

AS Inorganic Tests

Flame Tests: dip platinum wire in conc. HCl and then place into blue Bunsen flame

Metal Ion	Flame Colour
Lithium	Red
Sodium	Yellow
Potassium	Lilac
Magnesium	Bright White
Calcium	Orange/Brick Red
Strontium	Crimson
Barium	Pale Green

Tests for halide ions

Add HNO₃ then AgNO₃ → precipitate. Then add NH₃ if necessary.

Chloride: white precipitate that **dissolves** in **dilute NH₃**

Bromide: cream precipitate that **dissolves** in **concentrated NH₃**

Iodide: yellow precipitate that **does not dissolve** in any NH₃ solution

Ammonium NH₄⁺

Add NaOH → NH₃. Test for NH₃....it turns red litmus paper blue

Carbonate CO₃²⁻

Add HCl to the carbonate solution → CO₂. Turns limewater cloudy. Or vice-versa. Add the carbonate to an acid

Sulphate SO₄²⁻

Add BaCl₂ → a white precipitate, barium sulphate (BaSO₄).

AS Organic Tests

Alcohols: Add $\text{PCl}_5 \rightarrow \text{HCl}$ (steamy white fumes seen) or add $\text{K}_2\text{Cr}_2\text{O}_7/\text{H}^+$ orange \rightarrow green colour change for primary and secondary alcohols

Alkenes: Add bromine water. Orange \rightarrow colourless

Haloalkanes: Dissolve in ethanol, add water and then do the halide ion test (as above)

A-level Inorganic Tests

The transition metal complexes could be included in chemical test questions. It's a huge part of that topic and there are a lot of reactions. I have included all of them in the table below. It's debatable if these are chemical tests.

Complex	a few drops $\text{NaOH}_{(\text{aq})}$ or $\text{NH}_3_{(\text{aq})}$	excess $\text{NaOH}_{(\text{aq})}$	excess $\text{NH}_3_{(\text{aq})}$
$[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$ green	Pale green ppt $\text{Cr}(\text{H}_2\text{O})_3(\text{OH})_3$	ppt dissolves \rightarrow deep green soln. $[\text{Cr}(\text{OH})_6]^{3-}$	ppt dissolves \rightarrow green solution $[\text{Cr}(\text{NH}_3)_6]^{3+}$
$[\text{Co}(\text{H}_2\text{O})_6]^{2+}$ pink	Blue ppt $\text{Co}(\text{H}_2\text{O})_4(\text{OH})_2$	No reaction	ppt dissolves \rightarrow Brown solution $[\text{Co}(\text{NH}_3)_6]^{2+}$
$[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$ pale green	Dirty green ppt $\text{Fe}(\text{H}_2\text{O})_4(\text{OH})_2$	No reaction	No reaction
$[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$ yellow	Red-brown ppt $\text{Fe}(\text{H}_2\text{O})_3(\text{OH})_3$	No reaction	No reaction
$[\text{Cu}(\text{H}_2\text{O})_6]^{2+}$ blue	Pale blue ppt $\text{Cu}(\text{H}_2\text{O})_4(\text{OH})_2$	No reaction	ppt dissolves \rightarrow deep blue soln. $[\text{Cu}(\text{NH}_3)_4(\text{H}_2\text{O})_2]^{2+}$

A-level Organic Tests

Aldehyde or ketone: add 2,4-DNPH (Brady's reagent) \rightarrow orange precipitate

Aldehyde: add Tollen's \rightarrow silver mirror or Fehling's \rightarrow red precipitate

Methyl Ketone (iodoform test): add NaOH and $\text{I}_2 \rightarrow$ yellow precipitate (CHI_3 iodoform)

Carboxylic Acid: add carbonate as for AS inorganic or add $\text{PCl}_5 \rightarrow$ steamy white fumes

Benzene: add bromine water at room temp \rightarrow no reaction. Not a good test! Or combustion \rightarrow burns with a sooty flame.

Esters and Amides: no easy test