

CAIE Chemistry A-level

15: Halogen Compounds Definitions

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Definitions and Concepts for CAIE Chemistry A-level Halogen Compounds

Addition: Joining two or more molecules together to form a larger molecule. *Hydration* is the addition of a H_2O molecule. *Halogenation* involves the addition of a halogen. *Hydrogenation* is the addition of H. *Electrophilic addition* describes all the above examples.

Alcohol: An organic molecule with the functional group -OH.

Electrophile: An electron pair acceptor.

Electrophilic addition: A reaction where a π bond is broken and 2 new σ bonds form due to the addition of an electrophile.

Elimination: A reaction in which a molecule loses atoms or groups of atoms to form a C=C bond.

Free radical: A species with an unpaired electron. These are represented in mechanisms by a single dot.

Free radical substitution: A photochemical reaction between halogens and alkanes to form halogenoalkanes. The reaction requires UV light and involves three stages: initiation, propagation and termination. Initiation creates a radical species. Propagation involves a series of chain reactions where free radicals bond to molecules to form new free radicals. Termination involves the reaction of free radicals with other free radicals to form new molecules.

Halogenoalkane: A saturated molecule where one or more of the hydrogen atoms in an alkane have been substituted for a halogen.

Nucleophile: An electron pair donor.

Nucleophilic substitution: A reaction in which an electron pair donor attacks an electrophilic atom (an atom with a partial or full positive charge) to replace an atom/group of atoms.

Primary halogenoalkane: A halogenoalkane in which the carbon bonded to the halogen is itself only bonded to one other carbon atom.

Secondary halogenoalkane: A halogenoalkane in which the carbon bonded to the halogen is itself bonded to two other carbon atoms.





S_N1: A nucleophilic substitution reaction that occurs in two steps. The S_N stands for it being a nucleophilic substitution reaction, and the 1 means it occurs in two steps (and therefore only involves one species in the rate equation).

S_N2: A nucleophilic substitution reaction that occurs in one step.

Substitution reaction: A reaction in which one atom/group of atoms is replaced by another atom/group of atoms.

Tertiary halogenoalkane: A halogenoalkane in which the carbon bonded to the halogen is itself bonded to three other carbon atoms.

