

Percent Yield

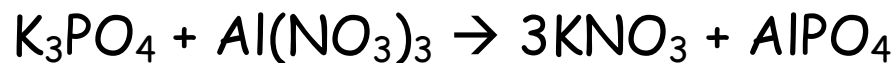
theoretical yield ~ amount of product that can be produced based on a stoichiometric calculation

- What mass of KNO_3 will be formed?
- During a lab 7.13g of KNO_3 is produced when 5.0g of K_3PO_4 reacts. Find the percent yield.

experimental (actual) yield ~ the amount of product obtained during an experiment

~ usually lower than theoretical yield

e.g. 5.0g of K_3PO_4 reacts with excess $\text{Al}(\text{NO}_3)_3$ as follows:



- What mass of KNO_3 will be formed?
- During a lab 7.13g of KNO_3 is produced when 5.0 g of K_3PO_4 reacts. Find the percent yield.

a)

$$5.0\text{g K}_3\text{PO}_4 \times \frac{1 \text{ mole K}_3\text{PO}_4}{212\text{g K}_3\text{PO}_4} = 0.024 \text{ mol K}_3\text{PO}_4$$

$$M_{\text{K}_3\text{PO}_4} = 212\text{g}$$

$$0.024 \text{ mol K}_3\text{PO}_4 \times \frac{3 \text{ mol KNO}_3}{1 \text{ mol K}_3\text{PO}_4} = 0.072 \text{ mol KNO}_3$$

$$0.072 \text{ mol KNO}_3 \times \frac{101.02\text{g KNO}_3}{1 \text{ mol KNO}_3} = 7.3\text{g KNO}_3$$

$$M_{\text{KNO}_3} = 101.02\text{g}$$

b)

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

$$\% \text{ yield KNO}_3 = \frac{7.13\text{g KNO}_3}{7.3\text{g KNO}_3} \times 100\% = 97.7\%$$