



Organic Chemistry Revision Sheets

Halogenoalkanes | Nucleophilic Substitution (with $\text{OH}^-_{(\text{aq})}$)

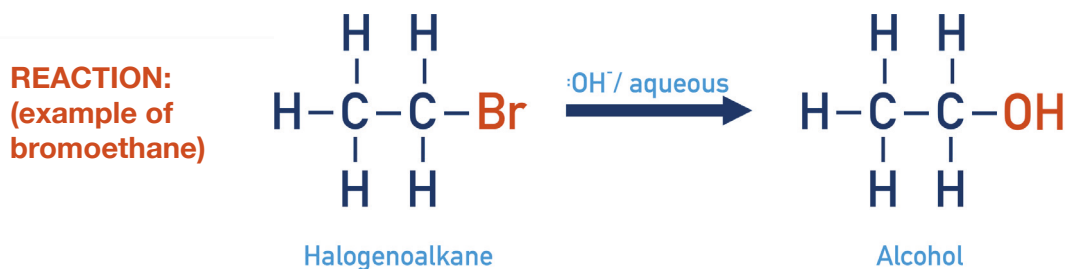
Reaction

REACTANTS: Halogenoalkane and Sodium Hydroxide, NaOH (for OH^- ions)

CONDITIONS: Aqueous ('aq' - water present)

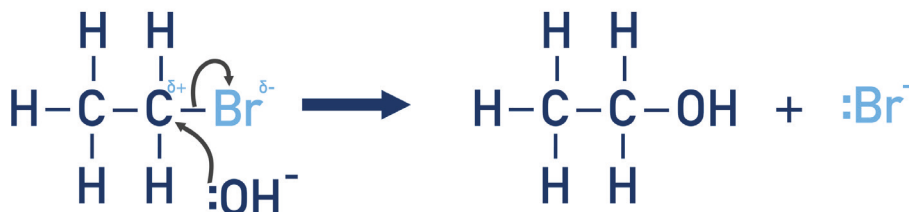
PRODUCT(S): Alcohol and Halide Ion (*sodium halide salt if sodium hydroxide used*)

REACTION TYPE: Nucleophilic Substitution



Mechanism

Hydroxide ion (OH^-) acts as a nucleophile and attacks the partially positive carbon atom in the carbon-halogen bond. The carbon-halogen breaks, forming alcohol and halide ion. OH group is **substituted** for the halogen group.



Notes:

- Reaction **must be carried out in aqueous conditions (in water)**, otherwise an **elimination reaction will occur and an alkene will be formed**.
- The strength of the carbon-halogen bond (bond enthalpy) determines the speed of the reaction. The stronger the bond, the slower the nucleophilic substitution reaction. *C-F bond is strongest, giving the slowest reaction; C-I bond is weakest, giving the fastest reaction.*