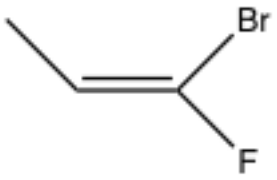
Alkene and Alkyne Nomenclature

E, Z - Nomenclature

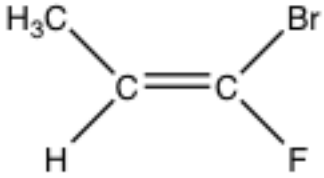
E - Entegegen - Opposite
Z - Zusammen - Together

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

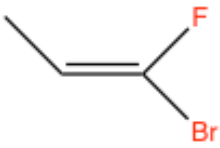
Example 2: 1-Bromo-1-fluoro-1-propene



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

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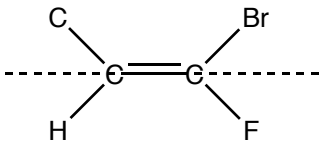
Example 1: 1-bromo-1-fluoro-1-propene
- compare the atomic no. of the adjacent atoms.

Compare the left side of the C=C bond

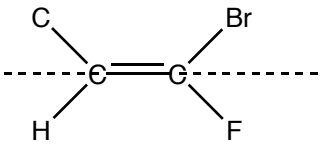
larger



smaller

Compare the right side of the C=C bond

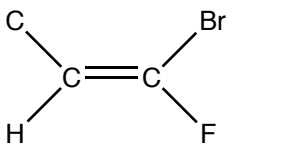
larger



smaller

same side = Z

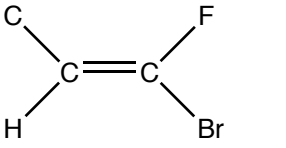
larger larger



smaller smaller

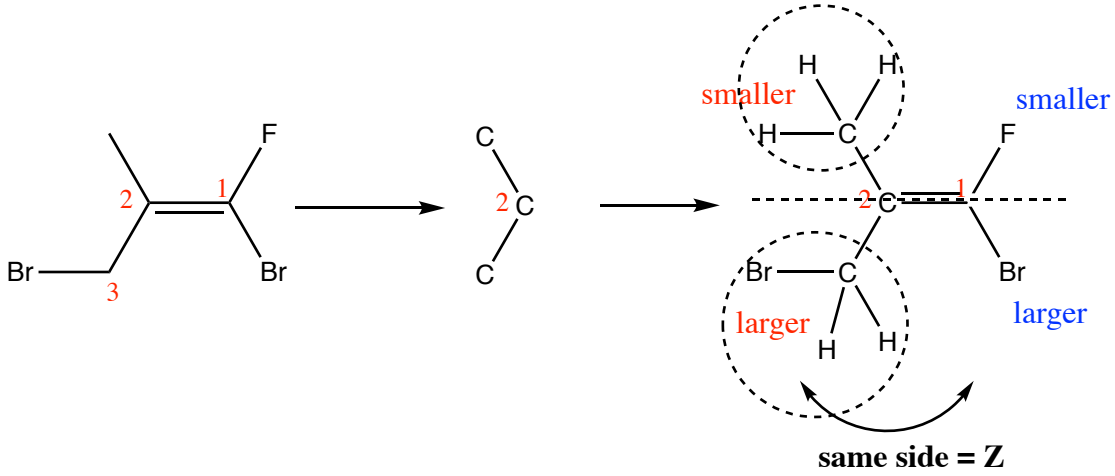
opposite = E

larger smaller



smaller larger

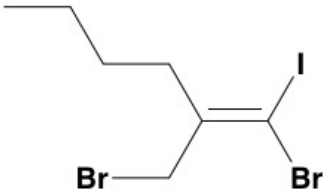
Example : 1,3-dibromo-1-fluoro-2-methyl-1-propene



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.

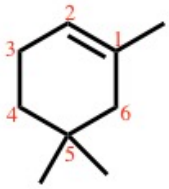
Nomenclature of Cycloalkenes

Cyclopropene

Cyclobutene

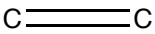
Cyclopentene

Cyclohexene



1,5,5-trimethyl-1-cyclohexene

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

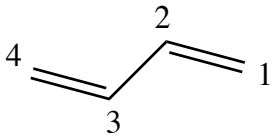
Multiple 

2 Diene

3 Triene

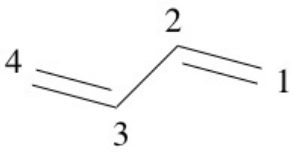
4 Tetraene

…etc



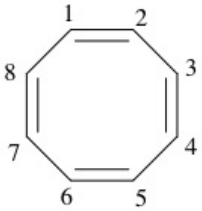
Buta-1,3-Diene
1,3-Butadiene

Drop -ne and add “diene”, “triene”, etc.

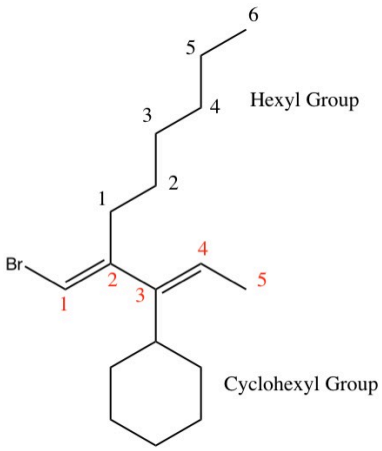


Buta-1,3-diene
1,3-Butadiene

1,3-Cylcobutadiene



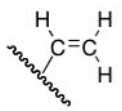
1,3,5,7-Cyclooctatetraene
COT



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

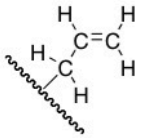
Note: Carbons attached to double and triple bonds are depicted as additional carbon-carbon bonds in the representations

Special Nomenclature of Common Groups:

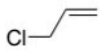


Vinyl group

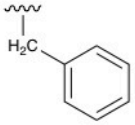
Vinyl chloride
1-chloroethene



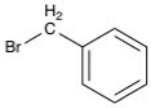
Allyl group



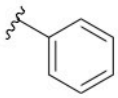
Allyl chloride
3-chloropropene



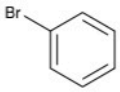
Benzyl group



Benzyl bromide



Phenyl group



Phenyl bromide

phenyl bromide is commonly called bromobenzene