Making salts

Threshold Concept

How do metals and acids react to make salts and water

Keywords

Reactivity – the ability for an atom or molecule to undergo a chemical reaction
Salt – a substance made of positive and negative ions
Sulphuric acid – an acid that contains sulphate ions
Nitric acid – an acid that contains nitrate ions
Hydrochloric acid – an acid that contains chloride
Balanced – equal on both sides
Symbol equation – a chemical equation using chemical symbols
Acidic – a solution that contains H^+ ions
Alkaline – a solution that contains OH^- ions

Neutralisation

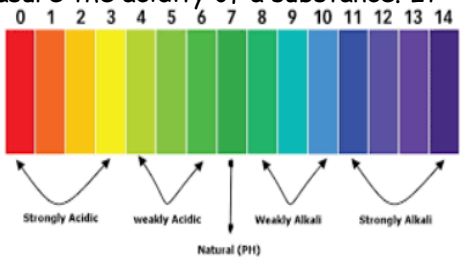
When an acid and alkali react they form neutral product water.
The H+ ions from the acid react with the OH- ions from the alkali to form water.
This can be represented using the following ionic equation:

$$H^+ + OH^- \rightarrow H_2O$$

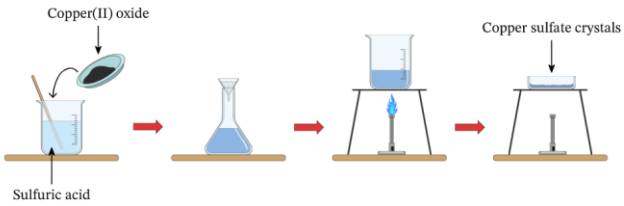
The pH scale

Acids contain H^+ ion and alkalis contain OH^- ions. The pH scale is used to measure the acidity of a substance. It ranges from 0-14.

Acidic = pH < 7
Neutral = pH 7
Alkaline = pH > 7



Making salts required pract



$$CuO(s) + H_2SO_4(aq) \longrightarrow CuSO_4(aq) + H_2O(l)$$

Reactions of acids

Acids react with metals, alkalis and carbonates to form a salt and either hydrogen, water or water and carbon dioxide. Each acid forms a different salt.

Acid Used	Salt Produced
hydrochloric	chloride
nitric	nitrate
sulfuric	sulfate

acid + metal → salt + hydrogen

hydrochloric acid + zinc → zinc chloride + hydrogen

$$2HCl + Zn \rightarrow ZnCl_2 + H_2$$

acid + alkali → salt + water

nitric acid + sodium hydroxide → sodium nitrate + water

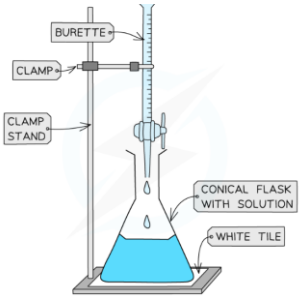
$$HNO_3 + NaOH \rightarrow NaNO_3 + H_2O$$

acid + carbonate → salt + water + carbon dioxide

sulfuric acid + zinc oxide → zinc sulfate + water

$$H_2SO_4 + ZnO \rightarrow ZnSO_4 + H_2O$$

Titration req prac (triple)



Redox reactions (higher tier)

Redox reactions are when oxidation and reduction (in terms of electron transfer) take place at the same time.

For example:

$$2H^+ + Ca \longrightarrow Ca^{2+} + H_2$$

The ionic equation can be further split into two half equations.

$$Ca \longrightarrow Ca^{2+} + 2e^-$$

Oxidation is loss of electrons.

$$2H^+ + 2e^- \longrightarrow H_2$$

Reduction is gaining of electrons.

Strong and weak acids

Strong acids are acids that fully ionise in water

$$HCl \longrightarrow H^+ + Cl^-$$

Weak acids are acids that partially ionise in water

$$CH_3COOH \rightleftharpoons H^+ + CH_3COO^-$$