12 Identifying ions and gases – Part 2

Name: _____ Class: _____ Date: _____

Vocabulary

Write each word three times.

English	**Write it 3 times** (English)		
ion			
cation			
anion			
precipitate			
hydrogen			
pop			
oxygen			
carbon dioxide			
limewater			
ammonia			
litmus			
chlorine			
flame test			
lithium			
sodium			

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English	**Write it 3 times** (English)		
potassium			
copper(II)			
sodium hydroxide			
iron(II)			
calcium			
carbonate			
chloride			
silver nitrate			

Recall

An **ion** is a charged particle:

- a **cation** is positive (e.g. Na^+);
- an **anion** is negative (e.g. Cl^-).

Many tests work by forming a coloured **precipitate** (an insoluble solid).

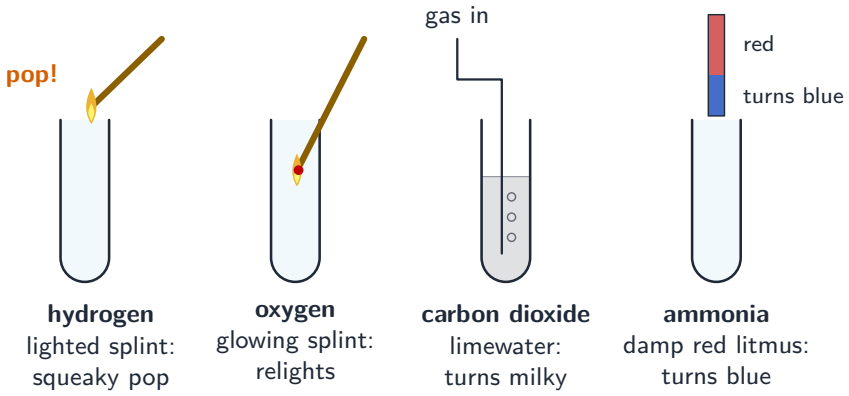
New ideas

Read these first, then do the Practice.

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1 Tests for gases

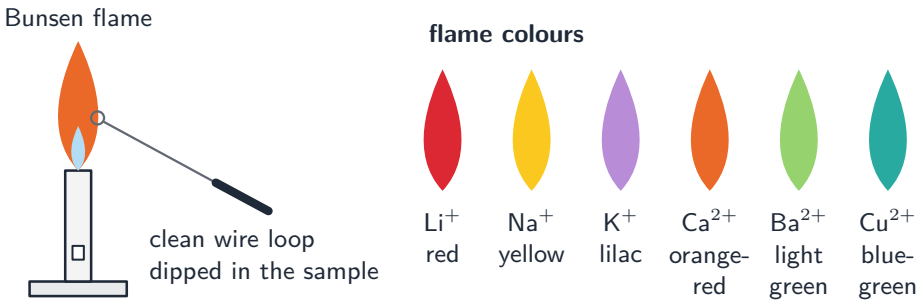
Gas	Test	Result
hydrogen	a lit splint	squeaky **pop**
oxygen	a glowing splint	it relights
carbon dioxide	bubble through **limewater**	turns milky
ammonia	damp red **litmus** paper	turns blue
chlorine	damp litmus paper	bleached white



2 Flame tests

A **flame test** identifies some metal cations by the colour they give a flame:

Cation		Flame colour
lithium	(Li^+)	red
sodium	(Na^+)	yellow
potassium	(K^+)	lilac (purple)
copper(II)	(Cu^{2+})	blue-green

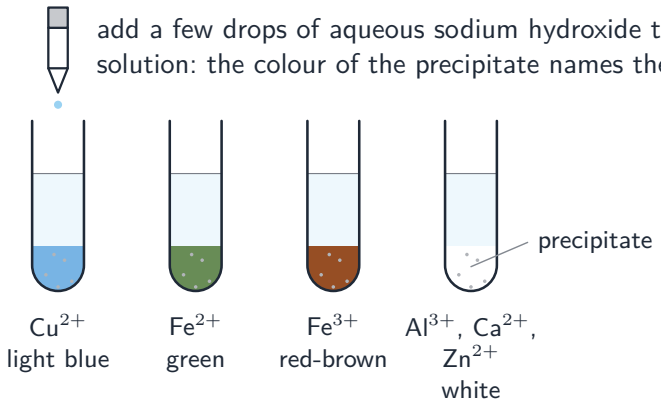


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3 Tests for cations

Add aqueous **sodium hydroxide** and look at the precipitate that forms:

Cation	Precipitate with sodium hydroxide
copper(II) (Cu^{2+})	light blue
iron(II) (Fe^{2+})	green
iron(III) (Fe^{3+})	red-brown
calcium (Ca^{2+})	white



4 Two anion tests

- **carbonate** : add dilute acid → it fizzes and gives carbon dioxide.
- **chloride** : add dilute nitric acid, then **silver nitrate** → a white precipitate.

Watch out: keep the gas tests apart – hydrogen → a **lit** splint pops; oxygen → a **glowing** splint relights; carbon dioxide → limewater turns **milky**. In a flame test, sodium is **yellow** and potassium is **lilac** – don't confuse them.

Practice

Try these in order.

12.6 Describe the test for hydrogen gas, and its result. [2]

12.7 A compound gives a yellow flame in a flame test. Which metal ion does it contain? [1]

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12.8 Sodium hydroxide solution is added to an unknown solution and a red-brown precipitate forms. Name the ion present. [1]

12.9 Describe the test for the chloride ion (Cl^-), and the result. [2]

12.10 How would you show that a gas is carbon dioxide? [1]

12.11 Challenge. An unknown solution gives a **green** precipitate with sodium hydroxide, and a **white** precipitate when dilute nitric acid then silver nitrate are added. Name the cation and the anion present. [2]

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