SC9b.1 Decomposition of copper carbonate

Your teacher may watch to see if you can:

- follow instructions carefully

Introduction

You are going to find out how much copper oxide can be made when some copper carbonate is thermally decomposed.

$$CuCO_3(s) \rightarrow CuO(s) + CO_2(g)$$

(relative atomic masses: Cu = 63.5, C = 12, O = 16).

Aim

To compare the mass of copper oxide actually produced by the thermal decomposition of copper carbonate with the mass calculated from the equation.

Apparatus

- Bunsen burner
- heat-resistant mat
- eye protection
- mineral wool
- spatula
- test tube
- test tube holder
- copper carbonate
- access to a balance

⚠ Safety

Wear eye protection.
Wash your hands after doing the experiment.
Place a plug of mineral wool in the open end of the test tube before heating.

Method

A Find the mass of an empty test tube.

B Add two spatulas of copper carbonate to the tube and measure the new mass of the tube.

C Place a plug of mineral wool in the open end of the test tube.

D Heat the tube with a medium flame for 2 minutes.

E Allow the tube to cool completely on the heat-resistant mat.

F Find the mass of the test tube and copper oxide.

Prediction

1 While you are waiting for the test tube of copper oxide to cool, find the mass of copper carbonate in your test tube.

2 Then use the balanced equation and the relative atomic masses to calculate the maximum mass of copper oxide you would expect to be made.

Recording your results

3 Draw a table to record your results.

Considering your results/conclusions

4 Calculate the mass of copper carbonate used and the mass of copper oxide produced.

5 Compare the mass of copper oxide produced with the mass you calculated using the balanced equation.

Evaluation

6 Try to explain any difference between your experimental value and your calculated mass.

7 Suggest ways of improving the experiment so your experimental value is closer to your calculated mass.

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Name _____ **Class** _____ **Date** _____

Prediction

1 While you are waiting for the test tube of copper oxide to cool, find the mass of copper carbonate in your test tube and record it in the table below.

2 Use the balanced equation and the relative atomic masses to calculate the maximum mass of copper oxide you would expect to be made, using the steps below.

$$CuCO_3(s) \rightarrow CuO(s) + CO_2(g)$$

(relative atomic masses: Cu = 63.5, C = 12, O = 16)

Calculate the relative formula mass of $CuCO_3$ _____

Calculate the relative formula mass of CuO _____

Complete the following: $CuCO_3$ makes CuO, so _____ g of $CuCO_3$ _____ make g of CuO

Write the fraction for the mass of CuO that should be formed from 1 g of $CuCO_3$.

_____

Now calculate the mass of CuO that should be formed from the mass of $CuCO_3$ that you started with.

_____

Recording your results

3 Complete the table to show your results.

Mass of empty test tube (g)	
Mass of test tube + copper carbonate (g)	
Mass of test tube + copper oxide (g)	
Mass of copper carbonate used (g)	
Mass of copper oxide formed (g)	

Considering your results

4 Calculate the mass of copper oxide produced and write this in the table above.

5 Compare the mass of copper oxide produced with the mass you calculated using the balanced equation.

_____

_____

Evaluation

6 Try to explain any difference between your experimental value and your calculated mass.

_____

_____

7 Suggest a way of improving the experiment so that your experimental value is closer to your calculated mass.

_____

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