

Percent Yield



Sometimes 100% of the expected amount of products cannot be achieved in a reaction because



- the reactants don't all react or...
- some product is lost during procedures (filtration, transfer, crystallization, etc.)

The term "Percent Yield" is used to express how much (in percent) is actually obtained.

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

Actual yield = how much you ACTUALLY collect after doing the experiment

Theoretical yield = how much you THEORETICALLY should get if you could do the experiment perfectly (calculated using stoichiometry)

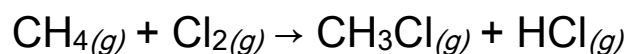
Note: We can never make more product than expected (unless we didn't actually make what we thought we did!)

so...

The *actual yield* of PRODUCTS should be **LOWER** than the *theoretical yield* .

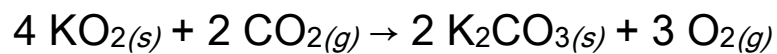
Percent yield problems fall into three categories:

1) When 15.0 g of $\text{CH}_4(g)$ is reacted with an excess of $\text{Cl}_2(g)$ according to the reaction:



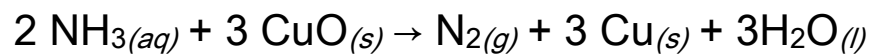
a total of 29.7 g of $\text{CH}_3\text{Cl}(g)$ is formed. What is the percent yield of the reaction?

2) What mass of $\text{K}_2\text{CO}_3(s)$ is produced when 1.50 g of $\text{KO}_2(s)$ is reacted with an excess of $\text{CO}_2(g)$ according to the reaction:



if the reaction has a 76.0% yield?

3) What mass of $\text{CuO}_{(s)}$ is required to make 10.0 g of $\text{Cu}_{(s)}$ according to the reaction:



If the reaction has a 58.0% yield?