



Ministry of higher education and scientific research
AL-Mustaqbal University college Department of
medical physics



Organic Chemistry

Lecture 3

Alkenes

By

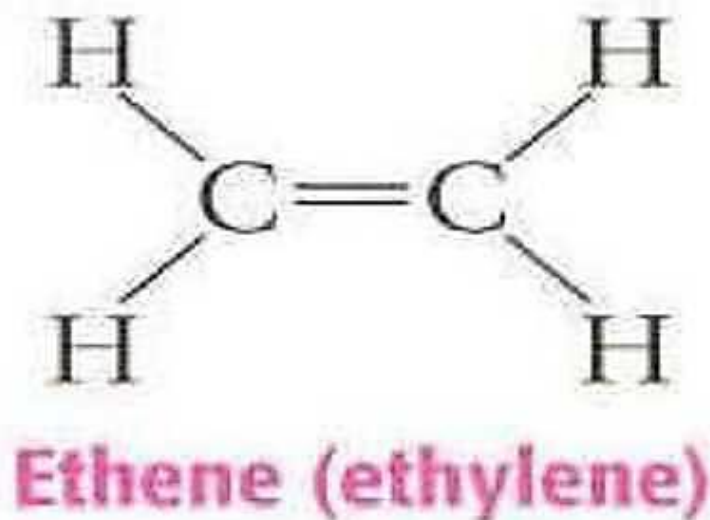
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Alkenes

1. Members of the alkene group have a double bond between two carbon atoms.
2. One hydrogen atom has been removed from two adjacent carbon atoms, thereby allowing the two adjacent carbon atoms to form a double bond.

General formula is **C_nH_{2n}**

Begins with **Ethene (ethylene)**



Some Members of the Alkene Series

Name	Molecular Formula	Condensed Structural Formula
Ethene (ethylene)	C_2H_4	$CH_2=CH_2$
Propene	C_3H_6	$CH_3CH=CH_2$
1-Butene	C_4H_8	$CH_3CH_2CH=CH_2$
2-Butene	C_4H_8	$CH_3CH=CHCH_3$
1-Pentene	C_5H_{10}	$CH_3(CH_2)_2CH=CH_2$

Physical properties

Carbon-carbon double bond changes the physical properties of alkenes.

Alkenes exist in all three phases, solid, liquids, and gases.

1) Physical state:

- Ethene, Propene, and Butene exist as colorless gases.
- Members of the 5 or more carbons such as Pentene, Hexene, and Heptene are liquid
- Members of the 15 carbons or more are solids .

2) Density:

- Alkenes are lighter than water.

3) Solubility:

- Insoluble in water.
- Alkenes are only soluble in nonpolar solvent like benzene, ether, chloroform.

4) Boiling point:

- Depends on more molecular mass (chain length.)

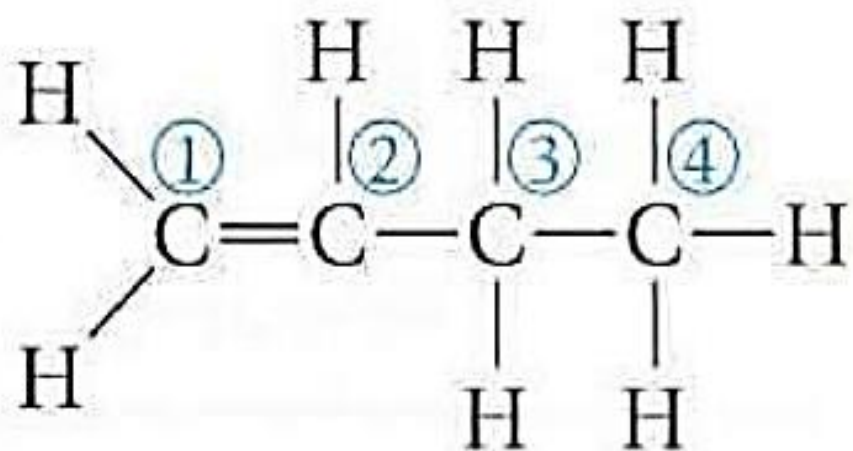
5) Melting point:

- Depends on the packaging of the molecules. Alkenes have similar melting points to that of alkanes.

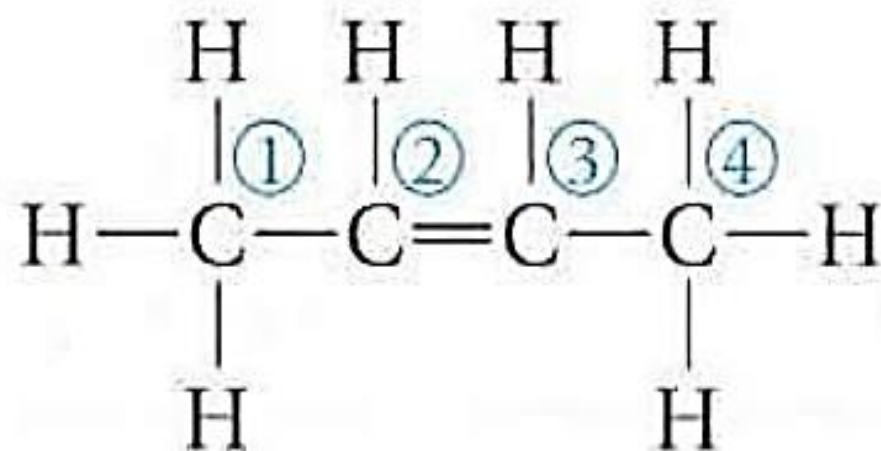
Naming Alkenes

- A. (**ane**) suffix for the corresponding alkane is changed to (**ene**) for alkenes.
- B. A number preceding the name indicates the C atom on which the double bond starts.
- C. The carbons are numbered such that the double bond has the **lowest number**.

For example, 1-butene and 2-butene.



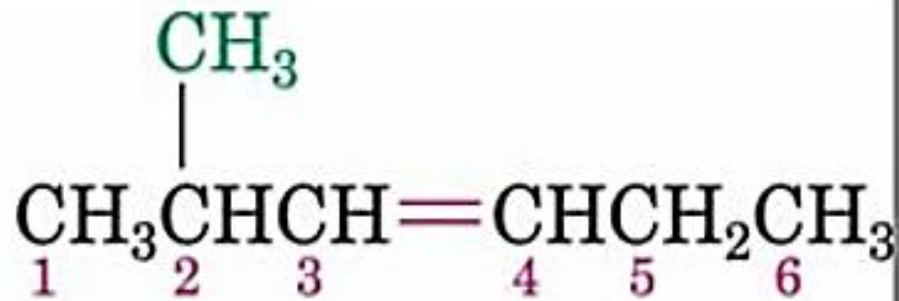
1-Butene



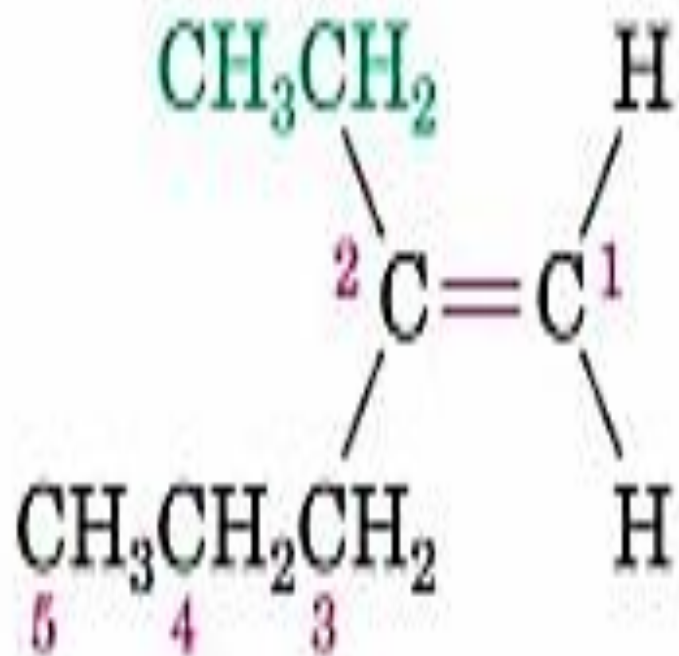
2-Butene



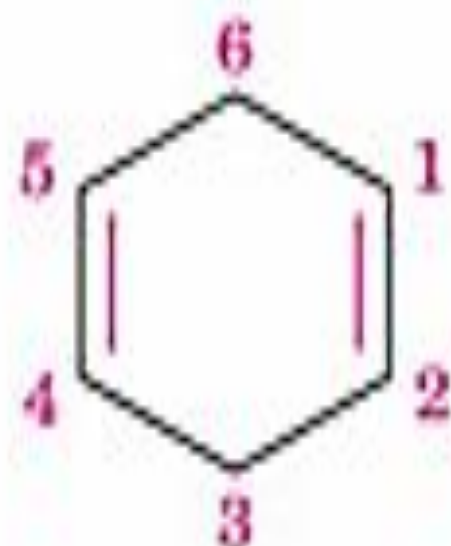
2-Hexene



2-Methyl-3-hexene



2-Ethyl-1-pentene

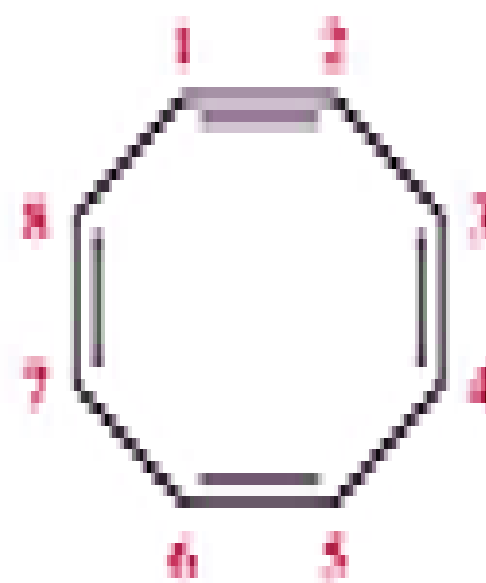


1,4-Cyclohexadiene



1,3-butadiene

buta-1,3-diene



1,3,5,7-cyclooctatetraene
cycloocta-1,3,5,7-tetraene

Thank
you

