

DETERMINING IONIC FORMULAS

sodium sulfate



tin(II) phosphate

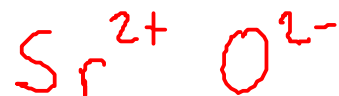


barium hydroxide



We must use the PARENTHESIS to indicate more than one hydroxide ion!

strontium oxide



chromium(III) nitrate



titanium(IV) chloride



chromium(III) nitride



titanium(IV) oxide



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

usually
Group VIIA
↓

② OXYACIDS

- contain hydrogen, OXYGEN, and another element

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

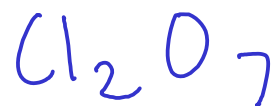
MEMORIZE THE GREEK PREFIXES. SEE COURSE WEB SITE FOR A LIST!

BINARY MOLECULAR COMPOUNDS

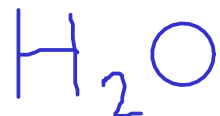
Examples:



boron trifluoride



dichlorine hept(a)oxide

carbon
monoxidecarbon
dioxide

dihydrogen monoxide ; (common name "water")

carbon tetrachloride



iodine trichloride



dinitrogen tetrafluoride



MgCl_2 : magnesium CHLORIDE (not magnesium DICHLORIDE). It's IONIC.

How can we tell them apart? Simplest way: Ionic compounds usually contain a METAL as their first element, while MOLECULES contain no metal atoms. (exception: AMMONIUM compounds are ionic, but start with a nonmetal)

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!

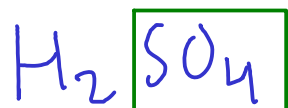
HCl : hydrochloric acid * most common binary acid!

HBr : hydrobromic acid

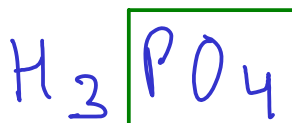
HI : hydroiodic acid

② OXYACIDS

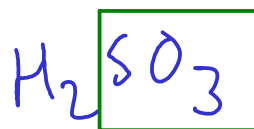
- Easy to think about as HYDROGEN IONS combined with POLYATOMIC IONS
- These acids are not true ionic compounds, but they interact with water to PRODUCE ions!
- named based on the polyatomic ion they contain, with an ending change:
 - ① - ions ending in -ATE form acids ending in -IC
 - ② - ions ending in -ITE form acids ending in -OUS



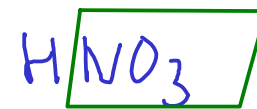
sulfuric acid



phosphoric acid



sulfurous acid



nitric acid