

Name: _____

Date: _____

AQA A-LEVEL CHEMISTRY

Elimination of Halogenoalkanes: Mechanism, Reagents & Conditions

Learn Pack

This pack is designed to be completed alongside the video to help you build a secure understanding of this topic before moving on to revision and exam practice.

How to use this Learn Pack:

1. Watch the video and complete the activities.
 2. Answer the Fact Recall and Application questions.
 3. Check your work using the Learn Pack
- Answers available at mrcolescience.co.uk.

WATCH THE LESSON



Elimination Reactions

During an elimination reaction, an atom or a group of atoms is removed from the starting molecule without being replaced.

When halogenoalkanes undergo elimination reactions the halogen is eliminated as a halide ion and the halogenoalkane forms an alkene.

Lesson Objectives:

- Describe what elimination reactions are.
- Know the reagents and conditions needed for the elimination of halogenoalkanes.
- Be able to outline the mechanism for the elimination of halogenoalkanes.
- Understand how elimination reactions can produce position and E/Z isomers of alkenes.

Give an overall equation for the elimination of halogenoalkanes:



Reaction Conditions

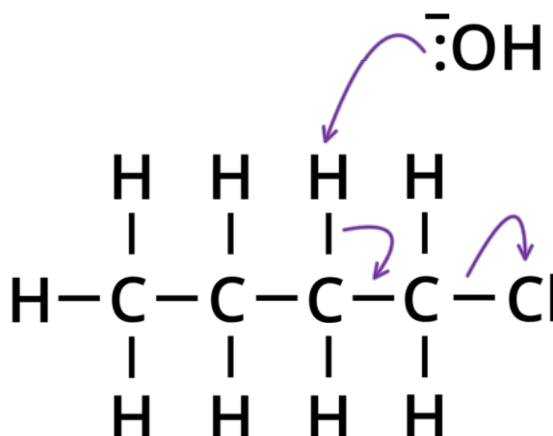
To help ensure that an elimination reaction takes place, rather than nucleophilic substitution, there are three reaction conditions that are used:

1. Potassium/Sodium hydroxide should be in an ethanolic solution.
2. The potassium/sodium hydroxide solution should be hot.
3. The reaction should be carried out under reflux.

Reaction Mechanism

Complete the reaction mechanism below:

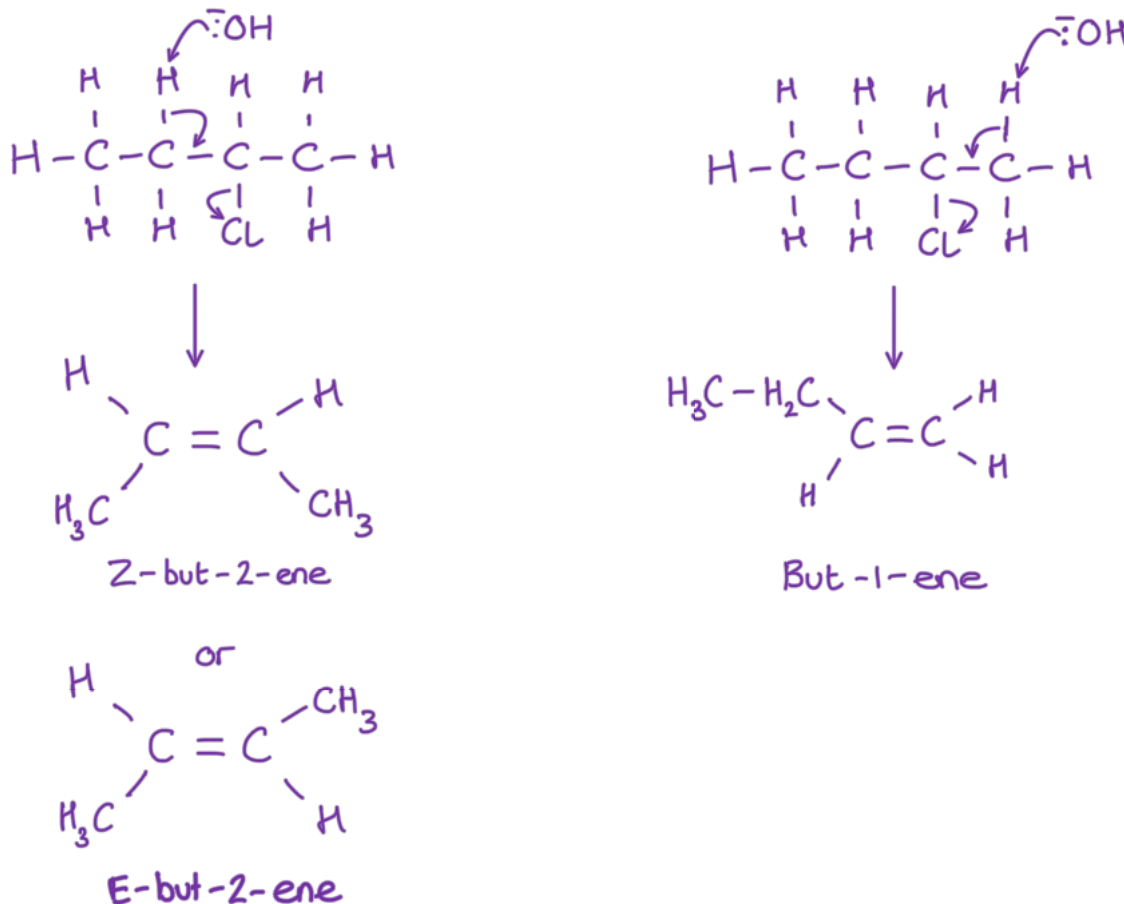
1. The hydroxide ion attacks a hydrogen atom that is bonded to a carbon atom that is adjacent to the C-X bond.
2. The C-H bond breaks and those electrons form the C=C double bond.
3. The C-X bond breaks, eliminating a halide ion.



Products of Elimination and Isomerism

During the elimination of halogenoalkanes, it is possible to form a mixture of alkenes that are isomers of one another. There are two types of isomerism that can be demonstrated in the products; position isomerism and E-Z isomerism.

Using 2-chlorobutane as an example, show how elimination reactions can produce both position and E/Z isomers:



Practise Questions – Fact Recall

1. Briefly describe what an elimination reaction is.

When an atom or group of atoms is removed from a molecule without being replaced.

2. Name a reagent that can be used in the elimination reactions of halogenoalkanes.

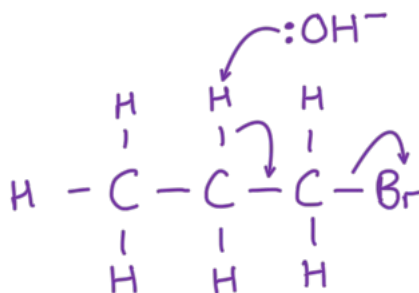
Potassium/Sodium hydroxide

3. What conditions favour elimination reactions over nucleophilic substitution?

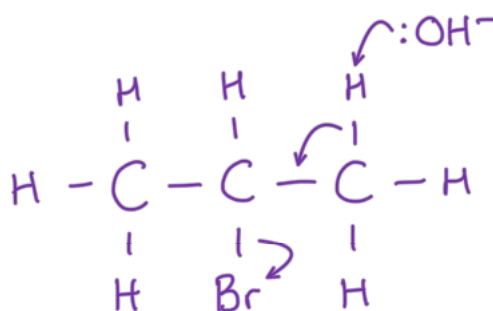
Warm, ethanolic solution heated under reflux

Practise Questions – Application

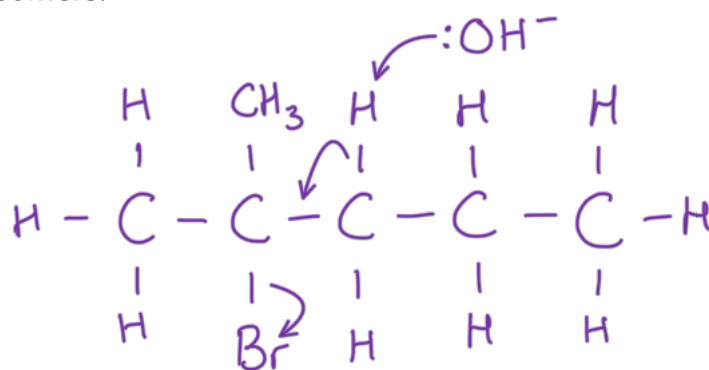
1. Draw the mechanism for the reaction of 1-bromopropane with sodium hydroxide dissolved in ethanol.



2. Outline the mechanism for the reaction of 2-bromopropane with sodium hydroxide to form an alkene that does not demonstrate stereoisomerism.



3. 2-bromo-2-methylpentane is heated with potassium hydroxide dissolved in ethanol. Two structural isomers are formed. Name and draw the mechanism for the formation of one of the isomers.



Next Steps

Check your work using the Learn
Pack Answers:

