

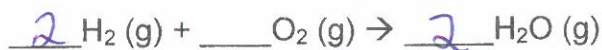
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Chemistry 11
Calculations Involving Balanced Chemical Reactions

STOICHIOMETRY- (stoik-y-o-metry) the relationship
between the amount of reactants used
in a chemical reaction and the amount
of products produced.

In Chemistry it is the Balanced equation that gives us the
PROPORTIONAL RATIO of substances involved in the reaction...it is the
RECIPE in chemistry.

CO-EFFICIENTS- tell the number of EITHER molecules or
moles of substances.



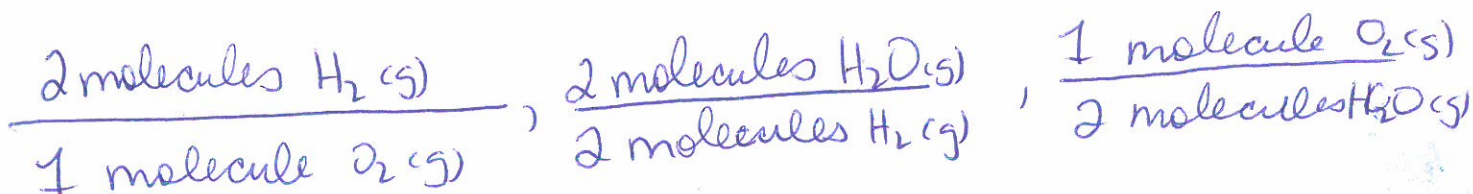
You can read the above balanced chemical reaction as:

"2" molecules hydrogen gas combine with "1" molecule of
oxygen gas to form "2" molecules of gaseous water.

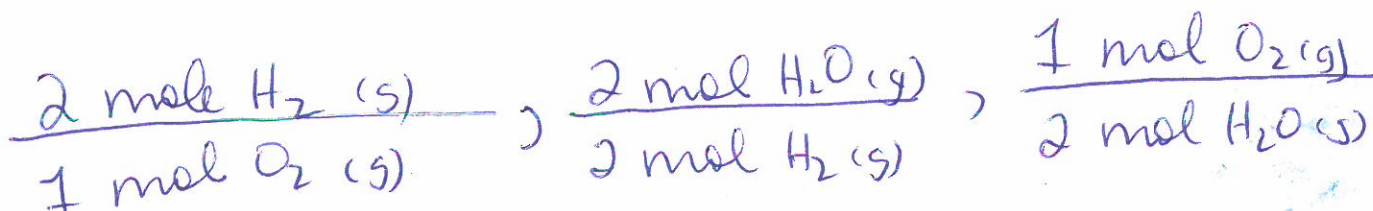
OR

"2" moles of hydrogen gas combine with "1" mole of
oxygen gas to form "2" moles of gaseous water.

We can use the above co-efficient to create a variety of
CONVERSION FACTORS:

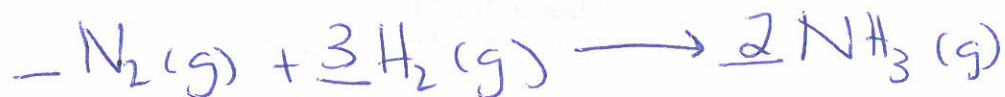


OR



Example 1. Consider the reaction that occurs when nitrogen gas combines with hydrogen gas to form gaseous ammonia.

a. Write out the balanced equation



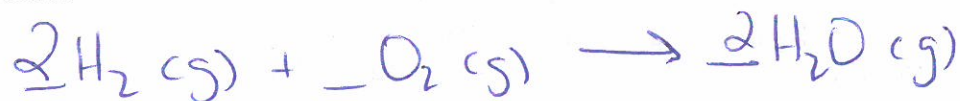
b. How many molecules of nitrogen gas are required to react with 15 molecules of hydrogen gas?

$$15 \text{ molecules H}_2 \times \frac{1 \text{ molecule N}_2}{3 \text{ molecules H}_2} = \boxed{5 \text{ molecules of N}_2(\text{g})}$$

c. How many moles of hydrogen gas are required to produce 18 moles of ammonia?

$$18 \text{ mol NH}_3 \times \frac{3 \text{ mol H}_2(\text{g})}{2 \text{ mol NH}_3(\text{g})} = \boxed{27 \text{ mol H}_2(\text{g})}$$

Example 2. When hydrogen gas combines with oxygen gas to form gaseous water, how many moles of water are produced if 10.5 moles of hydrogen gas react?



$$10.5 \text{ mol H}_2 \times \frac{2 \text{ mol H}_2\text{O}}{2 \text{ mol H}_2} = \boxed{10.5 \text{ mol H}_2\text{O}}$$