

Chapter 11:

  CHEM 111

Chemical reactions communicate information to us...

Reactants: starting substances ; always on left.

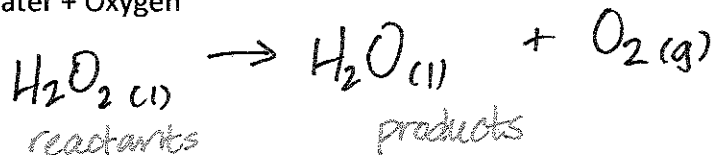
Products: ending substances ; always on right.

Word Equation: names of reactants & products w/ yield arrow between

Skeleton Equation: chemical equation using formulas and states (s, l, g/aq)

WORD EQUATION EXAMPLE:

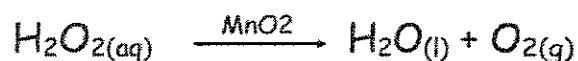
Hydrogen peroxide -> Water + Oxygen



Symbols used in chemical equations	
Symbol	Explanation
+	found between reactants & products
->	yields or produces
<u>word</u> →	catalyst
(s)	solid
(l)	liquid
(g)	gas
(aq)	aqueous - dissolved in water.

CATALYST: a substance that speeds up a reaction but isn't used in the reaction (is not a reactant or product).

Example: MnO_2 catalyzes the decomposition of hydrogen peroxide to produce water and oxygen.



What is a coefficient?

a number that goes before a formula - tells us the mole ratio (# of each)

Which number means what?

2 H_2O ^{subscript} -

↑ coefficient

The Law of Conservation of Mass: matter can neither be created nor destroyed, matter changes.

How do we write Skeleton Equations?

• hydrogen + sulfur → hydrogen sulfide $H_2(g) + S_8(s) \rightarrow H_2S(s)$

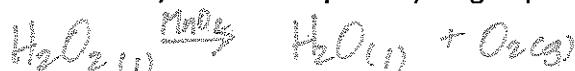
• Solutions of lead (II) nitrate and potassium iodide are mixed, producing a solution of potassium nitrate and lead (II) iodide precipitate.



• Magnesium is burned in the presence of oxygen to produce magnesium oxide



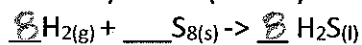
• Manganese (IV) oxide is used as a catalyst to decompose hydrogen peroxide into water and oxygen gas.



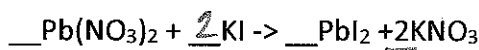
Helpful Hints For Balancing Equations:

- > determine correct formulas for reactants & products. (skeleton equation).
- > count # of atoms in reactants & products
- > Balance using coefficients only.
- > Use lowest ratio to balance. (reduce if need be.)
- > save hydrogen & oxygen until the end.

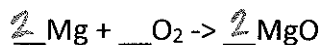
Now Try these (classify the reaction too):



synthesis



single displacement



synthesis / combustion



decomposition.