

Stoichiometry Limiting Reagent

- ① Write down the chemical reaction when 3 g of Mg is ignited in 2.2 g of O₂?

What reagent is in excess, and what reagent is limiting? What is the mass of MgO formed?

- ② When lead (II) nitrate reacts with sodium iodide, sodium nitrate and lead (II) iodide are formed.

a Write the balanced equation.

b Suppose 25 grams of lead (II) nitrate reacts with 15 grams of sodium iodide. How many grams of sodium nitrate can be formed?

c How much of the excess reagent remains?

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Answers

- ① Write down the chemical reaction when 3 g of Mg is ignited in 2.2 g of O₂?



What reagent is in excess, and what reagent is limiting? What is the mass of MgO formed?

$$3 \text{ g Mg} \times \frac{1 \text{ mol Mg}}{24.31 \text{ g Mg}} \times \frac{2 \text{ mol MgO}}{2 \text{ mol Mg}} \times \frac{40.31 \text{ g MgO}}{1 \text{ mol MgO}} = 4.97 \text{ g MgO}$$

$$2.2 \text{ g O}_2 \times \frac{1 \text{ mol O}_2}{32 \text{ g O}_2} \times \frac{2 \text{ mol MgO}}{1 \text{ mol O}_2} \times \frac{40.31 \text{ g MgO}}{1 \text{ mol MgO}} = 5.54 \text{ g MgO}$$

O₂ is in excess, and Mg is limiting. 4.97 g of MgO is formed.

- ② When lead (II) nitrate reacts with sodium iodide, sodium nitrate and lead (II) iodide are formed.

a Write the balanced equation.



b Suppose 25 grams of lead (II) nitrate reacts with 15 grams of sodium iodide. How many grams of sodium nitrate can be formed?

$$25 \text{ g Pb}(\text{NO}_3)_2 \times \frac{1 \text{ mol Pb}(\text{NO}_3)_2}{331 \text{ g Pb}(\text{NO}_3)_2} \times \frac{2 \text{ mol NaNO}_3}{1 \text{ mol Pb}(\text{NO}_3)_2} \times \frac{85 \text{ g NaNO}_3}{1 \text{ mol NaNO}_3} = 12.8 \text{ g NaNO}_3$$

$$15 \text{ g NaI} \times \frac{1 \text{ mol NaI}}{150 \text{ g NaI}} \times \frac{2 \text{ mol NaNO}_3}{2 \text{ mol NaI}} \times \frac{85 \text{ g NaNO}_3}{1 \text{ mol NaNO}_3} = 8.51 \text{ g NaNO}_3$$

8.51 grams of sodium nitrate can be formed.

c How much of the excess reagent remains?

$$15 \text{ g NaI} \times \frac{1 \text{ mol NaI}}{150 \text{ g NaI}} \times \frac{1 \text{ mol Pb}(\text{NO}_3)_2}{2 \text{ mol NaI}} \times \frac{331 \text{ g Pb}(\text{NO}_3)_2}{1 \text{ mol Pb}(\text{NO}_3)_2} = 16.55 \text{ g Pb}(\text{NO}_3)_2 \text{ used}$$

25 g Pb(NO₃)₂ - 16.55 g Pb(NO₃)₂ = 8.45 g Pb(NO₃)₂ remains.