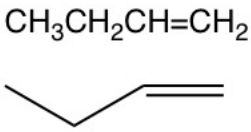
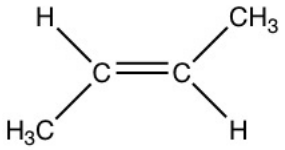
REVIEW:

Alkene Nomenclature:

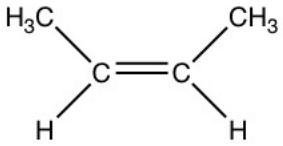


butylene OR 1-butene OR but-1-ene

Below are two structural isomers of 1-butene



trans-2-butene

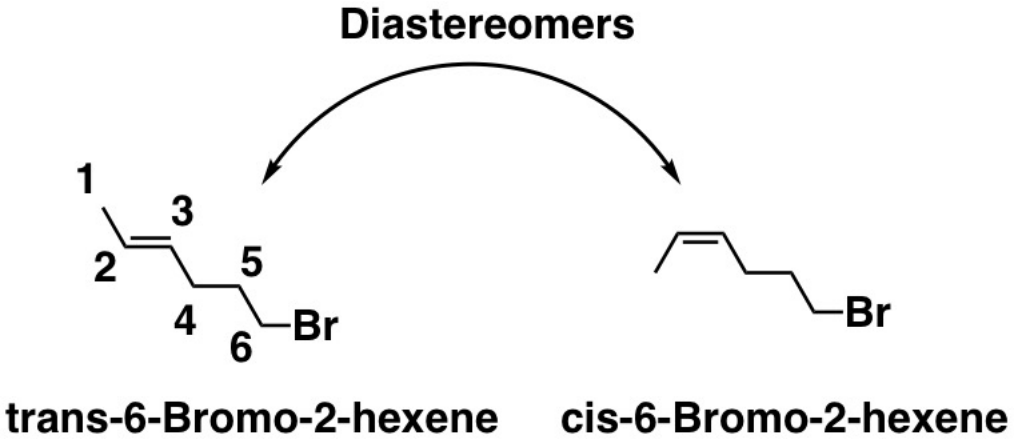


cis-2-butene

} diastereomers

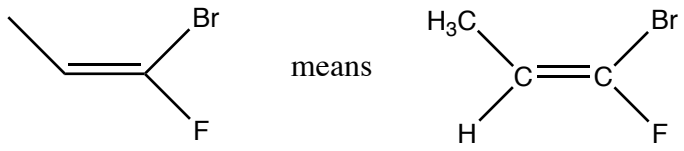
Note: no free rotation around the double bond. No way to interconvert between the *cis* and *trans* isomer without a chemical reaction.

Example 1: 6-Bromo-2-hexene

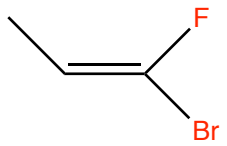


In the cis isomer, the two higher priority groups on either side of the carbon-carbon double bond are pointing in the same direction.

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



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

<u>E, Z - Nomenclature</u>

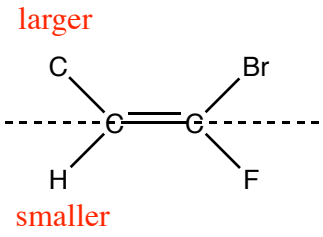
E - Entegegen - Opposite
Z - Zusammen - Together

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

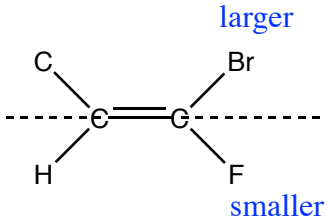
Example 1: 1-bromo-1-fluoro-1-propene

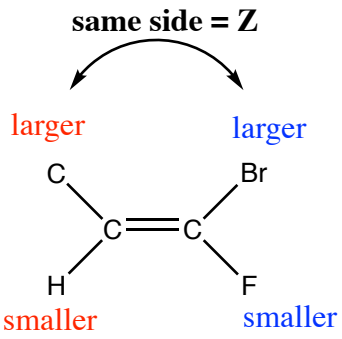
- compare the atomic no. of the adjacent atoms.

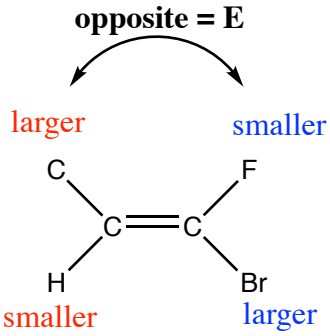
Compare the left side of the C=C bond



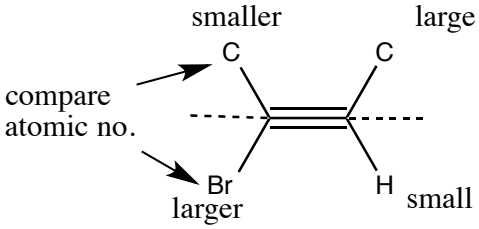
Compare the right side of the C=C bond

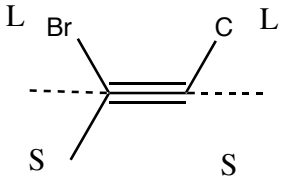






Example 2: 2-bromo-2-butene



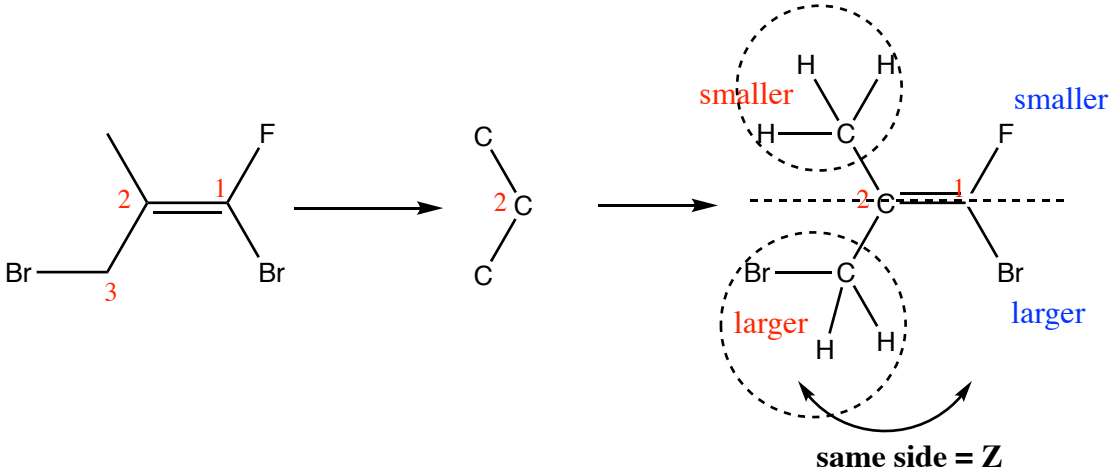


Large groups are on opposite sides on the C=C --> E

E-2-bromo-2-butene

Z-2-bromo-2-butene

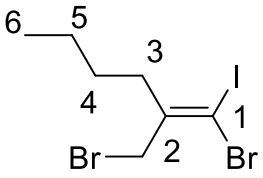
Example 3: 1,3-dibromo-1-fluoro-2-methyl-1-propene



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

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

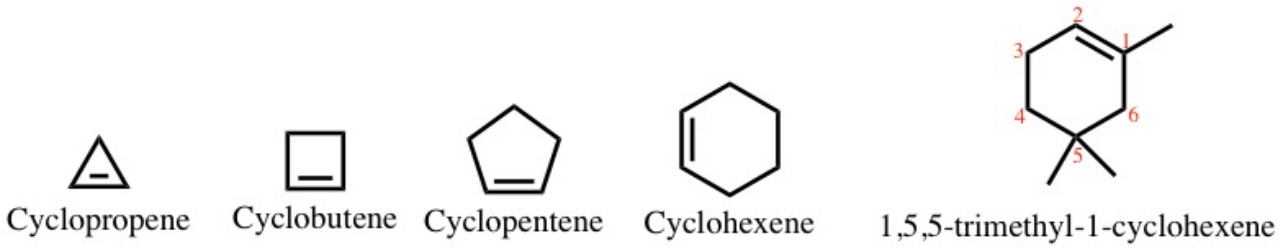
Example 3:



1-E-1-bromo-1-iodo-2-(bromomethyl)-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.

<u>Nomenclature of Cycloalkenes</u>



Rule: Number the cycloalkene such that the double bond is between C1 and C2 and that the first substituent has the lowest number possible.

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

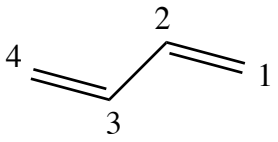
Multiple C=C

2 Diene

3 Triene

4 Tetraene

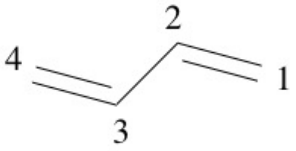
…etc



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

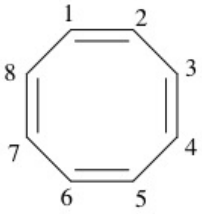
Drop -ne and add "diene", "triene", etc.

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.



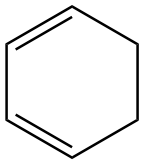
Buta-1,3-diene
1,3-Butadiene

1,3-Cylcobutadiene

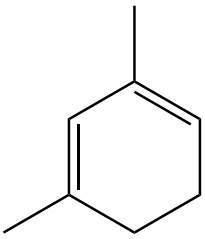


1,3,5,7-Cyclooctatetraene
COT

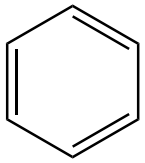
Other examples:



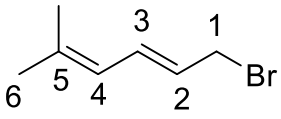
1,3-cyclohexadiene



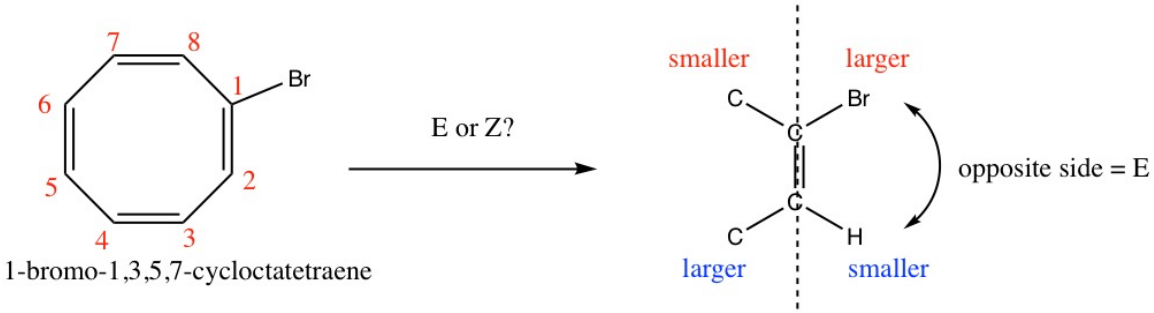
1,3-dimethyl-1,3-cyclohexadiene



benzene
(NOT a cyclohexatriene)
(aromatic)

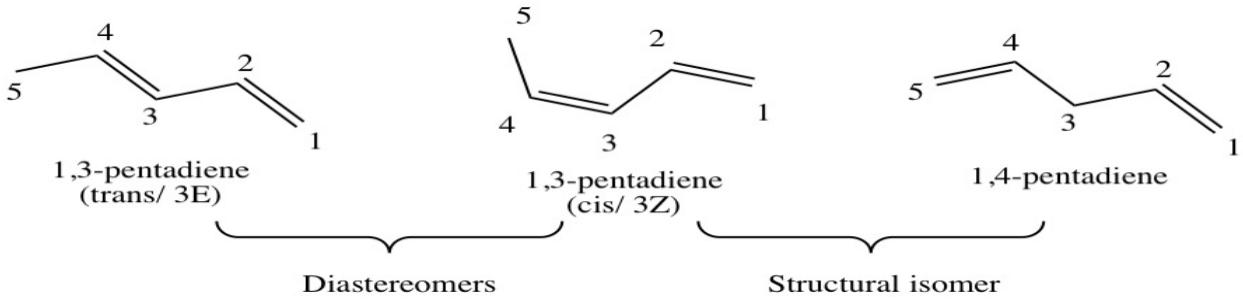


3E-1-bromo-5-methyl-2,4-hexadiene



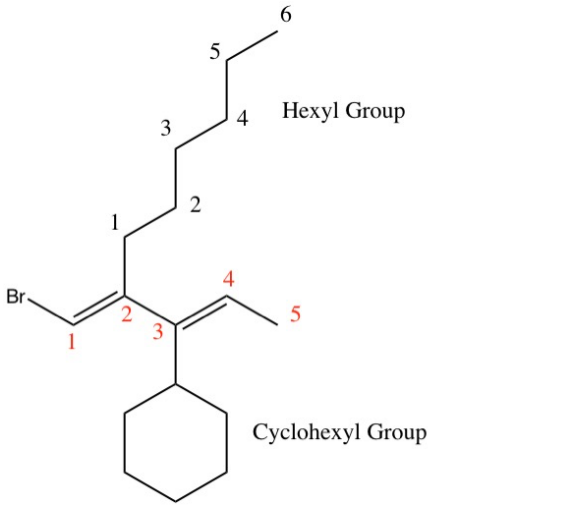
1-bromo-1,3,5,7-cycloctatetraene

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



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

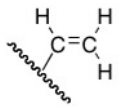
1,3-pentadiene (cis) = (Z)-1,3-pentadiene



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

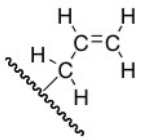
Note: Carbons attached to double and triple bonds are depicted as additional carbon-carbon bonds in the representations above.

Special Nomenclature of Common Groups:

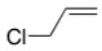


Vinyl group

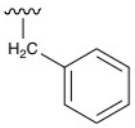
Vinyl chloride
1-chloroethene



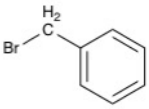
Allyl group



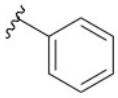
Allyl chloride
3-chloropropene



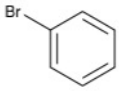
Benzyl group



Benzyl bromide



Phenyl group



Phenyl bromide

Note: phenyl bromide is commonly called bromobenzene