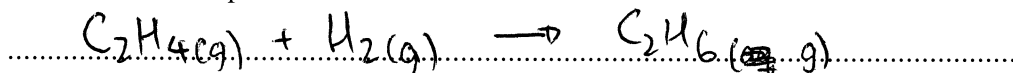


Question 24 (4 marks)

In the margarine industry, alkenes are often hydrogenated to convert unsaturated oils into solid fats that have a greater proportion of saturated molecules.

- (a) Using ethene as an example, write an equation for this reaction and state the type of reaction this represents. 2



This is an addition reaction whereby the unsaturated ethylene molecule's double bond is broken, and two new single bonds formed to hydrogen atoms. This forms ethane.

- (b) Describe a test that could be used to confirm that all the ethene has been converted. 2

Unsaturated hydrocarbons discolour bromine water, as the Br_2 molecules give a distinctive colour to water when in aqueous solution. As such, when an unsaturated hydrocarbon such as ethylene is introduced to $\text{Br}_2(\text{aq})$, it undergoes halogenation (a type of addition reaction), whereby $\text{Br}_2(\text{aq})$ is broken down into 2Br , and added across the double bond. This discolours the bromine water and forms $\text{C}_2\text{H}_4\text{Br}_2$.

