Department of biology

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Organic Chemistry

Lecture 3

Alkenes

By

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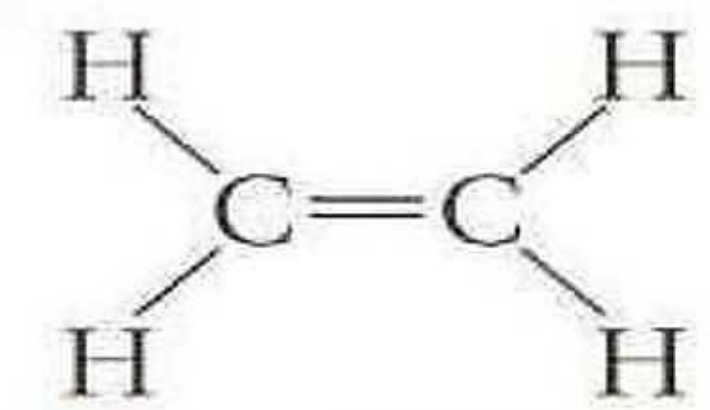
Alkenes

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 **CnH2n**

Begin 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.

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 .

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.

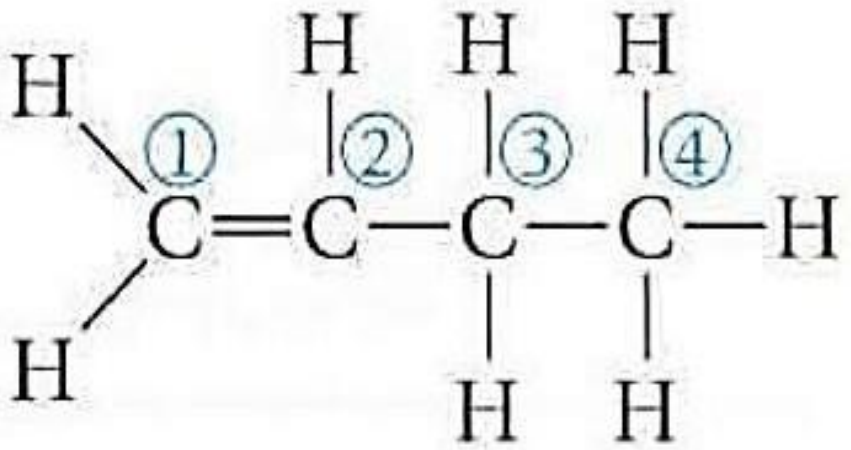
Naming Alkenes

A. (ane) suffix for the corresponding alkane is changed to (ene) for alkenes.

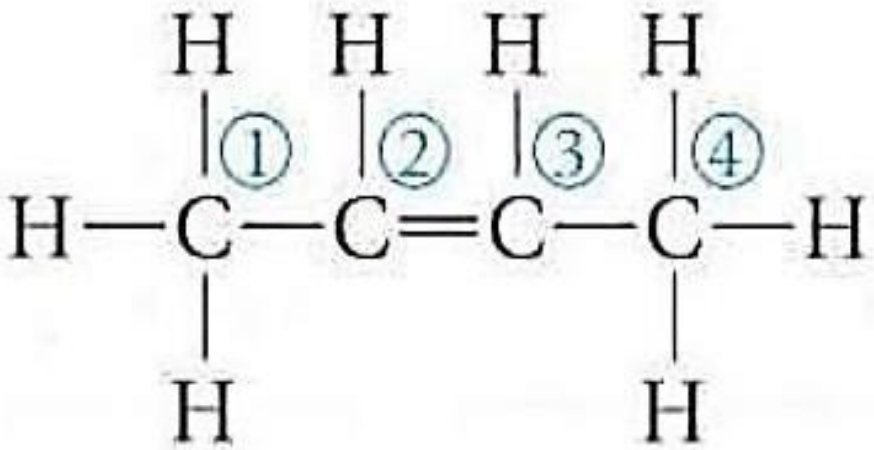
B. A number preceding the name indicates the C atom on which the double bond starts.

C. The carbons are numbered such that the double bond has the lowest number.

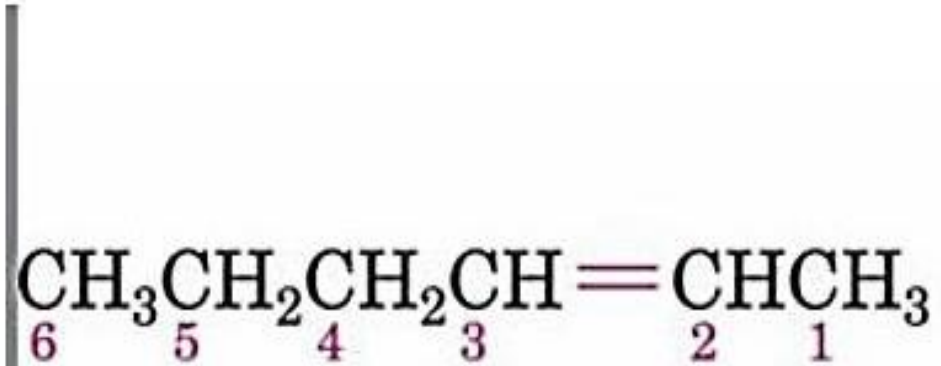
For example, 1-butene and 2-butene.



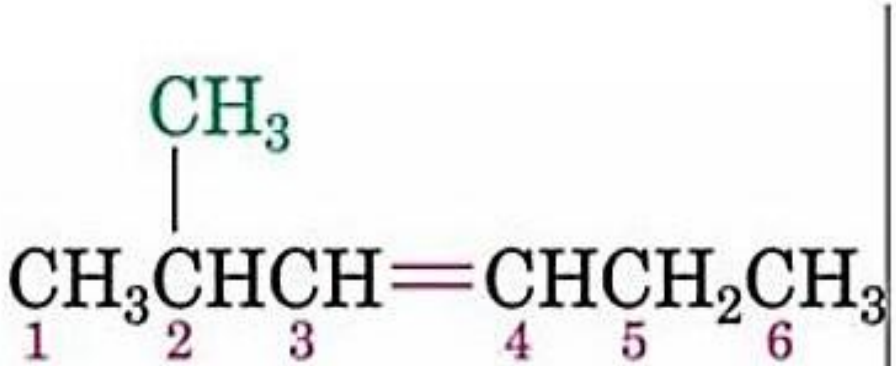
1-Butene



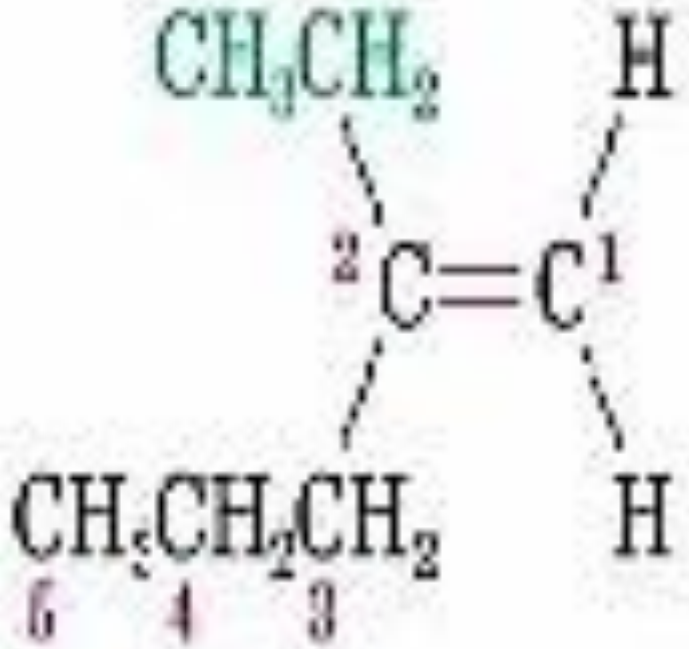
2-Butene



2-Hexene

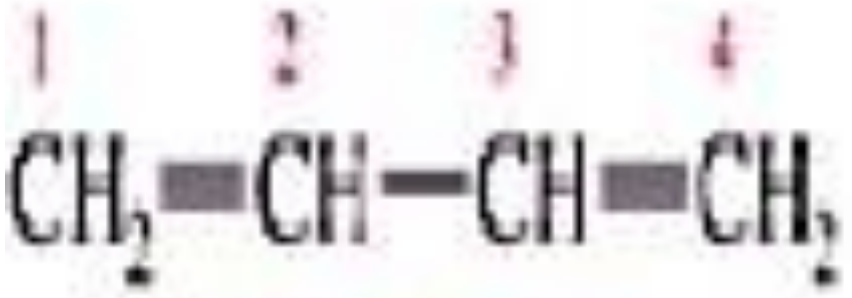


2-Methyl-3-hexene



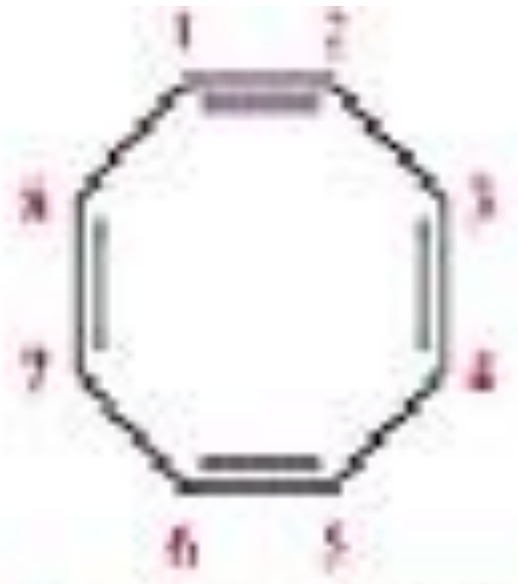
2-Ethyl-1-pentene

1,4-Cyclohexadiene



1,3-butadiene

buta-1,3-diene



1,3,5,7-cyclooctatetraene

cycloocta-1,3,5,7-tetraene


Thank
you