***Al-Mustaqbal University College***

***Department of Medical Physics***

***First Class***

***Organic Chemistry***

***Lec 4 Alkenes***

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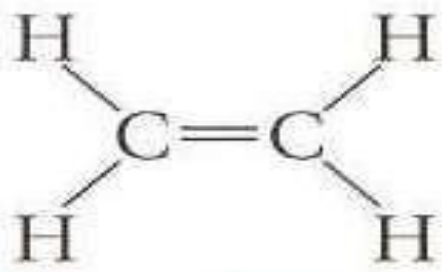
# *Alkenes*

Members of the alkene group have a double bond between two carbon atoms.

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*n*H2*n***

Begins with **ethene (ethylene)**




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 physicals properties of alkenes.

- At R.T. , alkenes exist in all three phases, solid, liquids, and gases.
- 1 . Physical state:
- Ethene, Propene, and Butene exists 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

. 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.)

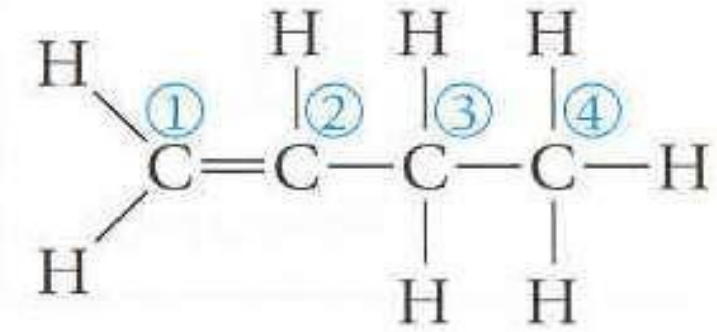
more intermolecular mass is added, the higher the boiling point.

5.Melting point : depends on the packaging of the molecules.

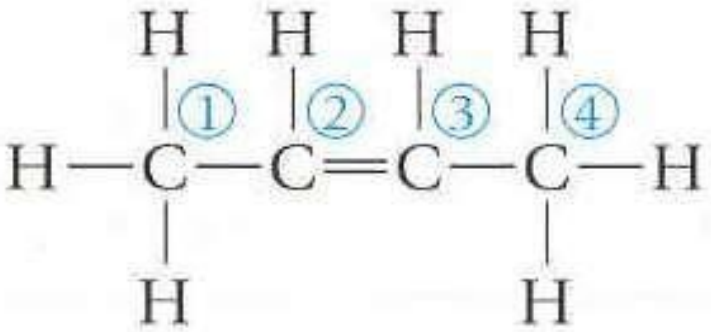
Alkenes have similar melting points to that of alkanes

# Naming Alkenes

- *" - ane"* suffix for the corresponding alkane is changed to *"ene"* for alkenes.
- A number preceding the name indicates the C atom on which the double bond starts.
- *The carbons are numbered such that the double bond has the lowest number.*
- For example, 1-butene and 2-butene



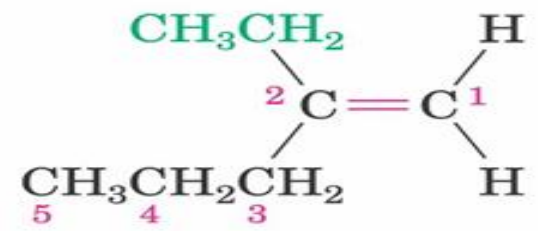
1-Butene



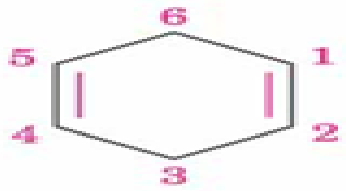
2-Butene

**2-Hexene**

**2-Methyl-3-hexene**



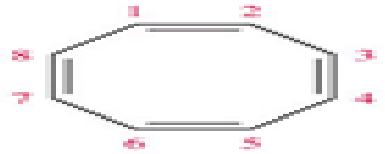

2-Ethyl-1-pentene




1,4-Cyclohexadiene


1,3-butadiene

buta-1,3-diene




1,3,5,7-cyclooctatetraene

cycloocta-1,3,5,7-tetraene

Thank you