

Exercise 1.38 – Treatment of experimental data

Q138-01 When a 0.24g sample of magnesium was dissolved in excess 2M HCl the volume of hydrogen gas produced was measured by collection in a gas syringe. The initial reading on the syringe was 0.0cm³ and the final reading was 240cm³. Find the stoichiometry of the reaction. [RAM Mg=24, all volumes measured at room temperature, 1 mole of gas = 24dm³]

Q138-02 When a sample of a copper oxide is heated in a stream of hydrogen gas the following results were obtained:

Mass of copper oxide used = 0.8g

Mass of copper remaining after heating 0.64g

[RAM Cu=64, O=16]

Calculate the formula of the copper oxide.

Q138-03 In an experiment to determine the formula of a transition metal chloride, dry chlorine gas was passed over heated iron and the iron chloride collected and weighed. The following results were obtained:

Mass of iron before heating = 2.8g

Mass of iron chloride collected = 8.1g

[RAM Fe=56, Cl=35.5]

Find the formula of the iron chloride produced.

Q138-04 In an experiment to determine the formula of tin iodide the following results were obtained:

Mass of tin used = 0.595g

Mass of tin iodide obtained = 3.138g

Find the formula of the tin iodide. [RAMs: Sn=119, I=127]

Q138-05 A 2.5g sample of limestone (calcium carbonate) reacted completely with exactly 50cm³ of 1.0M Hydrochloric acid. Find the stoichiometry of the reaction. Assume the limestone to be pure calcium carbonate. [Ca=40, C=12, O=16, H=1, Cl=35.5]

Q138-06 When 100cm³ of a hydrocarbon was burned in excess oxygen, 300cm³ of carbon dioxide and 300cm³ of steam were formed. Calculate the formula of the hydrocarbon.

Q138-07 When 20cm³ of a hydrocarbon was burned in 200cm³ oxygen, the total volume decreased by 60cm³. When the gas mixture was passed through strong NaOH solution the gas mixture decreased by a further 60cm³. Calculate the formula of the hydrocarbon, if all values were measured at STP.

Q138-08 Calculate the volume of 1.2M hydrochloric acid required to react with 8.0g of copper II oxide. [Cu=64, O=16]

Q138-09 Calculate the volume of 2M barium chloride solution needed to completely precipitate the sulphate ions from 25cm³ of 1.6M iron (III) sulphate solution.

Q138-10 Calculate the volume of 0.1M silver nitrate solution required to completely precipitate the chloride ions from 40cm³ of 0.02M sodium chloride solution.
