

Thermal decomposition of calcium carbonate

Aims

Copper carbonate decomposes easily on heating to make copper oxide and carbon dioxide. Calcium carbonate needs a higher temperature to make it decompose than copper carbonate does – you must supply more heat. Today, you will be studying the thermal decomposition of calcium carbonate. Marble and limestone are both forms of calcium carbonate.

A reaction which needs a constant supply of energy to work is called an **endothermic reaction**. All decomposition reactions are endothermic reactions.

Apparatus

Goggles	Test tube rack	Spatula
Bench mat	Crucible lid	Teat pipette
Bunsen burner	Filter funnel	Universal Indicator paper
Tripod and gauze	Filter paper	One marble chip
3 x test tubes	Pair of tongs	

Methods

Part One

1. Place a marble chip on the edge of a wire gauze, and heat the chip with a blue Bunsen burner flame for five minutes.
2. Let the chip cool for two minutes, then inspect it. Write down your observations.



EYE PROTECTION
MUST BE WORN

Part Two

3. **Using tongs**, place the solid on a crucible lid, and add drops of water from a teat pipette. Write down your observations.

Part Three

4. Scrape some of the material into a test tube using a spatula, and then half fill the tube with water.
5. Shake the test tube from side to side to help the product to dissolve a little, then filter it. Collect the filtrate (the liquid) in another test tube. Split the filtrate into two:
 - a) test one part with a piece of Universal Indicator paper;
 - b) blow three times into the other part, put your thumb over the tube and shake it well.

Write down all your observations.

Conclusions

1. In Part One, calcium carbonate was thermally decomposed. Write an equation for this reaction.
2. In Part Two, you reacted your product with water to make calcium hydroxide. Write an equation for this reaction.
3. Look carefully at all your observations. Explain, in as much detail as you can, what each observation means. Give the common name for the solution made in Part Three.

Thermal Decomposition of Calcium Carbonate

Technicians' Notes

In addition to normal laboratory equipment:

Per pair:

- 1 x marble chip
- 3 x test tubes
- 1 x filter paper
- 1 x spatula
- 1 x teat pipette
- 2 (minimum) x pieces of Universal Indicator paper
- 1 x Universal Indicator colour chart
- 1 x drinking straw

1 x copy of N-m06-05 (pupils' guide)

Health and Safety Notes

There should be no chemical hazard present, but note that the practical generates calcium oxide and calcium hydroxide solution (limewater). These are alkalis, and can damage skin.

Beware hot apparatus.