Chemistry 11

Stoichiometry IV

Name:
Date:
Block:

1. Limiting & Excess Reactants

Limiting & Excess

To make 36 cookies, you require:

- 6 cups of flour
- 2 cups of butter
- 3 cups of sugar

What is the balanced reaction?

How many cookies could you make if you had 5 cups of flour and 3 cups of butter and 2 cups of sugar?

With 5 cups of flour…

With 3 cups of butter…

With 2 cups of sugar…

With these ingredients, how many cookies will you be making?

The ingredient you run out of is: This is your _____ reactant

The ingredients you have left over are: These are your reactants in _____

When reactions occur, the reactants come together in proportions which do not react completely with each other, because one reactant is in _____. **We cannot tell which reactant is in excess just by looking at their masses.** We have to carry out preliminary calculations to determine the _____ reactant.

Example 1.
16.4 g of zinc and 0.300 mol of H_2SO_4 are mixed and reacted together. Hydrogen and $ZnSO_4$ are produced. What <u>volume</u> of H_2 gas is produced at standard temperature and pressure?

⇒ What is the balanced chemical equation? *What is the question asking for? What does the question give us?*

⇒ Calculate the L of H_2 produced from 16.4 g of Zn.

⇒ Calculate the L of H_2 produced from 0.300 mol of H_2SO_4

⇒ Which is the limiting reactant?

⇒ Which is the excess reactant?

⇒ How much of the excess reactant do you have left over?

Example 2.
Aluminum is burned with O_2 to give Al_2O_3. 74.0g of aluminum are mixed and reacted with 56.0g of O_2. What mass of aluminum oxide is produced?

⇒ Balanced reaction: *What does the question give us? What are we looking for?*

⇒ Calculation using 74.0g of Al.

⇒ Calculation using 56.0g of O_2.

⇒ What is the limiting reactant?

⇒ What mass of aluminum oxide is actually produced?

⇒ What is the excess reactant and how much of it is left over?