

Exercise 1.36 – Conservation of mass

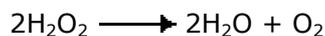
Q136-01 10.1g of potassium nitrate, KNO_3 , was heated in a test tube. The residue was weighed and found to be 8.5g. If the only gas given off is oxygen, find the equation for the decomposition.

Q136-02 A sample of an iron oxide was heated in a stream of carbon monoxide and the residue weighed. The following results were obtained.

- Mass of iron oxide before heating = 1.60g
- Mass of residue = 1.12g

Calculate the formula of the iron oxide.

Q136-03 A 100cm^3 sample of hydrogen peroxide was weighed and then left at 50°C for 1 week while mass measurements were taken from time to time. After several days there was no further decrease in mass. The following results were obtained:



- Mass of H_2O_2 before reaction = 103.36g
- Mass of solution after reaction = 100.16g

Calculate the molarity of the hydrogen peroxide.

Q136-04 2.23g of a lead oxide was heated in a stream of hydrogen gas and the metal residue was found to have a mass of 2.07g. Find the formula of the lead oxide.

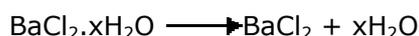
Q136-05 A sample of iron was heated in a stream of chlorine gas and the mass of the iron chloride produced was recorded. Use the following results to calculate the formula of the iron chloride:

- Mass of iron 2.800g
 - Mass of iron chloride = 8.125g
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Q136-06 An impure sample of calcium carbonate is heated in air and the mass of the residue found. Use the following data to calculate the percentage purity of the calcium carbonate assuming only the calcium carbonate decomposes:

- Mass of impure calcium carbonate = 1.25g
 - Mass of residue = 0.81g
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Q136-07 When hydrated barium chloride crystals are heated they lose water of crystallisation according to the equation:



In an experiment to determine the value of x , 2.017g of hydrated barium chloride was heated to constant mass and reweighed. The residue was found to have a mass = 1.720g. Calculate the value, x , for the coefficient of water of crystallisation. [$\text{Ba}=137.3$; $\text{Cl}=35.5$; $\text{H}=1$; $\text{O}=16$]

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Q136-08 An unknown divalent metal nitrate of mass 8.60 g was heated in a test tube and the residue was found to have a mass of 3.69 g. Find the identity of the metal.

Q136-09 When an unknown copper oxide was heated in a stream of hydrogen, the following results were obtained:

- Mass of empty test tube = 22.10 g
- Mass of test tube + metal oxide before heating = 42.34 g
- Mass of test tube + residue after heating = 40.08 g

- a) Calculate the mass loss.
 - b) Calculate the moles of oxygen removed from the copper oxide
 - c) Calculate the moles of copper remaining in the test tube
 - d) Find the formula of the unknown oxide of copper
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Q136-10 An 4.3g of unknown **alkane** was burned in air and the carbon dioxide produced was absorbed by passing through concentrated potassium hydroxide solution. Use the following data to calculate the formula of the unknown hydrocarbon:

- Mass of KOH solution before = 156.86g
 - Mass of KOH solution after = 170.06g
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