

Teaching notes

These are not worksheets for practicals but can be used as a revision exercise along with the PowerPoint or for adding observations from experiments.

The answer tables or PowerPoint could be used as a starting point to compare the students' practical results with those expected or as revision where the blanks can be filled in.

There is also a set of Matching interactive activities that could be used as a quick test of the group's knowledge of the various tests for anions, cations, gases and flame tests. They can also be printed to give quick and easy cut and paste versions - why not put them all together for a really challenging activity!

Answers

Tests for anions

Anion	Test	Result
carbonate (CO ₃ ²⁻)	add dilute acid	bubbles of carbon dioxide produced
chloride (Cl ⁻) in solution	add dilute nitric acid, then add aqueous silver nitrate	white precipitate
bromide (Br ⁻) in solution	add dilute nitric acid, then add aqueous silver nitrate	cream precipitate
iodide (I ⁻) in solution	add dilute nitric acid, then add aqueous silver nitrate	yellow precipitate
sulphate (SO ₄ ²⁻) in solution	acidify then add aqueous barium chloride	white precipitate

Tests for cations

Cation	Add aqueous sodium hydroxide
aluminium (Al ³⁺)	white precipitate, soluble in excess leaving a colourless solution
magnesium (Mg ²⁺)	white precipitate, insoluble in excess
calcium (Ca ²⁺)	white precipitate, insoluble in excess
copper (Cu ²⁺)	light blue precipitate, insoluble in excess
iron (II) (Fe ²⁺)	green precipitate, insoluble in excess
iron (III) (Fe ³⁺)	brown precipitate, insoluble in excess

Tests for gases

Gas	Test and result
ammonia (NH ₃)	turns damp red litmus paper blue
carbon dioxide (CO ₂)	turns lime water milky
chlorine (Cl ₂)	turns damp blue litmus paper red then bleaches it
hydrogen (H ₂)	'pops' with a lighted splint
oxygen (O ₂)	relights a glowing splint

Flame tests

Metal	Test result
barium (Ba)	pale green
calcium (Ca)	orange/red
copper (Cu)	green/blue
lithium (Li)	crimson red
sodium (Na)	orange
potassium (K)	lilac



Tests for anions

Task

Fill in the table to show the test and positive result that is used to identify each anion.

Anion	Test	Result
carbonate (CO_3^{2-})		
chloride (Cl^-) in solution		
bromide (Br^-) in solution		
iodide (I^-) in solution		
sulphate (SO_4^{2-}) in solution		



Tests for cations

Task

Fill in the table with observations when sodium hydroxide is added to different cations.

Cation	Observation when aqueous sodium hydroxide is added
aluminium (Al ³⁺)	
magnesium (Mg ²⁺)	
calcium (Ca ²⁺)	
copper (Cu ²⁺)	
iron (II) (Fe ²⁺)	
iron (III) (Fe ³⁺)	



Tests for gases

Task

Fill in the table with the test for each gas and what you would expect to see if that gas was present.

Gas	Test and result
ammonia (NH ₃)	
carbon dioxide (CO ₂)	
chlorine (Cl ₂)	
hydrogen (H ₂)	
oxygen (O ₂)	

Flame tests

Task

Fill in the table with the colour of flame you would see when each metal is heated.

Metal	Test result
barium (Ba)	
calcium (Ca)	
copper (Cu)	
lithium (Li)	
sodium (Na)	
potassium (K)	



Qualitative analysis

anions
cations
gas tests
flame tests

Teaching notes

This PowerPoint can be used as a standalone resource or alongside the Word document. It could be used as a revision tool or to compare class practical results with those expected.

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Tests for anions

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Tests for cations

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