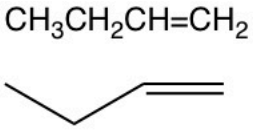
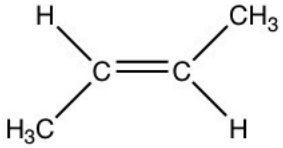
REVIEW:

Alkene Nomenclature:

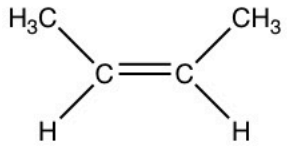


butylene OR 1-butene OR but-1-ene

Below are two structural isomers of 1-butene



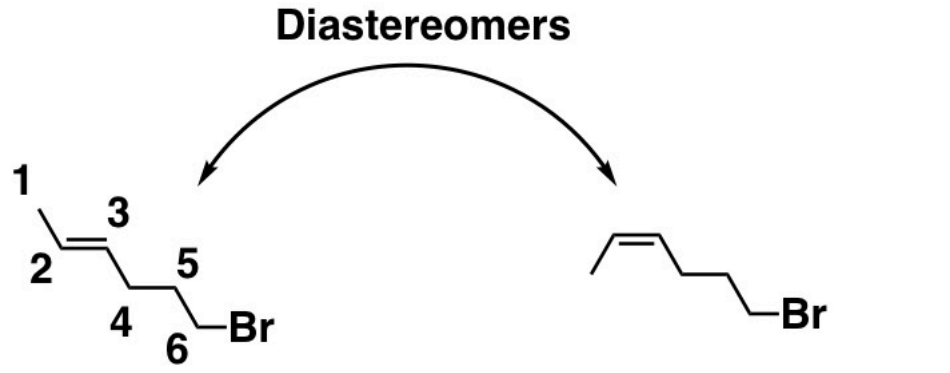
trans-2-butene



cis-2-butene

} diastereomers

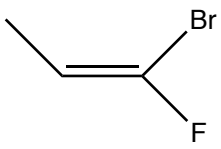
Example 1: 6-Bromo-2-hexene



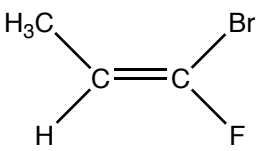
trans-6-Bromo-2-hexene **cis-6-Bromo-2-hexene**

In the cis isomer, the two higher priority groups on either side of the carbon-carbon double bond are pointing in the same direction.

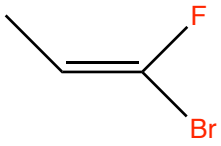
Example 2: 1-Bromo-1-fluoro-1-propene



means



1-bromo-1-fluoropropene



1-bromo-1-fluoropropene

Question: Are the compounds above the same?

Answer: No, they are diastereomers and we can differentiate them by using the E and Z nomenclature

E, Z - Nomenclature

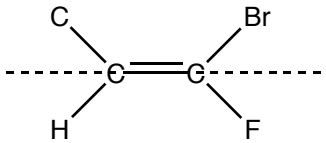
E - Entegegen - Opposite
Z - Zusammen - Together

Naming based on atomic number, similar process to identifying S/R stereochemistry

Example 1: 1-bromo-1-fluoro-1-propene
- compare the atomic no. of the adjacent atoms.

Compare the left side of the C=C bond

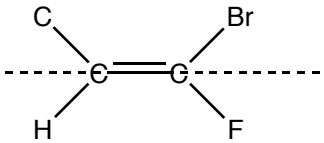
larger



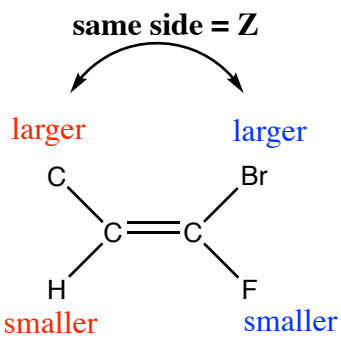
smaller

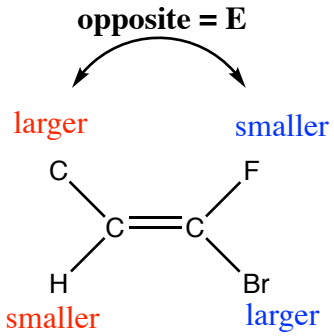
Compare the right side of the C=C bond

larger

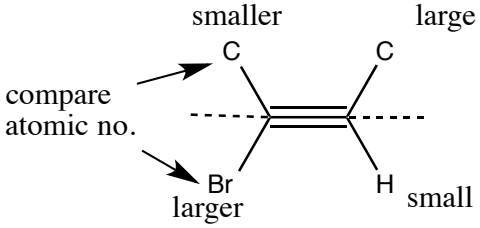


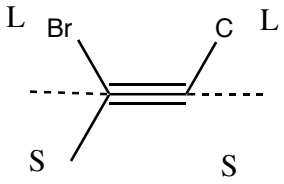
smaller





Example 2: 2-bromo-2-butene



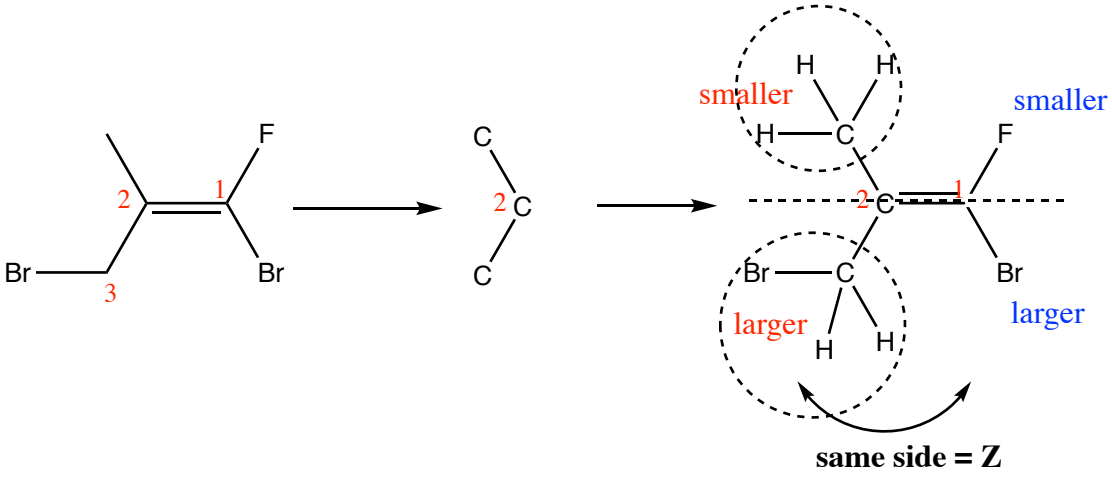


Large groups are on opposite sides on the C=C --> E

E-2-bromo-2-butene

Z-2-bromo-2-butene

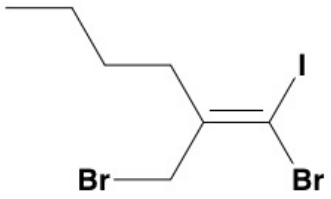
Example 3: 1,3-dibromo-1-fluoro-2-methyl-1-propene



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

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

Example 3:

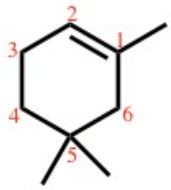


E-1-Bromo- 2-bromomethyl-1-iodohex-1-ene

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.

Nomenclature of Cycloalkenes

Cyclopropene Cyclobutene Cyclopentene Cyclohexene



1,5,5-trimethyl-1-cyclohexene

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

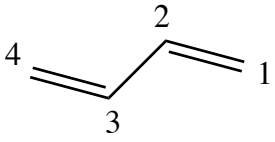
Multiple C=C

2 Diene

3 Triene

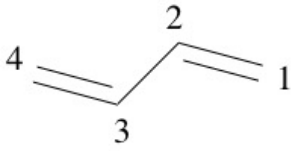
4 Tetraene

…etc



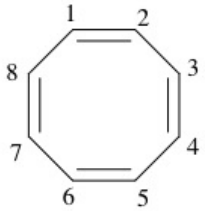
Buta-1,3-Diene
1,3-Butadiene

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



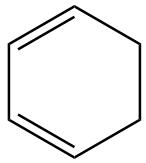
Buta-1,3-diene
1,3-Butadiene

1,3-Cylcobutadiene

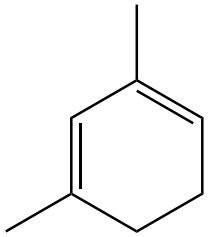


1,3,5,7-Cyclooctatetraene
COT

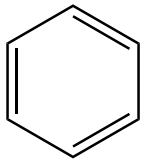
Other examples:



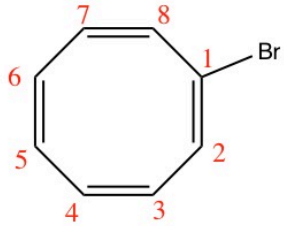
1,3-cyclohexadiene



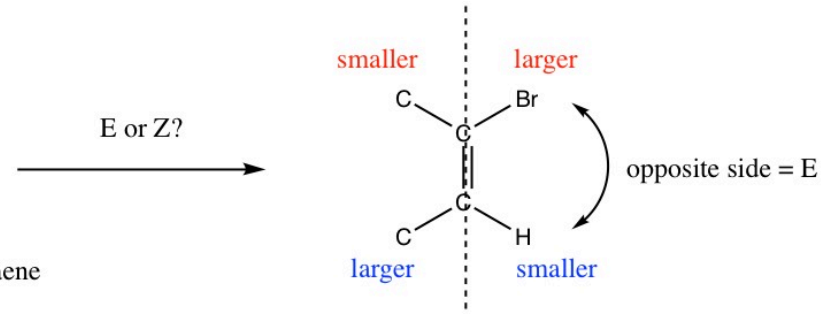
1,3-dimethyl-1,3-cyclohexadiene



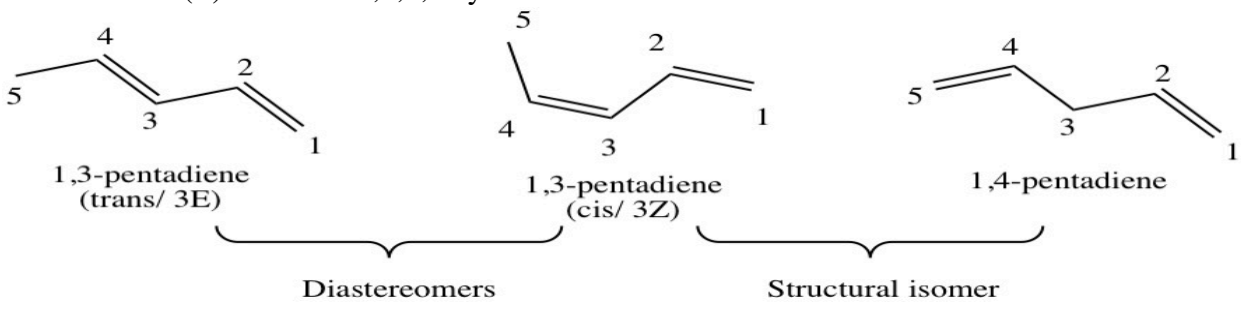
benzene
(NOT a cyclohexatriene)
(aromatic)



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

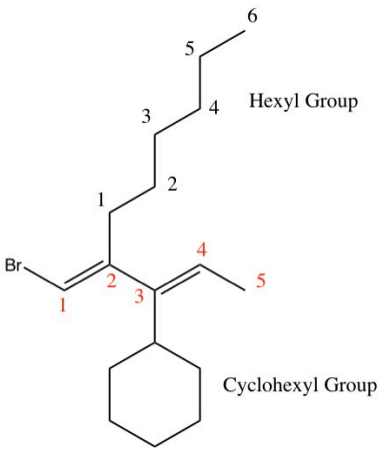


It is therefore (E)-1-bromo-1,3,5,7-cyclooctatetraene



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

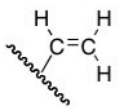
1,3-pentadiene (cis) = (Z)-1,3-pentadiene



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

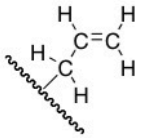
Note: Carbons attached to double and triple bonds are depicted as additional carbon-carbon bonds in the representations above.

Special Nomenclature of Common Groups:

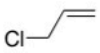


Vinyl group

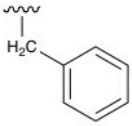
Vinyl chloride
1-chloroethene



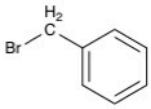
Allyl group



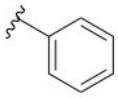
Allyl chloride
3-chloropropene



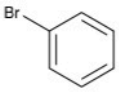
Benzyl group



Benzyl bromide



Phenyl group



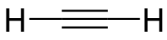
Phenyl bromide

phenyl bromide is caommonly called bromobenzene

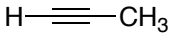
Nomenclature of Alkynes

Rules:

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

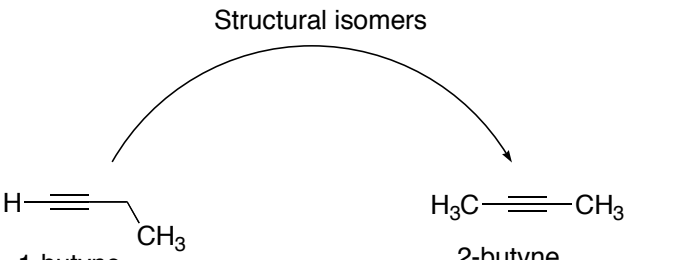


ethyne
acetylene



propyne

methylacetylene (common name)



1-butyne

ethylacetylene

2-butyne

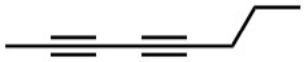
dimethylacetylene

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:

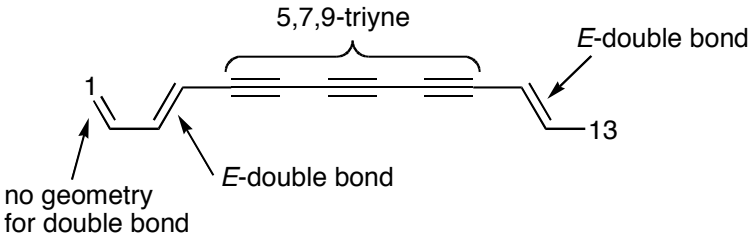


2,4 - Octadiyne

Example 2:

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

Parent alkane of 13 carbons is tridecane – hence trideca



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