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WORKSHEET 14

School: **Ba Sangam College**

Subject: **Chemistry**

Year: **12**

Name: _____

Strand	4 Materials
Sub strand	12.4.1 Inorganic Chemistry
Content Learning Outcome	12.4.1.3 Investigate the different classes and reactions of hydrocarbons.

Alkenes

Alkenes are unsaturated hydrocarbons that contain one or more carbon-carbon double bonds.

General formula is C_nH_{2n} .

IUPAC Rules for Alkene Nomenclature

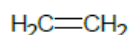
1. The general rules for naming alkanes apply to alkenes also, with some exceptions.
2. The “**ene**” suffix indicates an alkene. Wherever necessary, a number is written in front of “ene” to indicate the position of the carbon to carbon double bond.
3. The longest chain chosen for the parent name must include both carbon atoms of the double bond.
4. The parent chain must be numbered from the end nearest a double bond carbon atom.
5. If the double bond is in the center of the chain, the nearest substituent rule is used to determine the end where numbering starts. The smaller of the two numbers designating the carbon atoms of the double bond is used as the double bond locator.

The parent name of the longest continuous carbon chain is as follows:

Number of carbon atoms in the longest chain	Parent name
2	Ethene
3	Propene
4	Butene
5	Pentene
6	Hexene

Example 1

Name the alkene shown below.

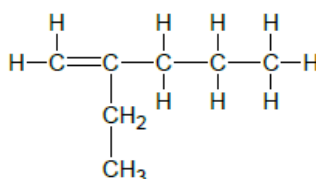


Solution

The longest chain contains 2 carbon atoms with no substituents so the name is **ethene**.

Example 2

Name the organic compound shown below.



Solution

- The compound is an alkene since it contains a carbon-carbon double bond.
- The longest chain with the double bond has 5 carbon atoms; therefore the parent name is pentene.
- The double bond falls on the 1st carbon atom. Thus the parent name will be pent-1-ene.

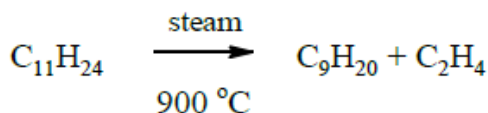
- The substituent has 2 carbon atoms, thus will be named ethyl.
- The substituent falls on carbon number 2 (*counting from the side which gives the carbon with a double bond a lower number*).
- Therefore, the name of the above compound is **2-ethylpent-1-ene**.

Preparation of Ethene

Ethene gas can be produced in two ways:

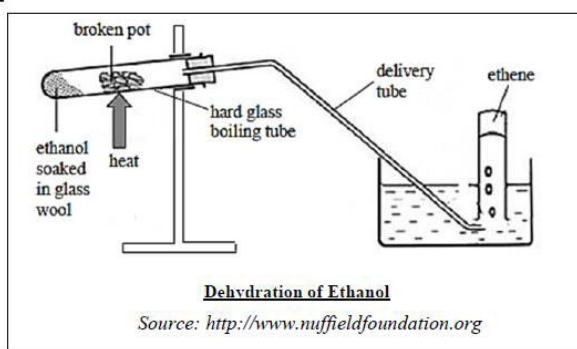
1. **Steam cracking of alkanes**- Steam cracking is a process in which saturated hydrocarbons (long chain alkane molecules) are broken down into smaller, often unsaturated, hydrocarbons.

Example:

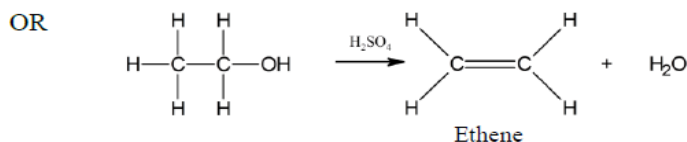
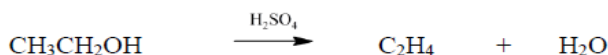


2. **Dehydration of ethanol** – Dehydration is the process of removing water molecules from a substance. Ethanol can be dehydrated to produce ethene and water when heated with concentrated sulfuric acid (H_2SO_4).

Example



Reaction equation



Activity

- The reaction of bromine with ethyne is an example of what type of reaction?
A. Substitution B. Halogenation C. Hydrohalogenation D. Hydration
- When the colorless gas ethene, C_2H_4 is bubbled through bromine water, the solution will turn
A. clear. B. dark brown. C. blue. D. pink.
- The representation C_2H_4 for ethene is
A. the empirical formula. B. the molecular formula. C. the structural formula. D. the line-angle formula.
- Name a catalyst which is used to convert ethene to ethane. _____
- Give the product of the addition reaction of ethene with:
a. Hydrogen (H_2)
b. Hydrogen chloride (HCl)

(5 marks)