WORKSHEET 15

EXPERIMENT: COMPARING THE PROPERTIES OF A COMPOUND WITH THOSE OF ITS COMPONENT ELEMENTS

Syllabus reference 8.2.5

INTRODUCTION

Chemical substances can be identified by their physical and chemical properties. Compounds are formed when elements react together. The physical and chemical properties of the resultant compound are quite different from those of its component elements.

In this experiment you will compare the properties of the elements with those of the resultant compound. The properties being compared experimentally are physical state, colour, odour, solubility in water, electrical conductivity and reaction with hydrochloric acid. You may also consult data tables to add melting point and density to the comparison table.

AIM

To compare the properties of the elements magnesium and oxygen with those of the compound magnesium oxide.

EQUIPMENT

- 2 strips of magnesium ribbon (20 cm and 1 cm)
- crucible tongs
- Bunsen burner
- test tubes and stoppers
- 250 mL beaker
- crucible and lid
- matches
- steel wool
- pipe clay triangle
- tripod
- test tube rack
- distilled water
- electrical conductivity apparatus
- 1 mol/L hydrochloric acid (HCl)

SAFETY: Wear safety glasses. The crucible, Bunsen and tripod will be very hot, handle with care. Magnesium burns with a very bright light so do not look at it directly. Hydrochloric acid is corrosive: do not allow contact with skin. If contact occurs wash thoroughly with water.

PROCEDURE

1. Thoroughly clean the surface of both pieces of magnesium ribbon with steel wool. Record the appearance of the cleaned magnesium.
2. Coil the longer piece of magnesium ribbon so that it fits inside the crucible.
3. Place the crucible on a pipe clay triangle or a tripod over the Bunsen burner and carefully heat the crucible without the lid until the magnesium begins to glow.

WARNING: Do not look directly at the burning magnesium.

4. Place the lid on the crucible with tongs and heat strongly for about 10 minutes.
5. Remove the lid and heat for a further 5 minutes to ensure complete reaction.
6. Replace the lid and allow to cool. This is the sample of magnesium oxide to be used for comparing properties.
7. Use the conductivity apparatus to test the electrical conductivity of magnesium metal, magnesium oxide and oxygen (air). Record the results.
8. Place 10 mL of distilled water in each of 2 test tubes. Add the 1 cm strip of magnesium to one and some of the magnesium oxide to the other. Stopper and shake. Record the results.
9. Consult data tables for the solubility of oxygen in water.
10. Add 10 mL of dilute hydrochloric acid to each of 3 test tubes. To one add the strip of magnesium ribbon (from step 9) and to a second add some magnesium oxide. Record your observations. Stopper the third test tube and shake to aerate the HCl with oxygen. Record your observations.

RESULTS

PROPERTIES	MAGNESIUM	OXYGEN	MAGNESIUM OXIDE
Physical state			
Colour			
Electrical conductivity			

PROPERTIES	MAGNESIUM	OXYGEN	MAGNESIUM OXIDE
Solubility in water			
Melting point			
Density			
Reaction with hydrochloric acid			

QUESTIONS

1 Write a balanced equation for the reaction between magnesium and oxygen.

2 What other properties could be compared?

3 How do the properties of the elements and compound compare?

CONCLUSION