AQA Chemistry A-level

Inorganic Chemistry I

Definitions

Selected Definitions modified or taken from: AQA Specification for GCSE Chemistry, 8462, Version 1.1 04 October 2019 & AQA Specification for AS & A-Level Chemistry, 7404 & 7405, Version 1.1, December 2015

Definitions and Concepts for AQA Chemistry A-level

Inorganic Chemistry I

2.1 Periodicity

Atomic radius trend: Atomic radius decreases across a period. This is because positive charge increases across a period due to the increasing proton number and this means the electrons are attracted closer to the nucleus, making the atomic radius smaller.

Element classification: An element is classified as s, p, d or f block according to its position in the Periodic Table.

Ionisation energy trend: Ionisation energy generally increases across a period due to the increasing positive charge in the nucleus attracting the outer shell electrons more strongly.

Periodicity: Trends in element properties with increasing atomic number. The trends are caused by the changes in element atomic structure.

Proton number: The number of protons found in the nucleus of every atom of that element. Elements are arranged in the periodic table in order of increasing proton number.

2.2 Group 2, the Alkaline Earth Metals

Barium meals: Barium sulfate is used in barium meals. Barium sulfate is opaque to x-rays (they won't pass through it) so barium meals can help to solve problems in the stomach or intestine.

Extraction of titanium: Magnesium is used in part of the process of extracting titanium from its ore. Titanium(IV) oxide is converted to titanium(IV) chloride by heating it with carbon in a stream of chlorine gas. The titanium(IV) chloride is then purified by fractional distillation and then reduced by magnesium in a very hot furnace.

$$TiCl_4 + 2Mg \rightarrow Ti + 2MgCl_2$$

Flue gases: The gases emitted from chimneys and industrial exhausts.

Solubility: The ability for a given substance to dissolve in a solvent. Solubility of the Group 2 hydroxides increases down the group and solubility of the Group 2 sulfates decreases down the group.

Sparingly soluble: Compounds which have very low solubilities are described as sparingly soluble. Magnesium hydroxide is sparingly soluble.

Test for sulfates: Add acidified barium chloride to a solution containing sulfate ions. A white precipitate of barium sulfate is formed.

Wet scrubbing: A process used to remove acidic sulfur dioxide from flue gases by reacting the gases with an alkali.

2.3 Group 7 (17), the Halogens

Displacement: A chemical reaction in which one element replaces another element in a compound. A halogen will displace a halide from solution if the halide is below it in the periodic table.

Disproportionation: A reaction in which a substance is simultaneously reduced and oxidised. Chlorine undergoes disproportionation in the reaction with cold, dilute, aqueous sodium hydroxide.

Electronegativity: The tendency of an atom to attract a bonding pair of electrons.

Oxidising ability: Oxidising ability is the ability to act as an oxidising agent. The oxidising ability of the halogens decreases down the group. This is because down the group the atoms get larger so the electrons are less strongly attracted to the nucleus so it is harder to gain an electron.

Redox reaction: A reaction in which oxidation and reduction occur simultaneously.

Reducing ability: Reducing ability is the ability to act as a reducing agent. The reducing ability, or reducing power, of the halides increases down the group. This is because to act as a reducing agent the halide needs to lose an electron. As you go down the group it is easier for a halide to lose an electron because the attraction from the outer electron and nucleus decreases due to increased shielding and an increasing ionic radius.