

Acids

- An Acid is a chemical that forms H^+ ions in water.
- Acids can be monobasic, dibasic, or tribasic, depending on the number of H^+ ions that can dissociate from it

Hydrochloric Acid

- $HCl(aq) \rightarrow H^+(aq) + Cl^-(aq)$

Nitric Acid

- $HNO_3(aq) \rightarrow H^+(aq) + Cl^-(aq)$

Sulfuric Acid (dibasic acid)

- $H_2SO_4(aq) \rightarrow 2H^+(aq) + SO_4^{2-}(aq)$

Phosphoric Acid (tribasic acid)

- $H_3PO_4(aq) \rightleftharpoons 3H^+(aq) + PO_4^{3-}(aq)$

Ethanoic Acid

- $CH_3COOH(aq) \rightleftharpoons H^+(aq) + CH_3COO^-(aq)$

Bases/Alkali

- Alkalis are bases that are soluble in water.
- Alkalis dissolve in water to form OH^- ions
- Bases tend to be metal oxides and metal hydroxides.
- Bases accept H^+ ions

Copper(II) Oxide

- CuO is insoluble so it is a base but not an alkali

Sodium Hydroxide

- $NaOH(aq) \rightarrow Na^+(aq) + OH^-(aq)$
- Can dissolve in water so it is a base an alkali

Ammonia

- $NH_3(aq) + H_2O(l) \rightleftharpoons NH_4^+(aq) + OH^-(aq)$
- Sometimes alkalis react with water to form OH^- ions

Salts

- Ionic compounds
- Usually compose of Positive Metal ion bonded to negative non-metal ion

(Hint: Always think about ions and how they swap around for the reaction)

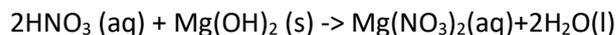
Properties of Acids

- Acids turn blue litmus paper red
- Acids have a pH of less than 7
 - o Acids turn indicators to the acidic colours
 - o E.g. Universal indicator turns red/orange/yellow depending on pH
 - o E.g. Methyl Orange turns from orange to red

Acid + Metal \rightarrow Salt + H_2 gas

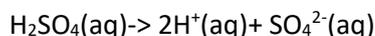
- E.g. $2HCl(aq) + Mg(s) \rightarrow MgCl_2(aq) + H_2(g)$
- Ionic Eqn: $2H^+(aq) + Mg(s) \rightarrow Mg^{2+}(aq) + H_2(g)$

Acid + Base \rightarrow Salt + H_2O

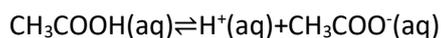


Strong Acid vs Weak Acid

- Strong Acids fully dissociate in water to form H^+ ions



- Weak Acids partially dissociate in water to form H^+ ions



Properties of Bases/Alkali

- Alkalis turn red litmus paper blue
- Alkalis have pH > 7
 - o Turns Universal indicator blue/purple/violet
 - o Turns methyl orange from orange to yellow

Acid + Base → Salt + H₂O

Alkali + Ammonium Salt → Salt + H₂O(l) + NH₃(g)

NaOH(aq) + NH₄NO₃(aq) → NaNO₃(aq) + H₂O(l) + NH₃(g)

Ionic Eqn: OH⁻(aq) + NH₄⁺(aq) → H₂O(l) + NH₃(g)

Natures of Oxides

Basic Oxide	Acidic Oxide	Amphoteric Oxide	Neutral Oxide
Metal Oxides	Non-Metal Oxides	Memorise 3 Examples	Memorise 3 Examples
Behave like Alkali	Behave like Acid	Behave like Alkali or Acid	Does not react with Alkali and Acid
Na ₂ O K ₂ O CaO	CO ₂ SO ₂ P ₄ O ₁₀	ZnO Al ₂ O ₃ PbO	H ₂ O CO NO