C4.2.3 Detecting anions

Previous knowledge

- An ion is an atom that has gained or lost an electron or electrons and is therefore a charged particle
- An anion is a negative ion
- A precipitate is a solid that forms from a solution

Answer the quiz questions

Learning objectives

After studying this lesson you should be able to:

- Write the formluae of sulfate, carbonate and halide ions
- Describe tests to detect sulfates, carbonates, and halides
- Identify compounds from test results.

Formulae of anions

Group 7 elements are called the **halogens**
Their negative ions are called **halide ions**
All of group 7 gain one electron to become **–1** ions

- Chloride is Cl^-
- Bromide is Br^-
- Iodide is I^-

The ending **–ate** means that oxygen is present in the ion

- Sulfide is S^{2-}
- Sulfate is SO_4^{2-}

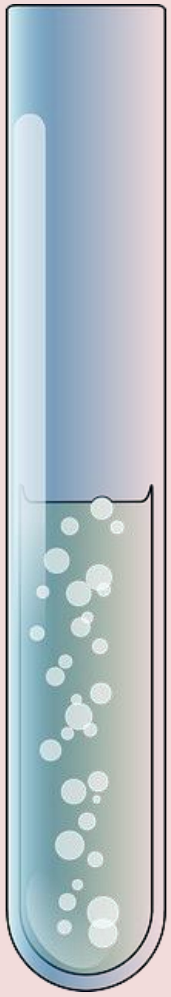
Carbonate is CO_3^{2-}

Test for **sulfate ions**

The test:
Add **hydrochloric acid** then **barium chloride** in

Positive result:
A **white precipitate of barium sulfate** forms

Test for **carbonate ions**

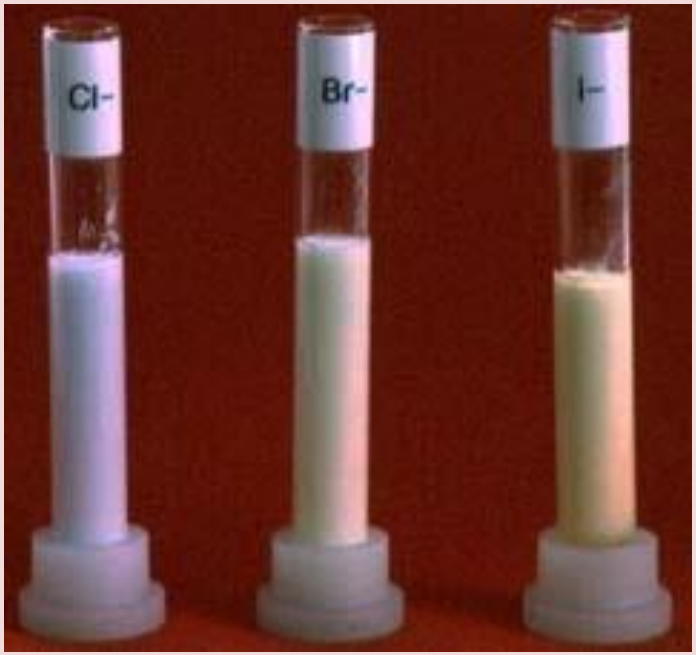


The test:
Add acid and test the gas given off with **limewater**

Positive result:
The **limewater turns from clear to cloudy**, due to CO_2 being released

Test for **halide ions**

The test:
Add **nitric acid** then **silver nitrate**

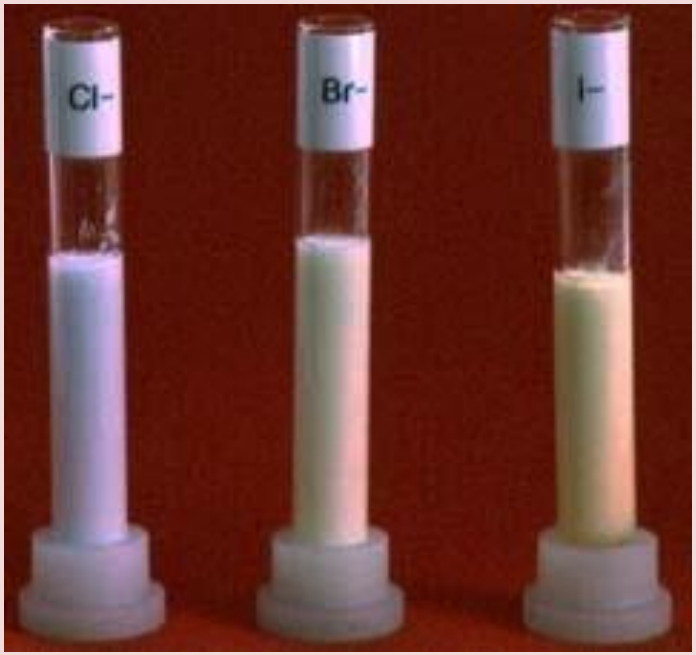


Positive result:
A **coloured precipitate of the silver halide** forms

Chloride = white
Bromide = cream
Iodide = yellow

Test for **halide ions**

The test:
Add **nitric acid** then **silver nitrate**



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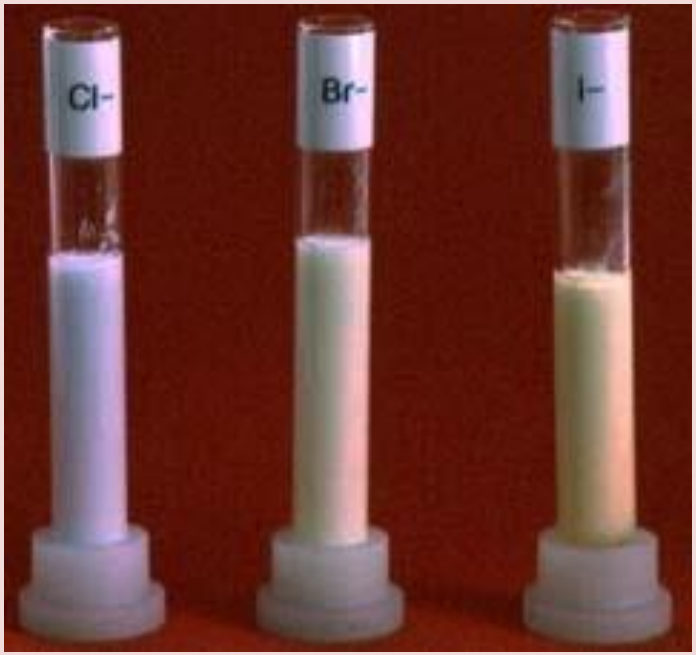
Test for **halide ions**



Can't be hydrochloric acid, otherwise you're adding chloride ions

The test:
Add **nitric acid** then **silver nitrate**

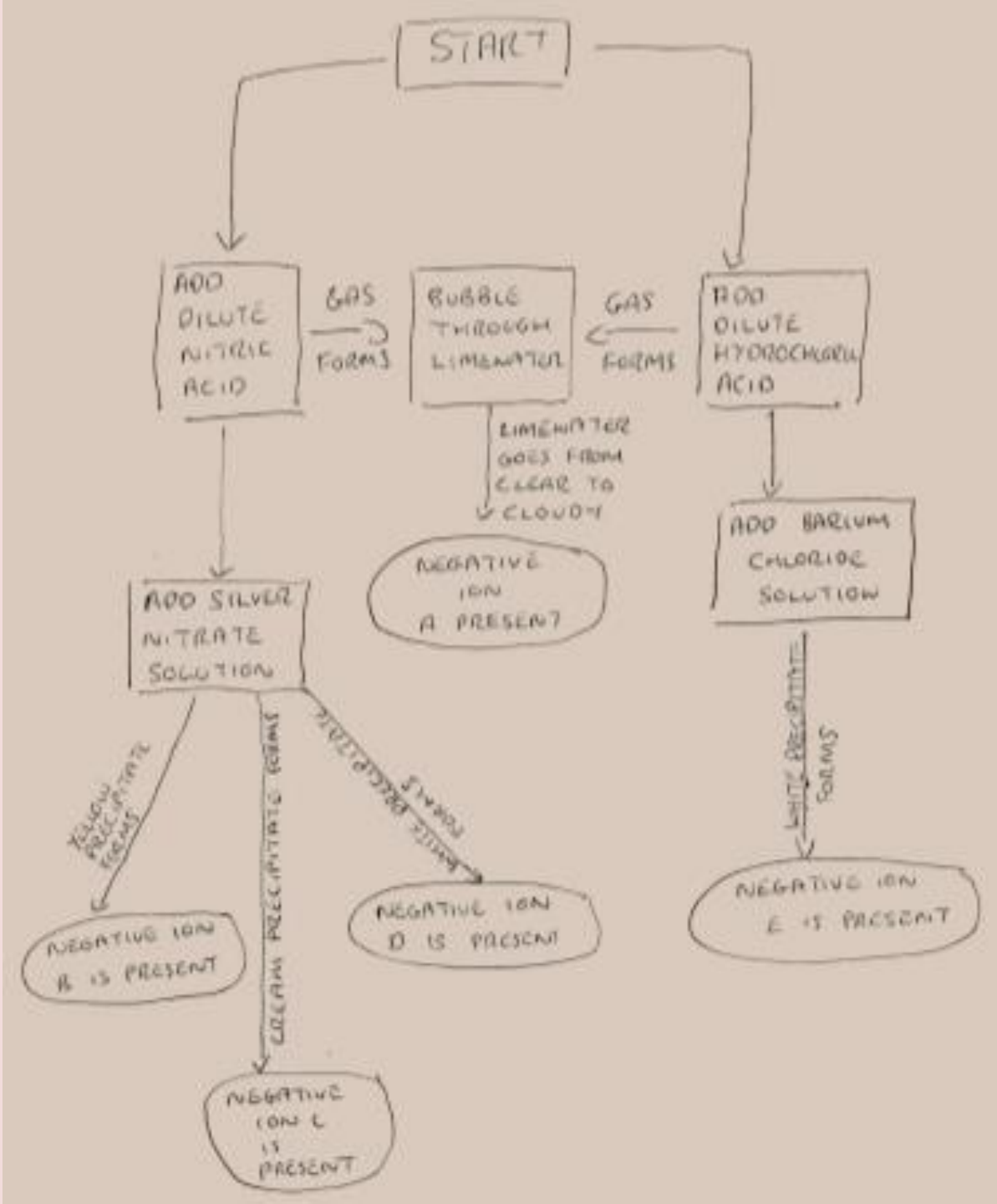
Positive result:
A **coloured precipitate of the silver halide** forms

Chloride = white
Bromide = cream
Iodide = yellow

TASK 1: Copy the table below and complete it using the information on the previous slides

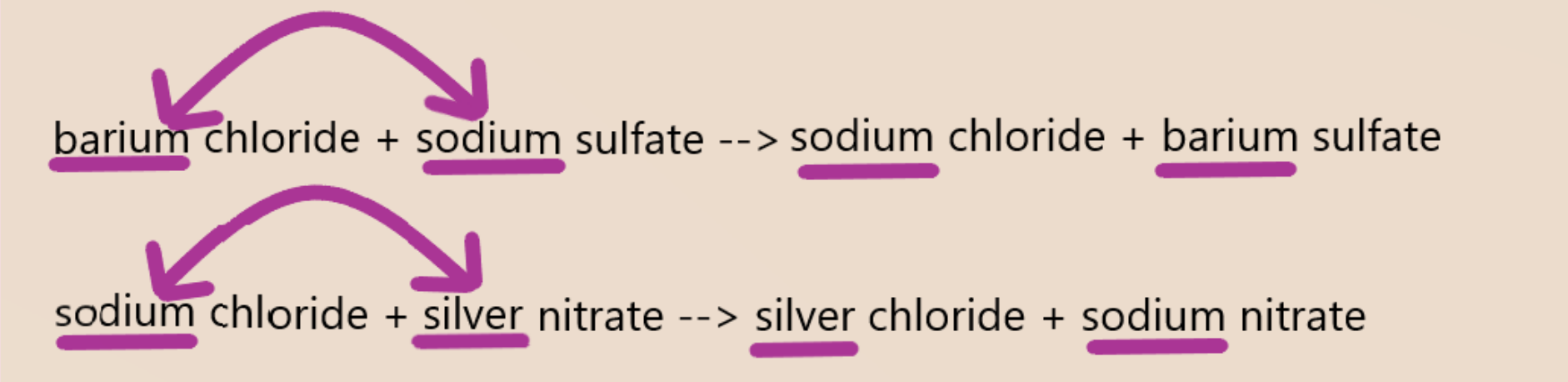
Anion	Test method	Positive result
Sulfate SO_4^{2-}		
Chloride Cl^- Bromide Br^- Iodide I^-		Chloride
		Bromide
		Iodide
Carbonate CO_3^{2-}		

TASK 2: Identify anions A-E



Extension Task

When writing word equations for the sulfate and halide ions, the two metals just swap around



Write word equations for the reaction between:

a) sodium bromide and silver nitrate

b) sodium iodide and silver nitrate

Extra hard: Find out what the symbol equations for these reactions are

Answer the quiz questions