

Percent Yield

The amount of product created in a chemical reaction is often less than expected. This could be due to:

1. _____ 2. _____

3. _____

The amount of product could be higher due to:

1. _____ 2. _____

Percent yield =

Theoretical yield: the mass of the product produced based on the balanced chemical equation

Actual yield: the mass of the product that is actually produced when performing the reaction

Example 1. 169.3 g of ZnI_2 reacts with excess of Na_3P .

a) What is the theoretical yield of NaI ?

b) If 96.2 g is actually produced, what is the percent yield?

Percent Yield Problem Set

- 20.0 g of HBrO_3 is reacted with excess HBr .
 $\text{HBrO}_3(\text{aq}) + 5\text{HBr}(\text{aq}) \rightarrow 3\text{H}_2\text{O}(\text{l}) + 3\text{Br}_2(\text{aq})$
 - What is the theoretical yield of Br_2 ?
 - If 47.3 g of Br_2 is produced, what is the percentage yield for this reaction?
- Barium sulfate forms as a precipitate in the reaction between barium nitrate and sodium sulfate. When 35.0 g of barium nitrate is reacted with excess sodium sulfate, 29.8 g of precipitate is recovered.
 - Calculate the theoretical yield
 - Calculate the percentage yield
- Yeast can act on sugar to produce alcohol in the following reaction:
 $\text{C}_6\text{H}_{12}\text{O}_6(\text{aq}) \rightarrow 2\text{C}_2\text{H}_5\text{OH}(\text{l}) + 2\text{CO}_2(\text{g})$
If 223 g of alcohol are recovered after 1.63 kg of sugar react, what is the percentage yield?
- The following reaction proceeds with a 70% yield:
 $\text{C}_6\text{H}_6(\text{l}) + \text{NNO}_3(\text{aq}) \rightarrow \text{C}_6\text{H}_5\text{NO}_2(\text{l}) + \text{H}_2\text{O}(\text{l})$
Calculate the mass of $\text{C}_6\text{H}_5\text{NO}_2$ expected if 12.8 g of C_6H_6 reacts with excess NNO_3 .
- Marble is made primarily of calcium carbonate. When calcium carbonate reacts with hydrogen chloride, it reacts to form calcium chloride, carbon dioxide and water. If this reaction occurs with 81.5% yield, what mass of carbon dioxide will be collected if 15.7 g of calcium carbonate is added to sufficient hydrogen chloride?
- 50.8 g of copper (II) chloride react in a single displacement reaction with 19.3 g of magnesium metal. If the reaction has a 54.3% yield, how much copper metal will be recovered?

Answers: 1. a) 74.4g b)63.6% 2. a) 31.3 g b)95.2% 3. 26.7% 4. 14.1g 5. 5.63 g 6. 13.0g