Nomenclature

Content

Notes

In this note following abbreviations will be used.

1. Priority: Will be used to state that this form of a chain/structure/substitute has higher priority than the other compounds its compared to.
2. [Square brackets] will be used as a reference to other chapters or publications.

References

1. C 3rd = Chemistry 3rd edition by Housecroft & Constable

Naming Organic Compounds

General naming procedure

1. Locate the functional group with the highest priority – Use the table provided in the next chapter. This group is going to be the end of the name.

2. Determine the stem carbon chain and name it. Normally this is the longest chain but, its much more important that the stem chain contains:
    - As many double /triple bonds as possible
    - As many functional groups as possible

3. Transform the stem chain name using the double / triple bond names.

4. Number the stem carbon chain, giving the highest priority group the lowest number.

5. Name all the remaining functional groups and rearrange them alphabetically.
    - Remember to add the numbers of there location corresponding to the stem carbon chain

6. Create the final name.

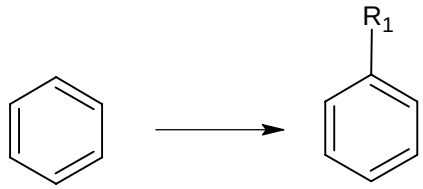
Priority table of functional groups

Class	Formula (group)	Prefix	Suffix
Carboxylic acid	R-COOH	Carboxy-	-carboxylic acid -acid
Carboxylicacidester	R-COO-R	(R)oxycarbonyl-	-???
Carboxylicacidamid	R-CO – NH_2	Carbomoyl-	-carboxylicacidamid
Amidines	R-C(=NH)-NH_2	Amidino-	-carboxamidine
Nitrile	R-CN	Cyano-	-nitril
Aldehydes	R-CHO	Formyl- Oxo-	-carbaldehyd -al
Ketones	R-CO-R R_1-CO-R_2	Oxo-	-on
Alcohol	R-OH	Hydroxy-	-ol
Thiols	R-SH	Sulfanyl-	-thiol
Amines	R-NH_2	Amino-	-amin
Ethers	R-O-R	(R)oxy -	-ether
Alkyner	-C≡C-	Alkynyl-	-yn
Alkener	-C═C-	Alkenyl-	-en
Alkaner	-C-C-	Alkyl-	-an
Halogener	Cl, Br, F	Cl, Br, F-	Cannot be suffix
Nitril	NO_2	Nitro-	Cannot be suffix
Alkyl or Aryl	-CH3 -C6H5 -CH2-C6H5	Methyl- Phenyl- Benzyl-	

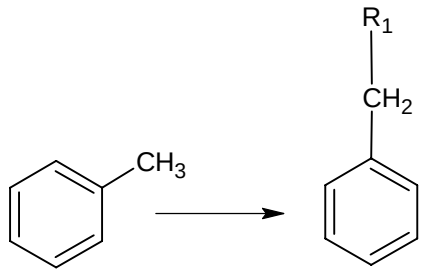
Other rules

1. If more than one stem (backbone) carbon chain in a molecule has the same length, the one generating fewest substitutes should be used as the stem chain.
2. Larger substitutes get lower chain number, coz they have higher priority.
3. If a plane of symmetry exists in a molecule with 2 chirale centers this can give rise to a meso form. [See more under R/S isomerism and meso forms]

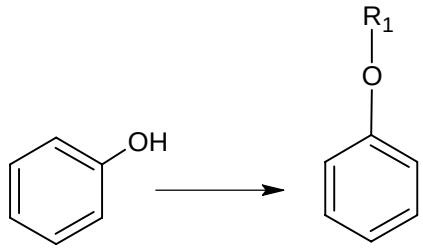
Names for cyclohexene & substitutes



Benzene Phenyl

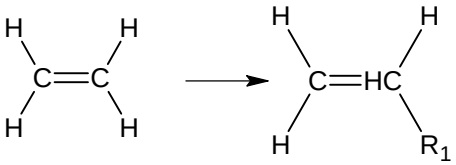


Toluene Benzyl



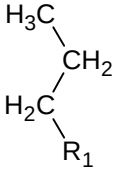
Phenol Phenoxy

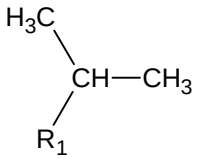
Names for ethene & substitutes



Ethene Vinyl

Alkyle or Isoalkyle





Propyle Isopropyle(Priority)

R/S Isomerism

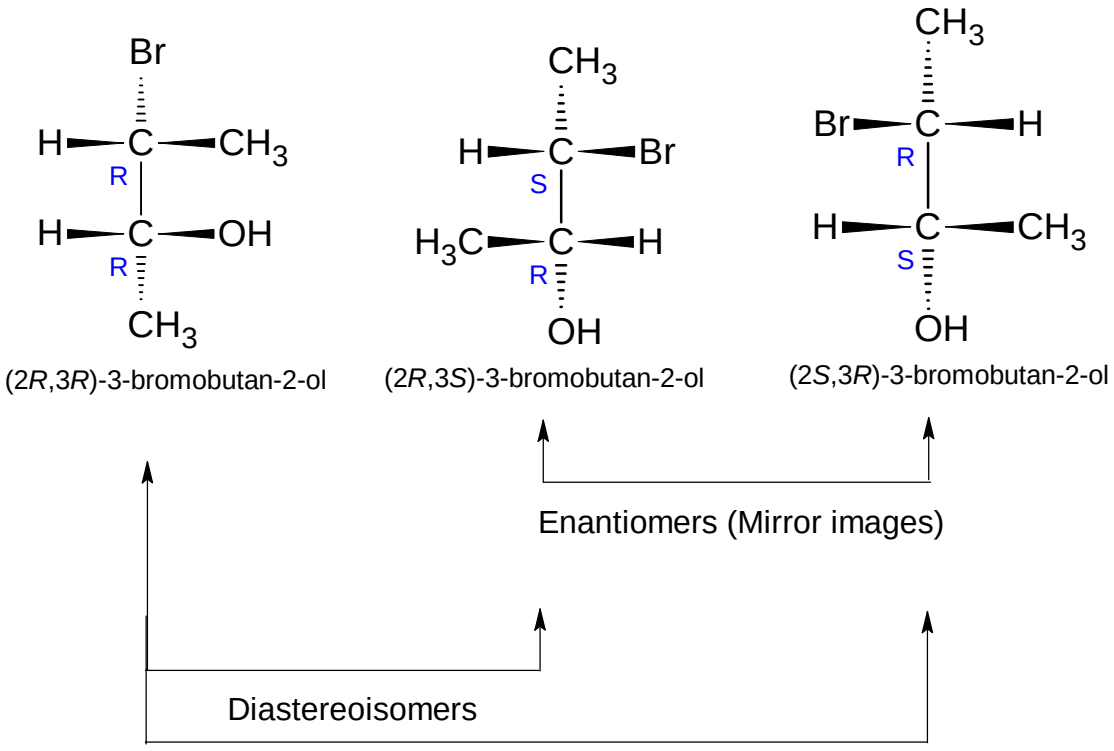
Facts

- **Asymmetrical carbon atoms**
  - Describes a carbon to which four different atoms or substituents (groups) are bonded, when drawing molecules you mark this with a asterisk *
- **Chirality**
  - Molecules with one(or more) chirale centers *can* have one (or more) mirror images, this is called chirality
- **Physics and chemical properties**
  - These properties are the same for both mirror images
  - Taste and smell can be different
- **Optical activity**
  - Molecules with chirale centers are optical active, meaning they rotate plane polarized light [C 3rd page 812 chapter 24]
- **Names**
  - **R** = Rectus = Clockwise priority(right)
  - **S =** Sinister = Counterclockwise(left)
    - **D, L,** +, – do not have anything to do with R or S[See under rotation of plane polarized light]
- **Racemic mixture**
  - A mixtures of equal amounts of a R and S compound, this solution is not optical active
- **Nature versus Labs**
  - Nature make only one of these forms, there are few exceptions
  - Laboratories often produce both forms

How to decide R or S

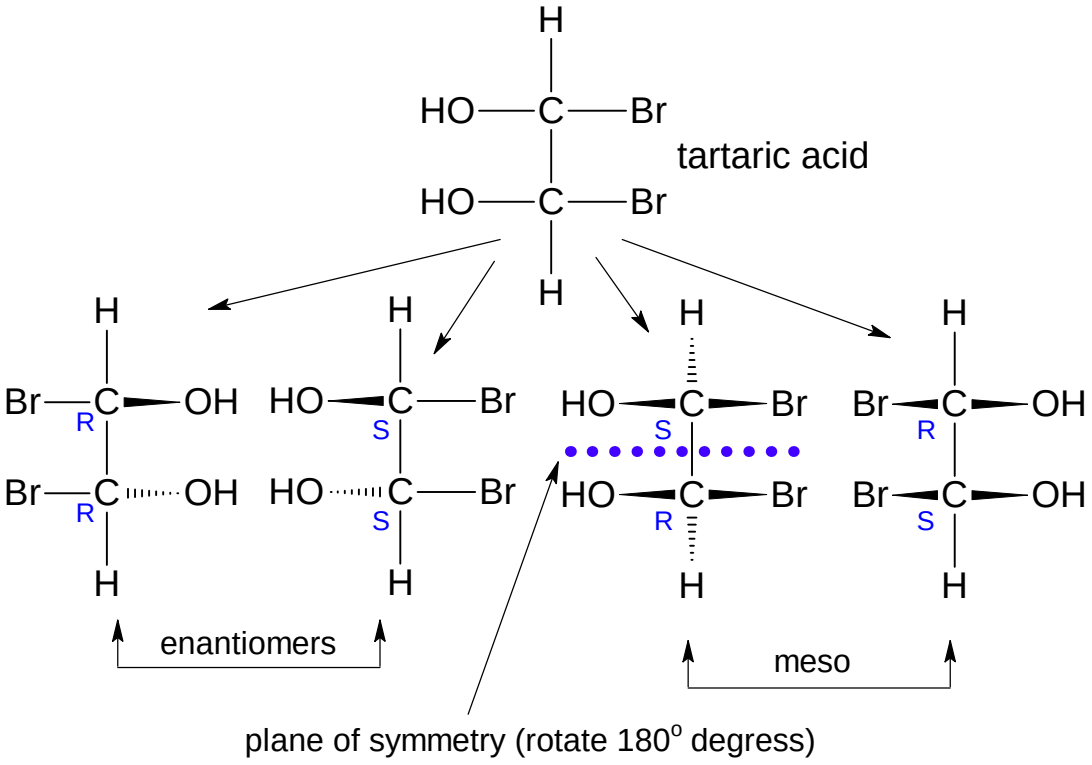
1. Be sure that the molecule has a chiral center
2. Priorities the substituents(groups) after the order (H has the lowest priority)
   $I > Br > Cl > S > F > O > N > COOH > CO > CHO > CH_2OH > CH_3 > H$
3. Rotate the molecule so that the lowest priority is turned away from you.
4. Now you a looking a something similar to a car wheel with 3 branches, now determine if the other priorities turn clock or counterclockwise
5. Name the molecules either R or S accordingly, R or S should be put in a (bracket)

- **Examples**



Meso forms

- Molecules which contains a plane of symmetry can have a meso form, planes of symmetry derive by dividing a molecule into 2 through the plane of symmetry, getting 2 a like parts.
- Meso compounds are not chiral and have different chemical and physic properties than the enantiomeric pair.
- **Examples**



Credits

Written by
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