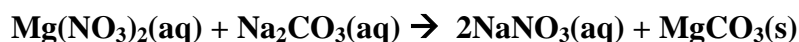


Stoichiometry Problems

- 1) How many grams of magnesium carbonate can be produced by reacting 1.75 g of magnesium nitrate with sodium carbonate? The balanced equation is:



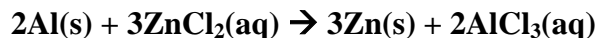
- 2) What mass of magnesium hydroxide will precipitate if 3.09 g of potassium hydroxide are added to a magnesium nitrate solution?

- 3) The reaction of a dry cell may be represented by:

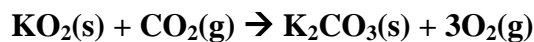


Determine the mass of the zinc consumed during the release of 6.03 g of ammonia.

- 4) How many grams of zinc chloride, ZnCl_2 , are required to completely react with 17.0 g of aluminum metal, Al? The balanced equation is:



- 5) What mass of oxygen can be produced by reacting 125 g KO_2 according to the reaction below:



- 6) Calculate the volume of oxygen produced when 3.5 g of potassium chlorate are decomposed by heat. The balanced equation for this reaction is:



Solutions

- 1) $1.75 \text{ g Mg(NO}_3)_2 \times 1 \text{ mol Mg(NO}_3)_2 / 148.32 \text{ g Mg(NO}_3)_2 \times$
 $1 \text{ mol MgCO}_3 / 1 \text{ mol Mg(NO}_3)_2 \times 84.31 \text{ g MgCO}_3 / 1 \text{ mol MgCO}_3 = 0.995 \text{ g MgCO}_3$
- 2) Must balance the chemical equation first.
 $2\text{KOH(aq)} + \text{Mg(NO}_3)_2\text{(aq)} \rightarrow 2\text{KNO}_3\text{(aq)} + \text{Mg(OH)}_2\text{(s)}$
 $3.09 \text{ g KOH} \times 1 \text{ mol KOH} / 56.11 \text{ g KOH} \times 1 \text{ mol Mg(OH)}_2 / 2 \text{ mol KOH} \times$
 $58.32 \text{ g Mg(OH)}_2 / 1 \text{ mol Mg(OH)}_2 = 1.61 \text{ g Mg(OH)}_2$
- 3) $6.03 \text{ g NH}_3 \times 1 \text{ mol NH}_3 / 17.04 \text{ g NH}_3 \times 1 \text{ mol Zn} / 2 \text{ mol NH}_3 \times$
 $65.39 \text{ g Zn} / 1 \text{ mol Zn} = 11.6 \text{ g Zn}$
- 4) $17.0 \text{ g Al} \times 1 \text{ mol Al} / 26.98 \text{ g Al} \times 3 \text{ mol ZnCl}_2 / 2 \text{ mol Al} \times$
 $136.29 \text{ g ZnCl}_2 / 1 \text{ mol ZnCl}_2 = 129 \text{ g ZnCl}_2$
- 5) $125 \text{ g KO}_2 \times 1 \text{ mol KO}_2 / 71.10 \text{ g KO}_2 \times 3 \text{ mol O}_2 / 4 \text{ mol KO}_2 \times$
 $32.00 \text{ g O}_2 / 1 \text{ mol O}_2 = 42.2 \text{ g O}_2$
- 6) $3.5 \text{ g KClO}_3 \times 1 \text{ mol KClO}_3 / 122.55 \text{ g KClO}_3 \times 3 \text{ mol O}_2 / 2 \text{ mol KClO}_3 \times$
 $22.4 \text{ L O}_2 / 1 \text{ mol O}_2 = 0.96 \text{ L O}_2$