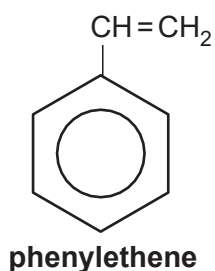


AS Level Chemistry B
H033/02 Chemistry in depth

Question Set 2

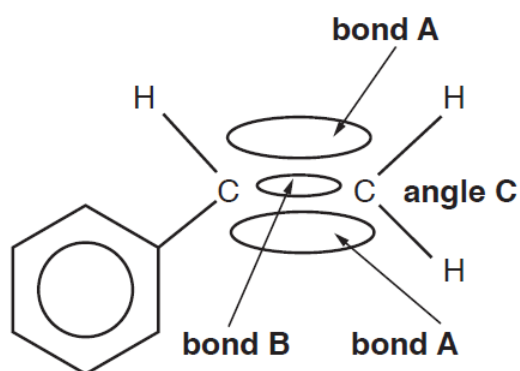
- 2 Poly(phenylethene), commonly known as 'polystyrene', can be used to make packaging. The monomer phenylethene is shown below.



- (a) Draw the structure of the repeating unit of poly(phenylethene).

[1]

- (b) The bonding between the carbon atoms in phenylethene can be represented as shown below.



- (i) Name the **types** of bond represented by **A** and **B**.

Bond **A**

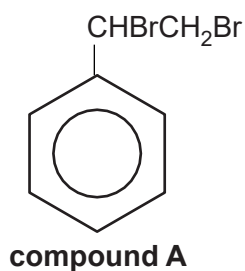
Bond **B** [1]

- (ii) State and explain the bond angle **C**.

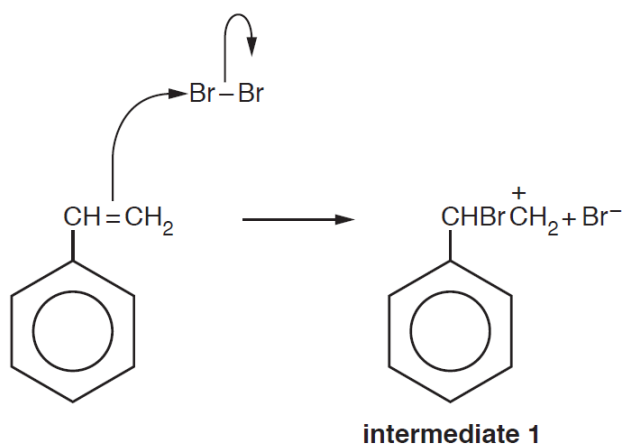
Bond angle **C** =°

Explanation [3]

- (c) Phenylethene is polymerised in the laboratory. Any unreacted phenylethene can be detected by adding aqueous bromine to the reaction mixture. Bromine reacts to produce **compound A**.

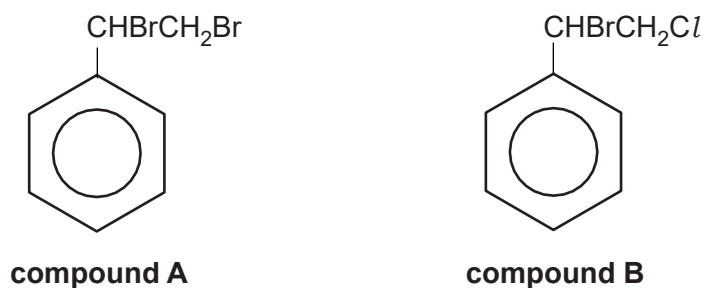


- (i) What colour **change** would be observed when phenylethene reacts with aqueous bromine? [1]
- (ii) The first step in the mechanism for the reaction of phenylethene with bromine is shown below.



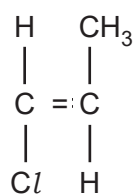
What name is given to the **type** of organic intermediate, such as **intermediate 1**, formed in the reaction? [1]

- (iii) If an aqueous mixture of bromine and potassium chloride is added to phenylethene some of **compound B** is produced, as well as **compound A**.



Use the mechanism shown in (c)(ii) to explain why both **compound A** and **compound B** are formed. [1]

(d) Another substituted alkene is 1-chloroprop-1-ene, shown below



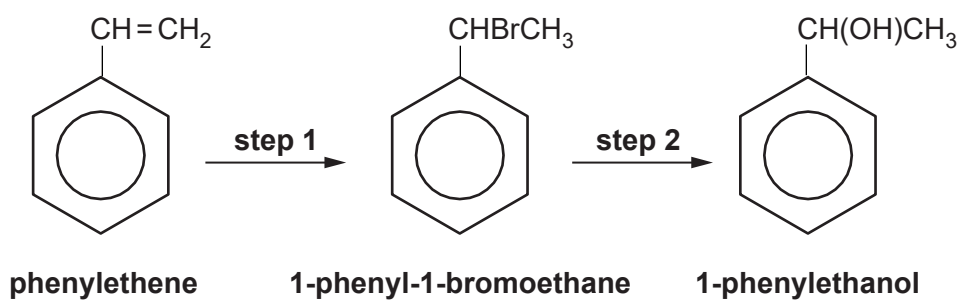
1-chloroprop-1-ene

Unlike phenylethene, 1-chloroprop-1-ene shows *E/Z* stereoisomerism.

Describe how this *E/Z* isomerism arises.

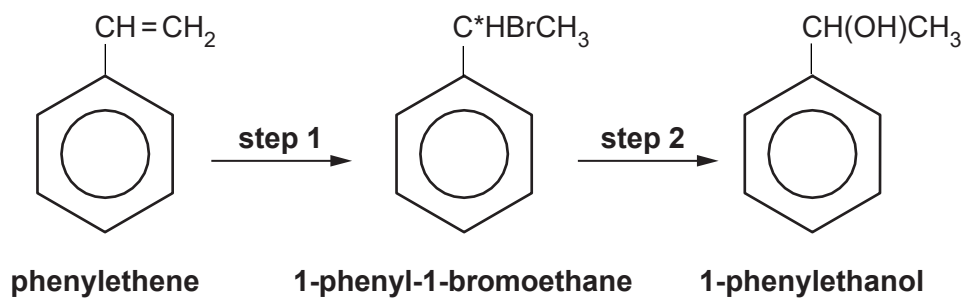
[2]

(e) 1-phenylethanol is a compound that is used when making perfumes.
1-phenylethanol can be prepared in the laboratory from phenylethene in two steps.



(i) Give the reagent that you would use for **step 1**.

[1]



(ii) Draw a diagram to show the three-dimensional arrangement of the atoms around the carbon atom C* in 1-phenyl-1-bromoethane. [1]

(iii) 1-phenylethanol is an example of a secondary alcohol.
Explain why the alcohol is classified as *secondary*. [1]

(iv) 1-phenylethanol is reacted with potassium dichromate(VI) in sulfuric acid.
Draw the structural formula of the product of this reaction. [1]

Total Marks for Question Set 2: 14

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