

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!

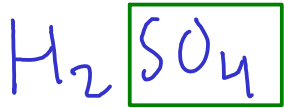
HCl : hydrochloric acid * most common binary acid!

HBr : hydrobromic acid

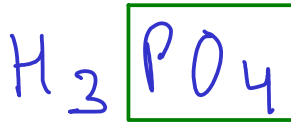
HI : hydroiodic acid

② OXYACIDS

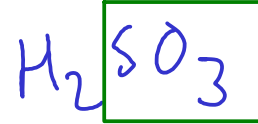
- Easy to think about as HYDROGEN IONS combined with POLYATOMIC IONS
- These acids are not true ionic compounds, but they interact with water to PRODUCE ions!
- named based on the polyatomic ion they contain, with an ending change:
 - ① - ions ending in -ATE form acids ending in -IC
 - ② - ions ending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



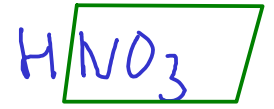
sulfuric acid



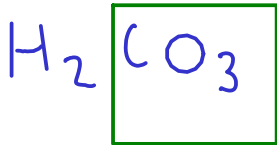
phosphoric acid



sulfurous acid



nitric acid

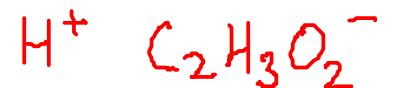


carbonic acid

OXYACID EXAMPLES

acetic acid

└ based on ACETATE ion



nitrous acid

└ based on NITRITE ion



carbonic acid

└ based on
CARBONATE ion



* The number of hydrogen ions to add to the polyatomic to make the acid equals the charge of the polyatomic.

SUMMING UP CHEMICAL NOMENCLATURE

- You need to be able to tell, by looking at a name OR a formula, what kind of compound you are working with!

DON'T GET THE NAMING SYSTEMS MIXED UP! EACH KIND OF COMPOUND IS NAMED WITH ITS OWN SYSTEM!

FROM A CHEMICAL NAME

- If the name has a Roman numeral, the name of a metal, or "ammonium", the compound is likely IONIC

- If the name has a Greek prefix, the compound is BINARY MOLECULAR

- If the name contains the word "acid":

... and starts with "hydro-", then the compound is a BINARY ACID

... and does not start with "hydro-", the compound is an OXYACID

98 FROM A CHEMICAL FORMULA

- if the formula contains a metal or the NH_4^+ ion, it is likely IONIC

- If the formula starts with H and is not either water or hydrogen peroxide, the compound is likely an ACID. Which kind?

- BINARY ACIDS contain only two elements

- OXYACIDS contains oxygen

- If the formula contains only nonmetals (and is not an ammonium compound or an acid), the compound is likely MOLECULAR

Examples:

PCl_3 : BINARY MOLECULAR
Name: phosphorus trichloride

NH_4Cl : IONIC (ammonium ion)
Name: ammonium chloride

H_3PO_4 : OXYACID (hydrogen, phosphate)
Name: phosphoric acid

$\text{Fe}_2(\text{SO}_4)_3$: IONIC (iron - metal!)
Name: iron(III) sulfate

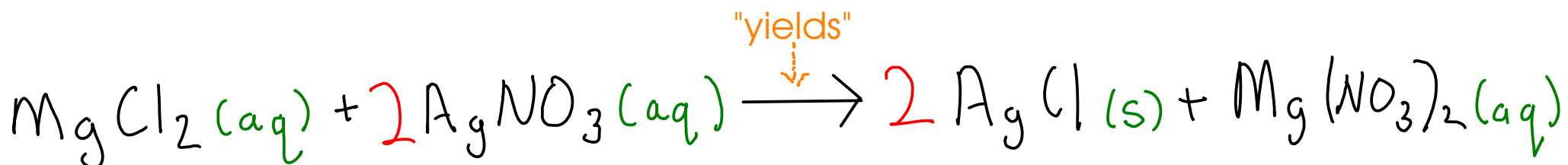
Fe^{3+} SO_4^{2-}
 Fe^{3+} SO_4^{2-}
 SO_4^{2-}

END OF MATERIAL FOR TEST #2

TEST 2 WILL BE GIVEN ON TUESDAY, JUNE 29, 2010

CHEMICAL EQUATIONS

- are the "recipes" in chemistry
- show the substances going into a reaction, substances coming out of the reaction, and give other information about the process



REACTANTS - materials that are needed for a reaction

PRODUCTS - materials that are formed in a reaction

COEFFICIENTS - give the ratio of molecules/atoms of one substance to the others

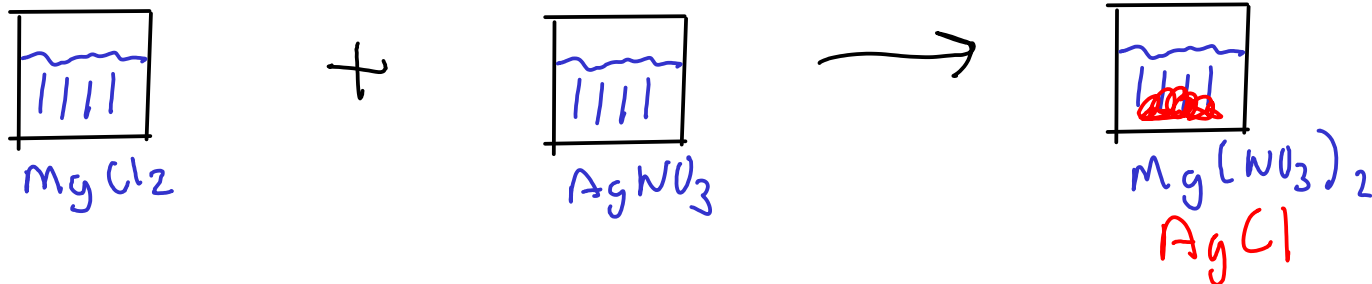
PHASE LABELS - give the physical state of a substance:

(s) - solid

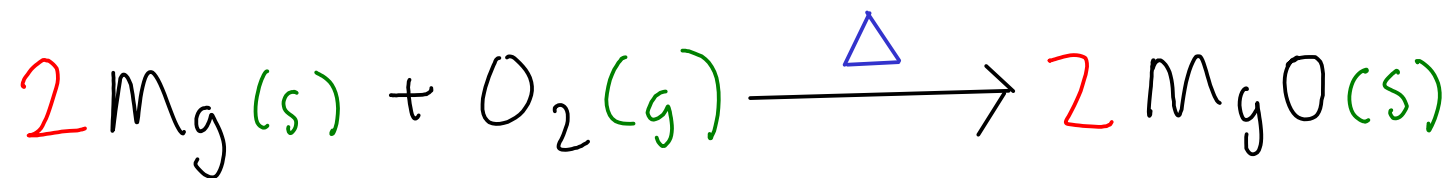
(l) - liquid

(g) - gas

(aq) - aqueous. In other words, dissolved in water



CHEMICAL EQUATIONS



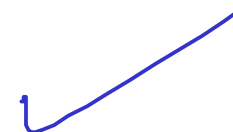
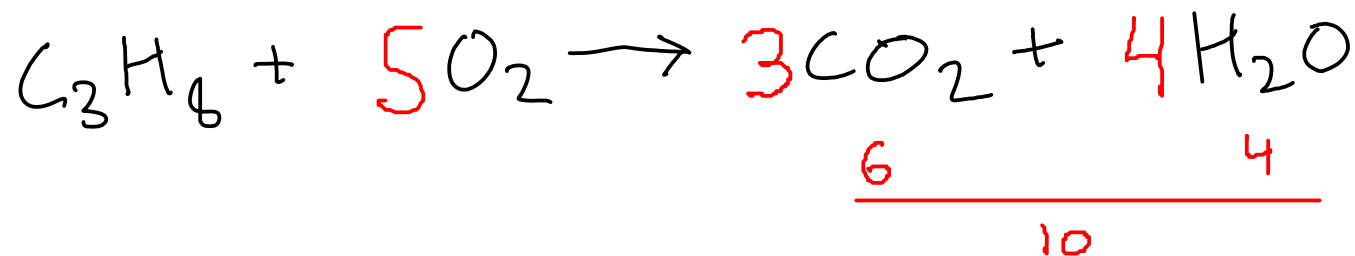
REACTION CONDITIONS - give conditions necessary for chemical reaction to occur. May be:

- Δ apply heat
 - catalysts - substances that will help reaction proceed faster
 - other conditions, such as required temperatures
- Reaction conditions are usually written above the arrow, but may also be written below if the reaction requires several steps or several different conditions

COEFFICIENTS

- Experimentally, we can usually determine the reactants and products of a reaction
- We can determine the proper ratios of reactants and products WITHOUT further experiments, using a process called BALANCING
- BALANCING a chemical equation is making sure the same number of atoms of each element go into a reaction as come out of it.
- A properly balanced chemical equation has the smallest whole number ratio of reactants and products.
- There are several ways to do this, but we will use a modified trial-and-error procedure.

BALANCING



- ① Pick an element. Avoid (if possible) elements that appear in more than one substance on each side of the equation.
- ② Change the coefficients on substances containing this element so that the same number of atoms of the element are present on each side. **CHANGE AS LITTLE AS POSSIBLE!**
- ③ Repeat 1-2 until all elements are done.
- ④ Go back and quickly VERIFY that you have the same number of atoms of each element on each side. If you used any fractional coefficients, multiply each coefficient by the **DENOMINATOR** of your fraction.

Use SMALLEST WHOLE NUMBER RATIOS!