Tests for Ions

* A salt contains at least two ions, a positive ion (cation) and a negative ion (the anion)

+ 1) Flame Tests

Sodium Na^+ = yellow
Potassium K^+ = lilac
Barium Ba^{2+} = apple green
Copper Cu^{2+} = blue
Calcium Ca^{2+} = brick red

+ 2) Using sodium hydroxide

- dissolve sample in water + add NaOH (few drops)
- Copper $Cu^{2+}_{(aq)} + 2OH^-_{(aq)} \rightarrow Cu(OH)_{2(s)}$ = blue ppt
- Iron (II) $Fe^{2+}_{(aq)} + 2OH^-_{(aq)} \rightarrow Fe(OH)_{2(s)}$ = green ppt
- Iron (III) $Fe^{3+}_{(aq)} + 3OH^-_{(aq)} \rightarrow Fe(OH)_{3(s)}$ = red/brown ppt
- Magnesium $Mg^{2+}_{(aq)} + 2OH^-_{(aq)} \rightarrow Mg(OH)_{2(s)}$ = white ppt
- Aluminium $Al^{3+}_{(aq)} + 3OH^-_{(aq)} \rightarrow Al(OH)_{3(s)}$ = white redissolves colourless
- Zinc $Zn^{2+}_{(aq)} + 2OH^-_{(aq)} \rightarrow Zn(OH)_{2(s)}$ = white redissolves colourless

− 3) Test for halide ions

- dissolve sample in H_2O + add some silver nitrate solution
- Chloride $Cl^-_{(aq)} + Ag^+_{(aq)} \rightarrow AgCl_{(s)}$ = white ppt
- Bromide $Br^-_{(aq)} + Ag^+_{(aq)} \rightarrow AgBr_{(s)}$ = cream ppt
- Iodide $I^-_{(aq)} + Ag^+_{(aq)} \rightarrow AgCl_{(s)}$ = yellow ppt

− 4) Test for sulfate ions

- dissolve sample in H_2O add some barium chloride
- sulfate $SO_4^{2-}{}_{(aq)} + Ba^{2+}_{(aq)} \rightarrow BaSO_{4(s)}$ = white

$Zn^{2+}_{(aq)} + OH^-_{(aq)} \rightarrow Zn(OH)_{2}s$