

Flame Tests

Lithium Crimson red
Sodium orange
Potassium Lilac
Calcium brick red
Strontium red
Barium apple green

How to carry out a flame

Using nichrome wire, dip the wire into dilute Hydrochloric acid and then into the unknown sample. Place over a roaring blue Bunsen burner flame.

Topic 4 knowledge organiser Qualitative tests

Testing for halides ions I

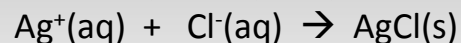
Silver nitrate test

Add acidified (using dilute nitric acid) silver nitrate solution to the sample.

Chloride – white precipitate

Bromide – cream precipitate

Iodide – yellow precipitate



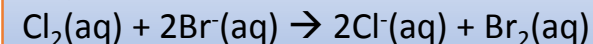
Silver halide precipitate left to stand

If the silver halide precipitates from the test above are left to stand in light, the following changes occur
AgCl(s) – Precipitate turns purple
AgBr(s) – precipitate turns green
AgI(s) – no change, remains yellow

Silver halides – solubility	In Dilute NH ₃	In Conc. NH ₃
AgCl(s)	Soluble	Soluble
AgBr(s)	Insoluble	Soluble
AgI(s)	insoluble	insoluble

Testing for halides II – displacement reactions

Chlorine is a **stronger oxidising agent** than bromine & will displace bromine from its salts in a **displacement** reaction.



Bromine cannot displace chlorine as it is a **weaker oxidising agent** than chlorine.

HALOGEN	Colour of pure element	Colour in solution (aq)	Colour in hexane
Flourine	Yellow	Colourless	Colourless
Chlorine	Green	Colourless	Pale yellow
Bromine	Brown	Orange	brown
Iodine	Grey	brown	violet

Testing for positive ions

Ammonium ions

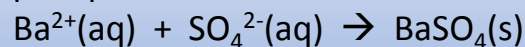
Add dilute sodium hydroxide, ammonia gas evolved which turns red litmus blue.

Magnesium ions

Add dilute ammonia, a white precipitate forms which is insoluble in excess ammonia.

Testing for sulfates

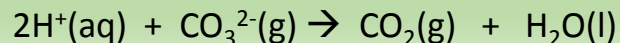
Add dilute nitric acid followed by barium nitrate solution (or barium chloride) to the sample, a white precipitate is observed



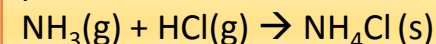
Nitric acid is added at the start to remove any impurities that might interfere with the test.

Testing for carbonates

Add dilute hydrochloric acid to the sample, effervescence is observed. Bubble any gas formed through limewater which will turn milky.



The **hydrogen halides will react with ammonia gas** to produce white smoke of ammonium chloride:



Testing for halides III – reaction with conc. sulfuric acid

All the halides react with concentrated sulfuric acid to a varying degree depending on their strength as reducing agents.

Chloride – misty fumes of HCl observed

Bromide – misty fumes (HBr), Br₂ brown vapour, SO₂ choking gas.

Iodide - misty fumes (HI), I₂ purple vapour, SO₂ choking gas, H₂S rotten egg smell.