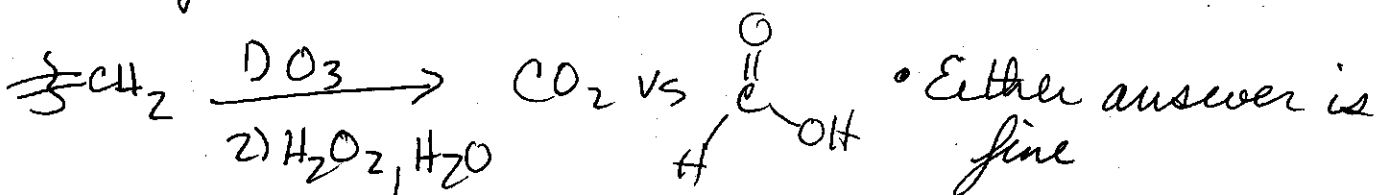
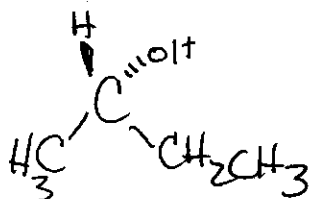


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Ozonolysis.



Recall: Stereochemistry at sp^3C ...



$[\alpha]_D^{20} = +13.9^\circ$

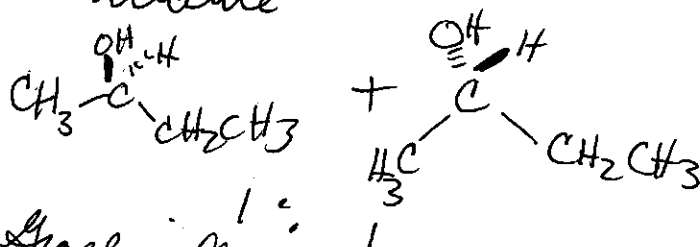
(S)-(+)-2-butanol

Racemic mixture ("Racemate"): 1:1 mixture of enantiomers

• Not optically active ($[\alpha]_D^{20} = 0^\circ$)

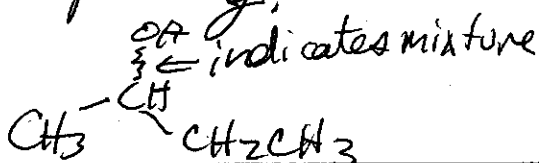
• Rotation by 1 enantiomer is exactly cancelled by rotation of the other

Nomenclature

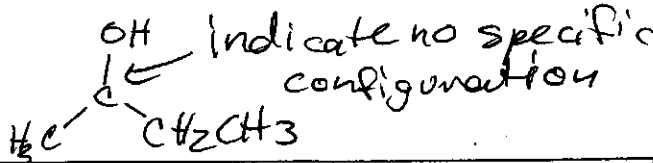


(±)-2-butanol

Graphically:

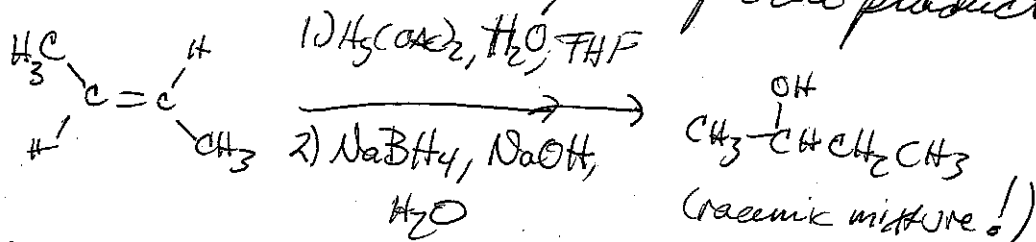


OR



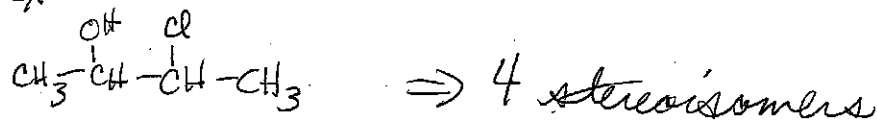
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• Any reaction in which a chiral center is created w/ achiral reagents, and from an achiral starting material, must produce a racemic mixture for the product

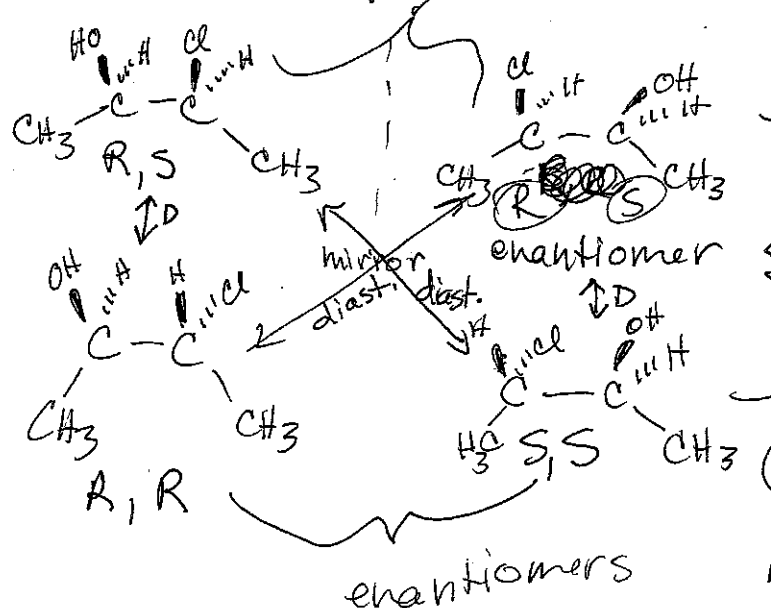


Molecules w/ 2 stereogenic centers

Ex:



2-chloro-3-butanol



diastereomers: different at one stereocenter + not the other

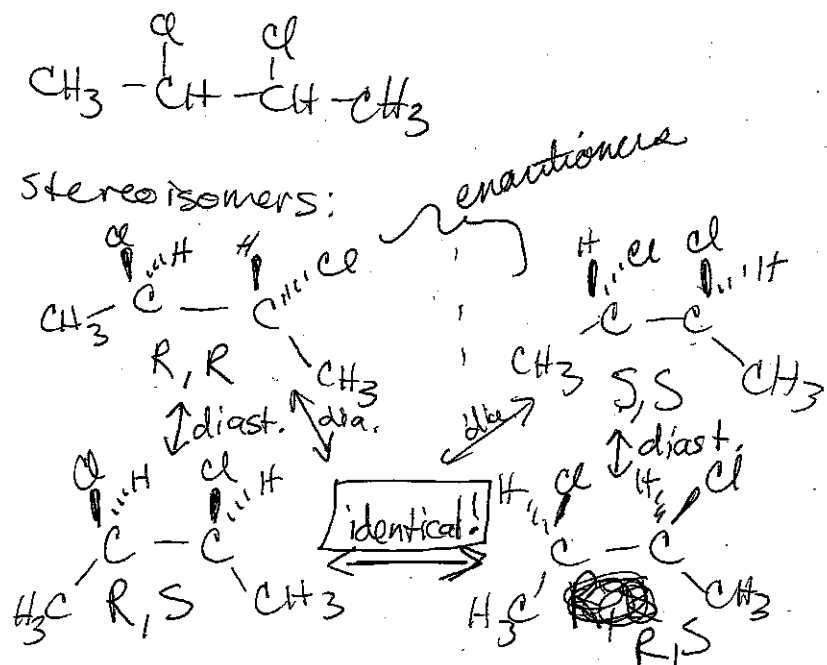
(Note: Diastereomers differ in physical properties too)

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Any pair of stereoisomers that are not enantiomers are diastereomers...

Another example:



A molecule can contain stereogenic sp³ centers, but nevertheless, be "achiral" (not chiral)

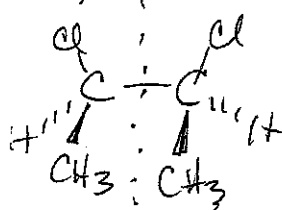
⇒ Meso compound

Recognition of meso compounds

Find a conformation that contains an internal mirror plane (or center of symmetry).

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Thus,



is meso

• Doesn't matter that this is an eclipsed (and therefore unstable) conformation

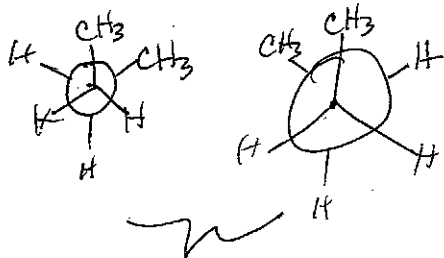
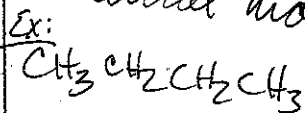
General rules

1. n sp^3 stereocenters $\rightarrow$ max # of stereoisomers is 2^n
 2. If there are meso stereoisomers, the actual # is $< 2^n$
- For chlorobutanol ex. 4 stereoisomers
 - For dichlorobutene ex. 3 stereoisomers (2 meso ones are only 1 isomer)

Can't have a meso compd w/o the stereocenters being bonded to the same things

Molecules vs. Conformations

- We assign configurations to molecules, not to conformations
- Achiral molecules often have chiral conformations



• These are interconverting rapidly & equally populated

• End of Ch 6

Non-superimposable mirror images!