

TOPIC 9 SUMMARY NOTES

Summary

- Neutralisation reactions:
 - a neutralisation reaction is one in which a base reacts with an acid to form water. A salt is also formed in this reaction;
 - equations can be written for the following neutralisation reactions:
 - a metal oxide + an acid $\rightarrow$ a salt + water;
 - a metal hydroxide + an acid $\rightarrow$ a salt + water;
 - a metal carbonate + an acid $\rightarrow$ a salt + water + carbon dioxide.
 - the name of the salt produced depends on the acid and base used:
 - hydrochloric acid produces chlorides;
 - sulfuric acid produces sulfates;
 - nitric acid produces nitrates.
- Spectator ions:
 - spectator ions are ions that remain unchanged by the reaction;
 - reaction equations can be used to identify spectator ions;
 - for neutralisation reactions, equations can be written omitting spectator ions:
 - $2\text{H}^+(\text{aq}) + \text{O}^{2-}(\text{s}) \rightarrow \text{H}_2\text{O}(\text{l})$ for metal oxides;
 - $\text{H}^+(\text{aq}) + \text{OH}^-(\text{aq}) \rightarrow \text{H}_2\text{O}(\text{l})$ for metal hydroxides;
 - $2\text{H}^+(\text{aq}) + \text{CO}_3^{2-}(\text{aq}) \rightarrow \text{H}_2\text{O}(\text{l}) + \text{CO}_2(\text{g})$ for aqueous metal carbonates;
 - $2\text{H}^+(\text{aq}) + \text{CO}_3^{2-}(\text{s}) \rightarrow \text{H}_2\text{O}(\text{l}) + \text{CO}_2(\text{g})$ for insoluble metal carbonates.
- Titration:
 - titration can be used to produce a soluble salt;
 - in an acid-base titration, the concentration of the acid or base is determined by accurately measuring the volumes used in the neutralisation reaction;
 - an indicator can be added to show the end-point of the reaction;
 - given a balanced equation for the reaction occurring in any titration:
 - the concentration of one reactant can be calculated given the concentration of the other reactant and the volumes of both solutions;
 - the volume of one reactant can be calculated given the volume of the other reactant and the concentrations of both solutions.
 - once the volumes of acid and alkali have been noted, the reaction can be repeated without the indicator to produce an uncontaminated salt solution;
 - the solution can then be evaporated to dryness.
- Insoluble metal carbonates:
 - insoluble metal carbonates and insoluble metal oxides can be used to produce soluble salts;
 - excess base is added to the appropriate acid, the mixture is filtered and the filtrate evaporated to dryness.