Reacting masses and moles

Pearson Edexcel 1CH0 Separate Chemistry · Foundation and Higher

Answer on your own paper. Show your working where needed.

Questions 3 to 8 require Higher content. Show your working and give units.

1. Conserve the total mass

In a sealed flask, two solutions react to form a solid precipitate. The flask and its contents had a total mass of 172.4 g before mixing. What should the mass be after the reaction? Explain.

2. Reacting masses

$S + O_2 \rightarrow SO_2$

Sulfur burns completely in excess oxygen. Find the mass of sulfur dioxide made from 12.8 g of sulfur. Use relative masses S = 32 and SO_2 = 64.

3. From grams to moles (Higher)

A sample contains 5.85 g of sodium chloride, NaCl. Calculate the amount in moles. Use A_r values Na = 23 and Cl = 35.5.

4. From moles to grams (Higher)

Find the mass of 0.125 mol of calcium hydroxide, $Ca(OH)_2$. Use A_r values Ca = 40, O = 16 and H = 1.

5. Making iron (Higher)

$Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$

Calculate the mass of iron made from 32.0 g of iron(III) oxide with excess carbon monoxide. Show your working in moles. Use $M_r(Fe_2O_3) = 160$ and $A_r(Fe) = 56$.

6. Which reactant runs out? (Higher)

$4Al + 3O_2 \rightarrow 2Al_2O_3$. In a model reaction 5.40 g of aluminium reacts with 3.20 g of oxygen. Identify the limiting reactant and find the maximum mass of Al_2O_3. Use A_r Al = 27 and O = 16.

7. Use reacting masses (Higher)

11.2 g of iron reacts with 4.80 g of oxygen gas to make 16.0 g of Fe_2O_3. Use the masses to deduce the coefficients in $Fe + O_2 \rightarrow Fe_2O_3$. Use A_r values Fe = 56 and O = 16.

8. How much remains? (Higher)

$2Mg + O_2 \rightarrow 2MgO$

At the start, a sealed vessel contains 3.60 g Mg and 1.60 g O_2. When the reaction is complete, calculate the mass of the reactant left over. Use A_r values Mg = 24 and O = 16.

9. Extra challenge · Compare two carbonate masses

Calcium carbonate decomposes completely: $CaCO_3 \rightarrow CaO + CO_2$. A sealed container starts with 30.0 g of pure $CaCO_3$. A different, open container starts with 22.0 g. Use the relative formula masses $CaCO_3$ = 100 and CaO = 56 to calculate the mass of solid left in each container. Explain what happens to the total mass inside each container.

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