

Identification of unknown ionic compounds using flame tests and chemical tests for ions

Introduction

Scientists need to identify the compounds that they are working with. To do this we use a series of chemical tests that allow us to identify the different metal or non-metal ions that are present in a compound.

These tests include:

- Flame tests
- Tests for carbonate
- Tests for Group 7 ions

Flame test		Test for a carbonate ion, CO_3^{2-}	Test for Group 7 ions, Cl^- , Br^- and I^-	
Dip a damp wooden splint into the solid sample being tested. Put the sample into the hottest part of a Bunsen flame (air-hole open).		Add dilute hydrochloric acid. Pipette the gas formed into the limewater.	Make a solution by dissolving the sample in water. Add silver nitrate solution.	
Result		Result	Result	
Ion	Flame colour	Fizzes when acid is added Gas formed turns limewater milky	Ion	Precipitate colour
potassium, K^+	lilac		chloride, Cl^-	white
sodium, Na^+	yellow		bromide, Br^-	cream/pale yellow
calcium, Ca^{2+}	brick red		iodide, I^-	yellow
lithium, Li^+	red			

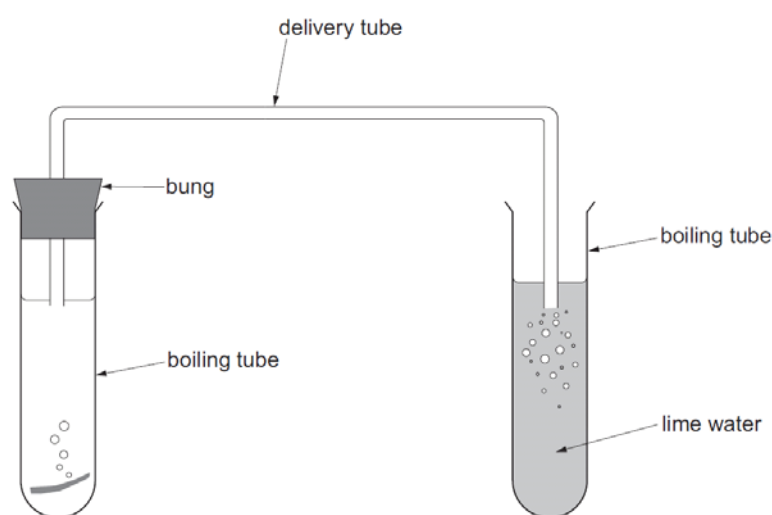
You will be provided with 5 solid compounds, labelled A, B, C, D and E.

You will use these tests to identify the five compounds you have been given.

Apparatus

5 × damp wooden splints
 Bunsen burner
 heat proof mat
 12 × test tubes
 1 × dropping pipette
 5 × spatulas
 silver nitrate solution
 dilute hydrochloric acid
 limewater

Diagram of Apparatus



Method - Flame test

1. Take a damp wooden splint and dip it into sample A.
2. Hold the splint in the roaring (blue) Bunsen burner flame.
3. Record the flame colour obtained.
4. Repeat for each of the samples with a separate damp splint.

Method - Test for carbonate ions

1. Add one of the samples to a test tube.
2. Half fill a second tube with limewater.
3. Add hydrochloric acid to the sample and quickly attach the bung and side arm tube.
4. Record what happens to the limewater.

Method – Test for Group 7 ions

1. Test each of the samples that did not give a positive result for the carbonate ion for the presence of a Group 7 ion.
2. Add a small amount of the solid to a test tube.
3. Add de-ionised water to each solid to create a solution.
4. Add silver nitrate to the solution using a dropping pipette.
5. Record the colour of the precipitate formed.

Analysis

1. Use the reference tables to identify each of the unknown compounds.