

Study the following Part of Lecture Outline 4 and Associated Problems Below**I. Structure and Nomenclature**

A. Alkenes with one double bond

1. Nomenclature
2. Orbital Hybridization
3. Stereoisomerism - cis, trans, and Z, E.
4. Cycloalkenes
5. Polyenes

B. Alkynes

1. Nomenclature
2. Structure and Orbital Hybridization

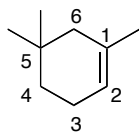
Read: Solomons 11e Edition:

- Chapter 4 – How to name Alkenes & Alkynes – p156-159
- Chapter 7 – Alkenes & Alkynes: Structure and Nomenclature Only p292, 293, 296
 - Problems; 7.25 to 7.28

Nomenclature of Alkenes continued:



cyclopropene - ringstrain makes this molecule very reactive



1,5,5-trimethylcyclohexene or
1,5,5-trimethyl-1-cyclohexene

For molecules having multiple double bonds:

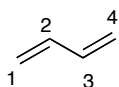
2 C=C bonds → diene

3 C=C bonds → triene

4 C=C bonds → tetraene

5 C=C bonds → pentaene

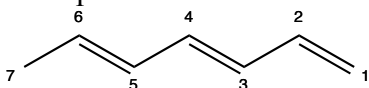
Example 1:



1,3-butadiene

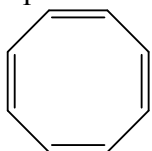
drop "ne" ending of alkane and add "diene"

Example 2:



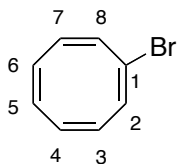
1,3,5-heptatriene

Example 3:

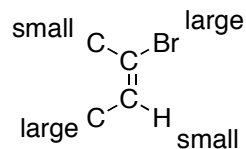


1,3,5,7-Cyclooctatetraene

Example 4:

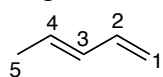


1-E-1-bromo-1,3,5,7-cyclooctatetraene

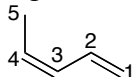


Example 5:

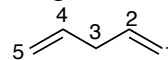
E-1,3-pentadiene



Z-1,3-pentadiene



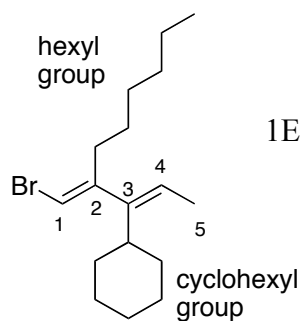
1,4-pentadiene



Stereoisomers
(diastereomers)

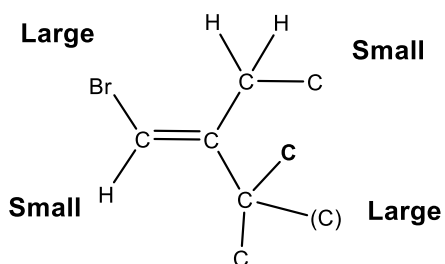
Structural
isomers

Example 6:

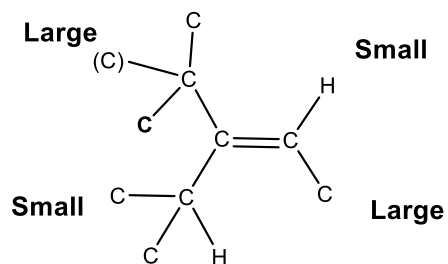


1E,3E-1-bromo-3-cyclohexyl-2-hexyl-1,3-pentadiene

1st double bond

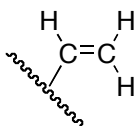


2nd double bond

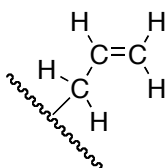


Note: Carbons attached to double and triple bonds are depicted as additional carbon-carbon bonds in the representations above.

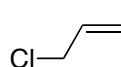
Different groups



Vinyl group

Vinyl chloride
1-chloroethene

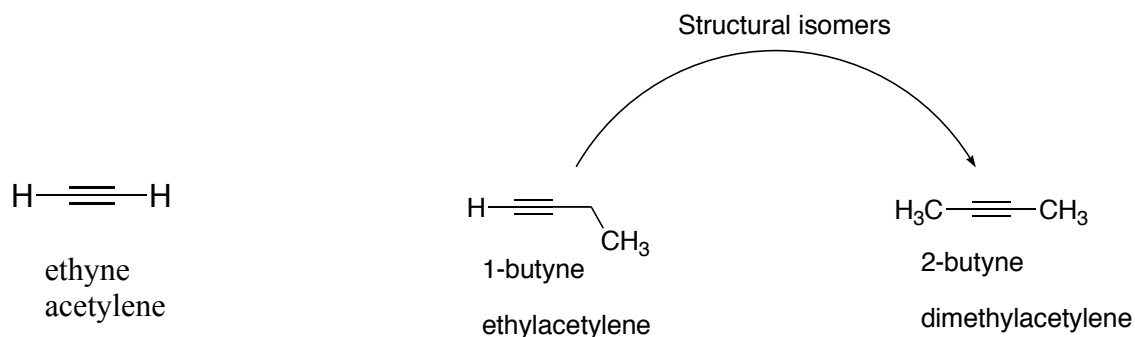
Allyl group

Allyl chloride
3-chloropropene

Nomenclature of Alkynes

Rules:

- Find longest chain with max number of multiple bonds
- Number from end to give 1st multiply bonded position the lowest number
- Drop “ane” and add “yne”
- For multiple triple bonds, drop “ne” and add “diyne”, “triyne”, etc.



Multiple alkynes end with:

- | | | |
|---|--------------------------|----------|
| 2 | $\text{C}\equiv\text{C}$ | diyne |
| 3 | $\text{C}\equiv\text{C}$ | triyne |
| 4 | $\text{C}\equiv\text{C}$ | tetrayne |

Mixed double and triple bond containing compounds are “eneynes”

The below example is from canola – defense substance (anti-nematode)

