PREPARATION OF SALTS

TITRATION:
Soluble Reactants → soluble Products

PRECIPITATION:
Soluble Reactants → Insoluble Products
Strong Reducing Agents:

- Amphoteric: ZnO, Al
- Neutral: H
- Acidic: CO
- Br

Oxidizing/Reducing Agents:

- Potassium di Chromate $K_2Cr_2O_7$ (orange). Turns green when reduced.
- Potassium Manganese $KMnO_4$ (purple). Turns colorless when reduced.

Strong Oxidizing Agents:

- $SO_2$ is a strong reducing agent, Gets oxidized to $SO_3$ ($SO_3$ is a bleaching Agent, and a Food Preservative)
- $I^-$ iodide is a strong reducing agents. Gets oxidized to $I_2$ iodine.

Color of Compounds:

- CuO (black), PbO (yellow), Group1, 2 and 3 are generally white. Anhydrous CuSO$_4$ is white. Hydrous CuSO$_4$$_x$H$_2$O is blue. CuSO$_4$(aq) is blue solution. Fe$_2$O$_3$ is red. Cl$_2$ is greenish gas, Br$_2$ is red brown liquid, I$_2$ is blue black solid. AgCl/PbCl$_2$ is white, AgBr/PbBr$_2$ is cream, AgI/PbI$_2$ is yellow. Hydrous CoCl$_3$ is pink, Anhydrous CoCl$_3$ is blue.

Some Names of Compounds:

- Lime – Ca(OH)$_2$, Limestone – CaCO$_3$

Test for Cations:

- $NH_4^+$: Ammonia gas released with NaOH (aq)
- $Fe^{2+}$: insoluble green ppt with both excess NaOH (aq) and NH$_3$(aq)
- $Fe^{3+}$: insoluble red/brown ppt with both excess NaOH (aq) and NH$_3$(aq)
- $Ca^{2+}$: white ppt with NaOH (aq) insoluble in excess. No or slight ppt with NH$_3$(aq)
- $Cu^{2+}$: Pale blue ppt with NaOH (aq) insoluble in excess. Pale blue ppt with NH$_3$ (aq) soluble in excess, giving a deep blue solution
- $At^{3+}$: White ppt with both NaOH (aq) and NH$_3$(aq) but only soluble in excess NaOH (aq)
- $Zn^{2+}$: White ppt, soluble in excess with both NaOH (aq) and NH$_3$(aq).

Test for Anions:

- $CO_3^{2-}$: CO$_2$ gas produced (effervescence) with aqueous Acid
- $Cl^{-}$: Acidify with dilute aqueous nitric acid and add with Ag$^{+}$ or Pb$^{2+}$. White ppt produced.
- $I^-$: Acidify with dilute aqueous nitric acid and add with Ag$^{+}$ or Pb$^{2+}$. Yellow ppt produced.
- $NO_3^{-}$: Add Aluminium foil/powder + NaOH and heat. Ammonia gas is given off
- $SO_4^{2-}$: Acidify with nitric acid and add Ba$^{2+}$. White ppt produced

Test for Gases:

- CO$_2$: Turns lime water (Ca(OH)$_2$) milky
- NH$_3$: Turns damp red litmus paper blue
- H$_2$: Pop sound produced when ignited
- O$_2$: Relights a glowing splint
- Cl$_2$: Bleaches damp litmus paper
- SO$_2$: Turns acidified potassium dichromate (VI) from orange to green