

10.4 Percent Yield



What's the yellow stuff?

Percent Yield

Chemical reactions are not 100% complete: something is always unreacted.

Chemists calculate the percent yield of reactions to predict product amount.

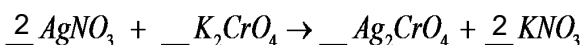
$$\text{Percent Yield} = \frac{\text{Actual Yield}}{\text{Theoretical Yield}} \cdot 100\% \quad \text{Resource P. 7}$$

Actual Yield: measured mass of product.

Theoretical Yield: maximum product mass possible from a given amount of reactant: use stoichiometry.

1. Percent Yield Example

In a reaction, silver chromate forms when excess potassium chromate is added to 0.500 g silver nitrate.

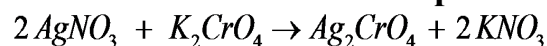


What is the % yield if this reaction actually produces 0.455 g silver chromate?

Strategy: calculate theoretical product yield using stoichiometry, starting with 0.500 g AgNO₃.

Molar Masses: AgNO₃: 169.9 g/mol
Ag₂CrO₄: 331.7 g/mol

1. Percent Yield Example



$$0.500 \text{ g AgNO}_3 \cdot \frac{1 \text{ mol AgNO}_3}{169.9 \text{ g AgNO}_3} \cdot \frac{1 \text{ mol Ag}_2\text{CrO}_4}{2 \text{ mol AgNO}_3} \cdot \frac{331.7 \text{ g Ag}_2\text{CrO}_4}{1 \text{ mol Ag}_2\text{CrO}_4}$$

$$\text{Actual yield} = 0.455 \text{ g} \qquad \qquad \qquad = 0.488 \text{ g Ag}_2\text{CrO}_4$$

Now percent yield:

$$\text{Percent Yield} = \frac{0.455 \text{ g Ag}_2\text{CrO}_4}{0.488 \text{ g Ag}_2\text{CrO}_4} \times 100\% = 93.4\%$$

Homework

10.4 Booklet Problems.
Due Next Class

For Next Class: Unit 10 Test Prep Questions