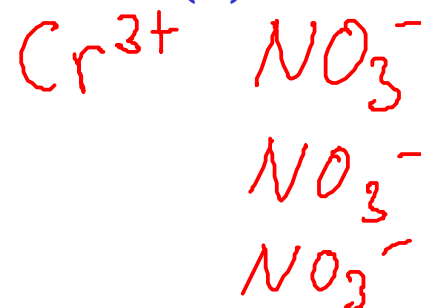
barium hydroxide



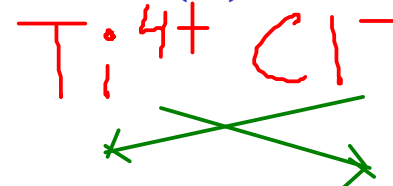
strontium oxide



chromium(III) nitrate



titanium(IV) chloride

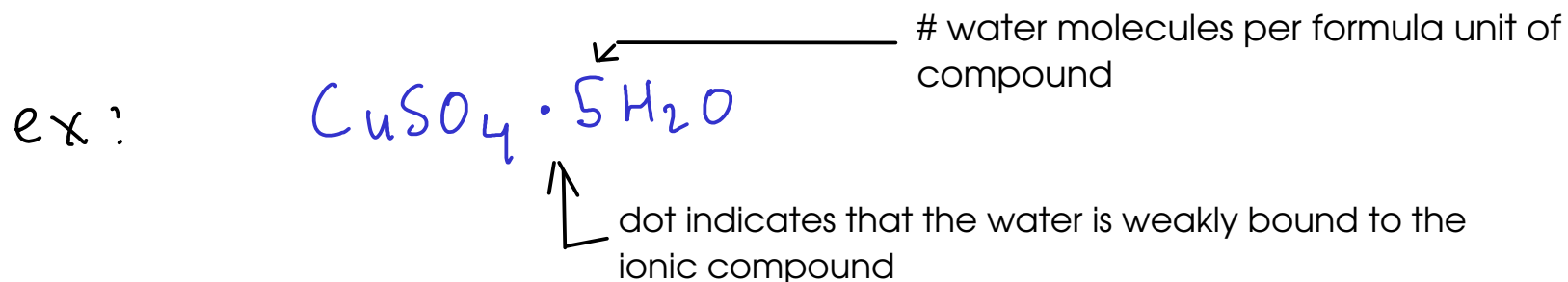


* Be careful with HYDROXIDE, CYANIDE, and HYPOCHLORITE ions. Try to avoid forgetting the parenthesis when you have more than one of these ions!

HYDRATES

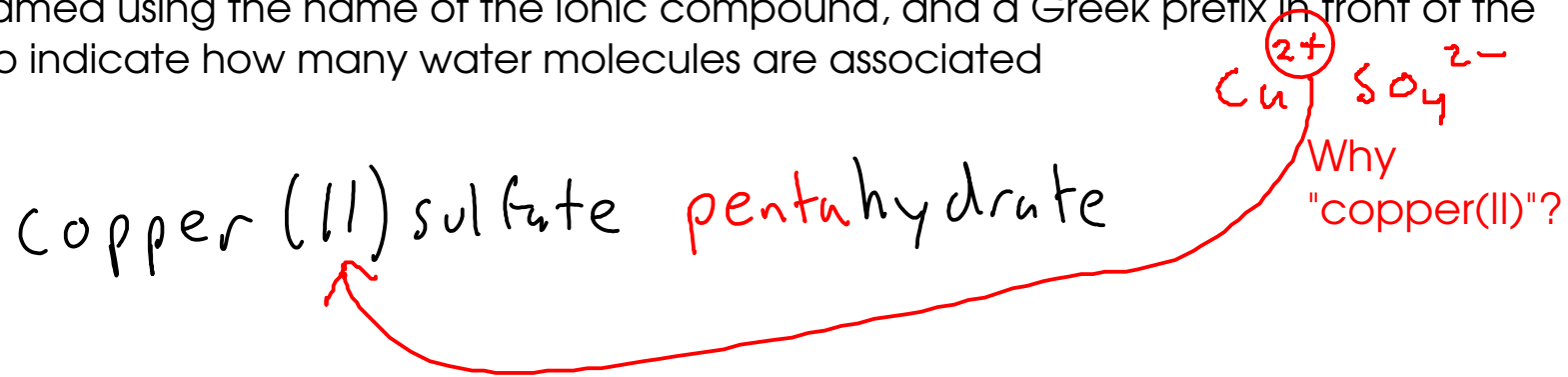
- many ionic compounds are formed by crystallizing the compound from water. Sometimes, this causes water molecules to become part of the crystal structure.

- 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

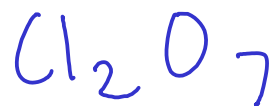
② SECOND ELEMENT

- 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:

boron
trifluoridedichlorine
heptaoxidecarbon
monoxidecarbon
dioxide

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

carbon tetrachloride



dihydrogen monoxide



dinitrogen tetrafluoride



MgCl_2 : MAGNESIUM CHLORIDE ... not magnesium dichloride. Why not? This one is IONIC. We can tell because its first element is a METAL, and METAL/NONMETAL combinations are usually IONIC.

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

HF : hydrofluoric acid * dissolves glass!

HCl : hydrochloric acid * most common binary acid!

HBr : hydrobromic acid

HI : hydroiodic acid

② OXYACIDS

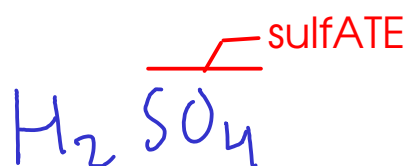
- Easy to think about as HYDROGEN IONS combined with POLYATOMIC IONS

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

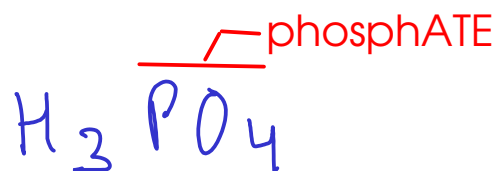
- named based on the polyatomic ion they contain, with an ending change:

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

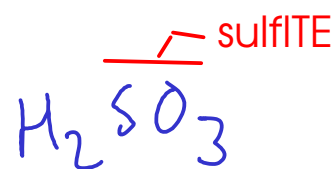
② - ions ending in -ITE form acids ending in -OUS



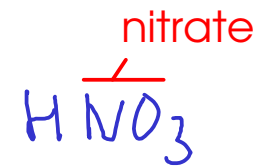
sulfuric
acid



phosphoric
acid



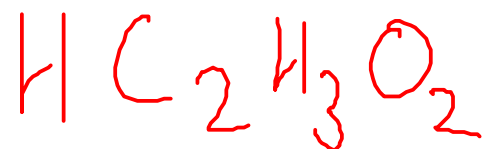
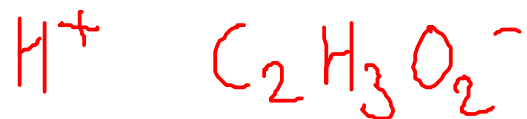
sulfurous
acid



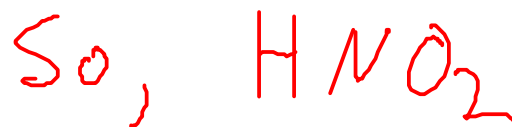
nitric
acid

OXYACID EXAMPLES

acetic acid

 $\overline{\text{C}}$ based on ACETATE ion


nitrous acid

 $\overline{\text{N}}$ based on NITRITE


carbonic acid

 $\overline{\text{C}}$ based on CARBONATE


The number of hydrogen atoms at the beginning of the formula equals the charge of the anion the acid is based on!