

PERCENT YIELD

How efficient is a reaction?

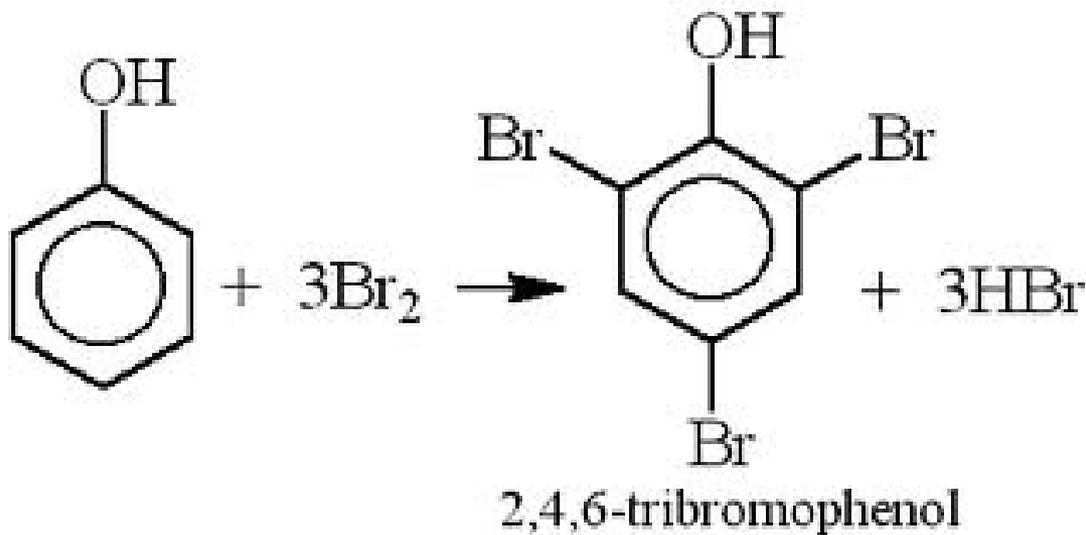
Batting Average

- A ratio of the number of hits achieved compared to the number of hits possible



Theoretical yield

- The expected amount of product from a chemical reaction
- *Calculated* during a stoichiometry problem



Actual yield

- The amount of product actually produced
- Determined experimentally in lab

- Usually, the actual yield is less than the theoretical yield.

Why?

- Sometimes reactions do not go to completion
- Side reactions, which make different products, may have occurred
- Impurities in the reactants
- Product may have been lost before it was measured

Percent Yield

- A measure of reaction efficiency
- Must be determined experimentally!

$$\% \text{ yield} = \frac{\textit{actual yield}}{\textit{theoretical yield}} \times 100$$

Problem Solving Strategy

- List what you know:
 - ▣ Balance the equation
 - ▣ Set up the stoichiometric relationships table
 - ▣ What are you solving for?
 - ▣ What information is given?
- Set up the problem
 - ▣ Solve for the theoretical yield
 - ▣ Substitute into the percent yield formula.
- Estimate and calculate.
 - ▣ Is your answer reasonable?
 - ▣ Remember to use significant figures.

Problem

- The combustion of methane (CH_4) produces carbon dioxide and water. Assume that 32.0 g of methane are burned in the presence of excess oxygen. What is the percent yield if the reaction produces 80.0 g CO_2 ?

Strategy

1. Balanced equation:

Mole ratios:

2. What are you solving for?

3. What is given?



□ Solving for % yield

□ Given:

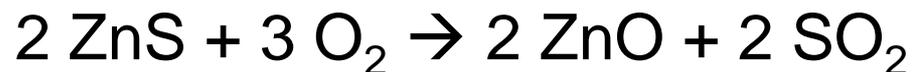
■ actual yield = 80.0 g CO_2

■ Start with 32.0 g CH_4

■ Need to calculate theoretical yield

Problem 2

- Huge quantities of sulfur dioxide are produced from zinc sulfide by means of the following reaction:



If the percent yield is 86.78%, how much SO_2 would actually be produced if 4897 g of ZnS react completely?