Recall:

Nomenclature of Alkene

- Note that there is no free rotation around C=C.

Rules:

1. Find longest chain
2. Number from end to contain both ends of C=C and give lowest number to 1st C of C=C
3. Change "ane" to "ene" precede with number to indicate first double bond position

Nomenclature of alkenes with multiple carbon-carbon double bonds (poly-enes):

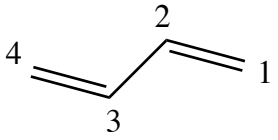
Multiple C=C

2 Diene

3 Triene

4 Tetraene

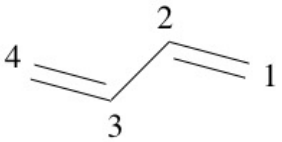
…etc



Buta-1,3-Diene
1,3-Butadiene

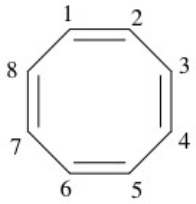
Drop -ne and add "diene", "triene", etc.

1) Find the longest chain containing the maximum number of double bonds.
2) Start numbering such that the first doubly bonded position would have the lowest number possible
3) Write out the full name. Number the substituents according to their position in the chain and list them alphabetically.

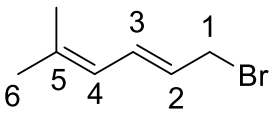


Buta-1,3-diene
1,3-Butadiene

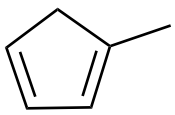
1,3-Cylcobutadiene



1,3,5,7-Cyclooctatetraene (All *Z*)
COT

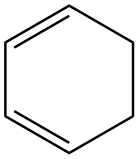


3E-1-bromo-5-methyl-2,4-hexadiene

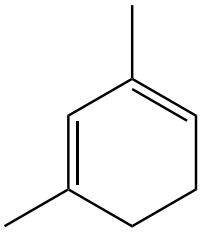


1-methyl-1,3-cyclopentadiene

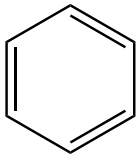
Other examples:



1,3-cyclohexadiene



1,3-dimethyl-1,3-cyclohexadiene



benzene
(NOT a cyclohexatriene)
(aromatic)

Abbrev:
PhH or C_6H_6 or ϕH

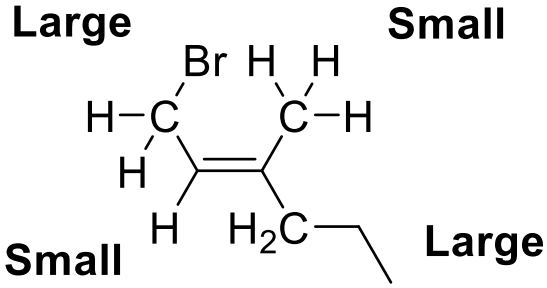
E, Z - Nomenclature

E - Entegegen - Opposite
Z - Zusammen – Together

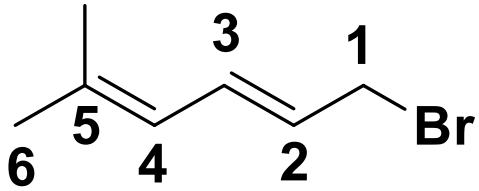
Cis (*Z*) **Trans (*E*)**

2-butene

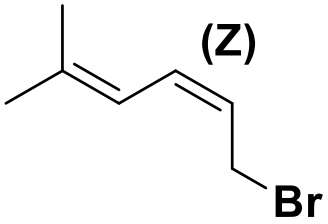
Naming based on atomic number, similar process to identifying S/R stereochemistry
Example 1: 1-bromo-3-methyl-2-hexene



Example 2: (*E*)-1-bromo-5-methylhexa-2,4-diene

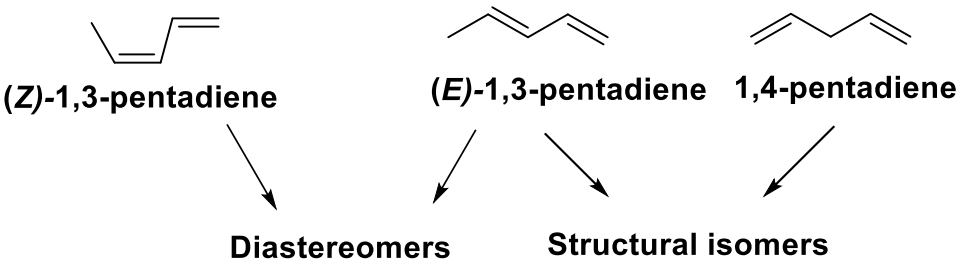


4,5 positions: no stereochemistry
Position 2,3: E



This is a diastereomer

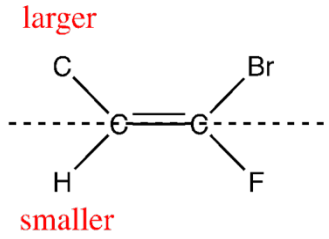
Example 3:



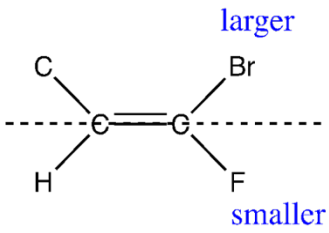
Example 4: 1-bromo-1-fluoro-1-propene

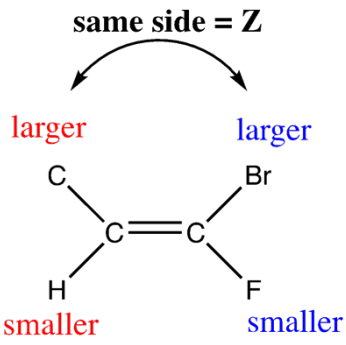
- compare the atomic no. of the adjacent atoms. These are diastereomers (non-superimposable, non-mirror images)

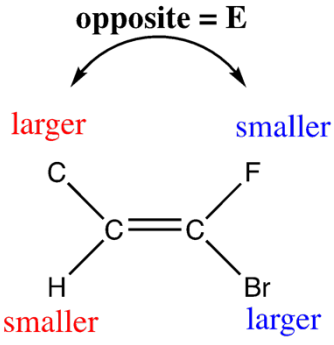
Compare the left side of the C=C bond



Compare the right side of the C=C bond

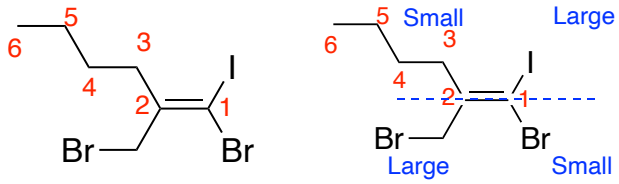






(Z)-1-bromo-1-fluoro-1-propene **(E)-1-bromo-1-fluoro-1-propene**

Example 5:

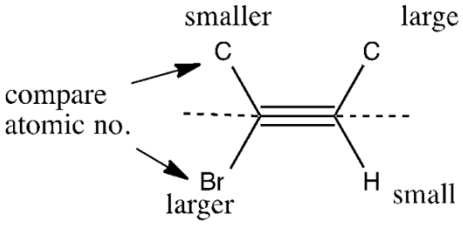


Substituents: 1-iodo; 1-bromo; 2-(1-bromomethyl)
Parent: Hex-1-ene or 1-Hexene

Name: *E*-1-bromo-2-(1-bromomethyl)-1-iodo-1-hexene

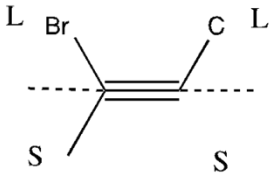
Iodine is on the opposite side to the bromomethyl (highest priority groups on either side of the alkene) and so the stereochemistry is deemed E

Example 6: 2-bromo-2-butene



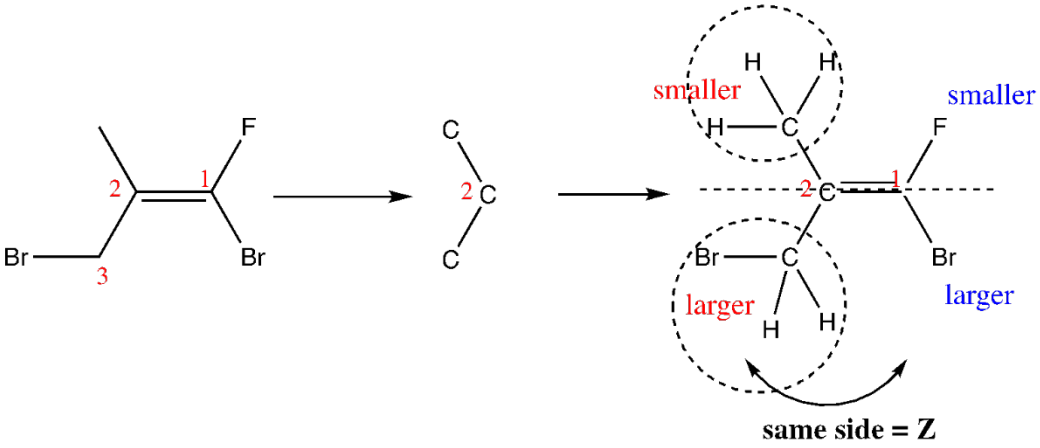
Large groups are on opposite sides on the C=C --> E

E-2-bromo-2-butene



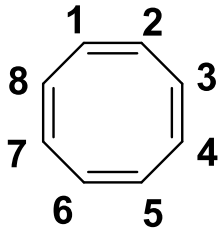
Z-2-bromo-2-butene

Example 7: 1,3-dibromo-1-fluoro-2-methyl-1-propene

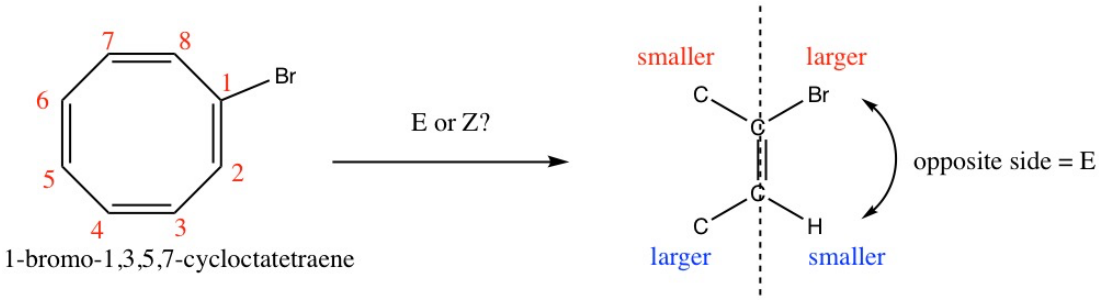


Therefore the name is: (Z)-1,3-dibromo-1-fluoro-2-methyl-1-propene

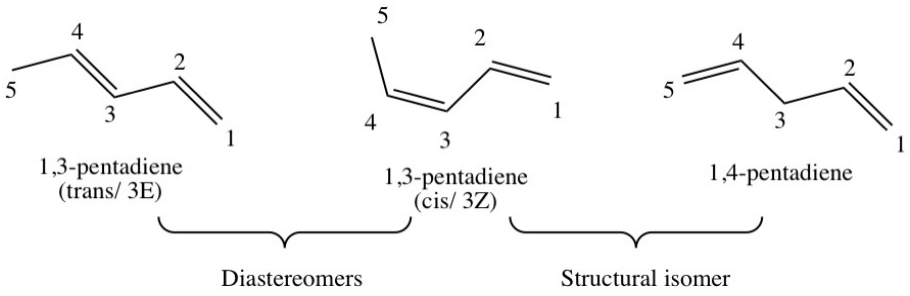
Note: If you cannot decide on basis of atomic number of atoms directly attached to double bond, go to the next set of atoms until a higher atomic number is found



1,3,5,7-cyclooctatetraene

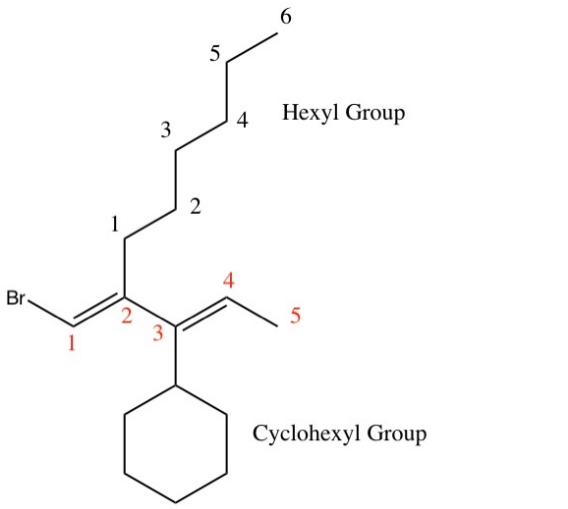


It is therefore (E)-1-bromo-1,3,5,7-cyclooctatetraene



1,3-pentadiene (trans) = (E)-1,3-pentadiene

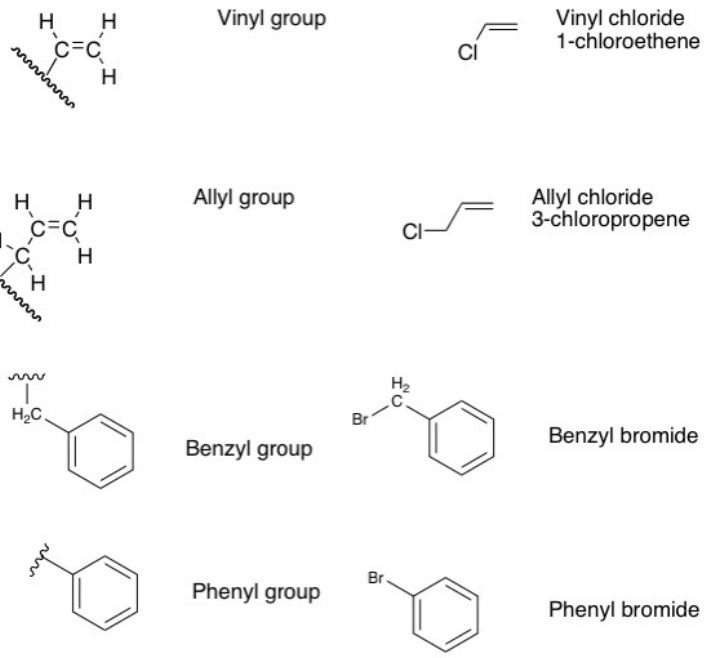
1,3-pentadiene (cis) = (Z)-1,3-pentadiene



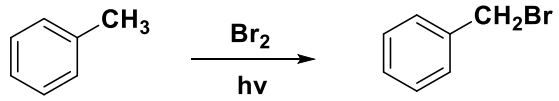
1E,3E-1-Bromo-3-cyclohexyl-2-hexyl-1,3-pentadiene

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

Special Nomenclature of Common Groups:



Note: phenyl bromide is commonly called bromobenzene

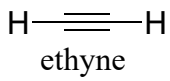


Toluene Benzyl bromide

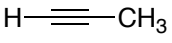
Nomenclature of Alkynes (also known as acetylenes)

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.
- Halides and alkyl substituents take lower priority than double or triple bond



ethyne
acetylene

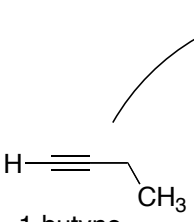


propyne

methylacetylene (common name)

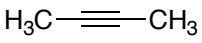
1-propyne

Structural isomers



1-butyne

ethylacetylene



2-butyne

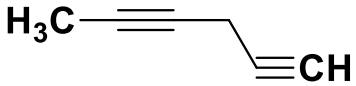
dimethylacetylene

Multiple alkynes end with:

2	C≡C	diyne
3	C≡C	triyne
4	C≡C	tetrayne

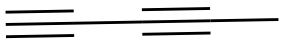
Mixed double and triple bond containing compounds are "eneynes."

Example 1:



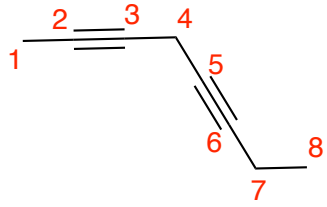
1,4-hexadiyne

Example 2:



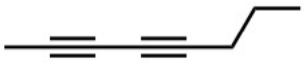
penta-1,3-diyne (1,3-pentadiyne)

Example 3



2,5 - Octadiyne
(octa-2,5-diyne)

Example 4:

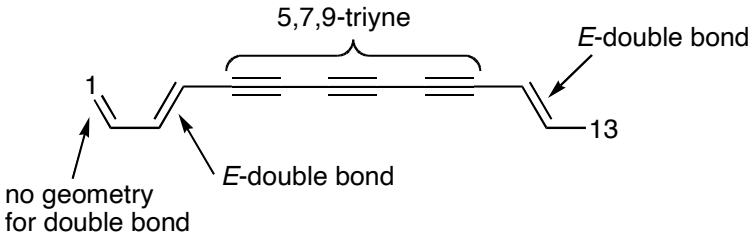


2,4 - Octadiyne
(octa-2,4-diyne)

Example 5:

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

- Parent alkane of 13 carbons is tridecane – hence trideca
- Start numbering the chain such that the **first multiply bonded position** gets the lowest number possible.



3*E*,11*E*-trideca-1,3,11-triene-5,7,9-triyne

Note: alkene stereochemistry can go right to the numbers indicating positions of double bonds: **trideca-1,3*E*,11*E*-triene-5,7,9-triyn**