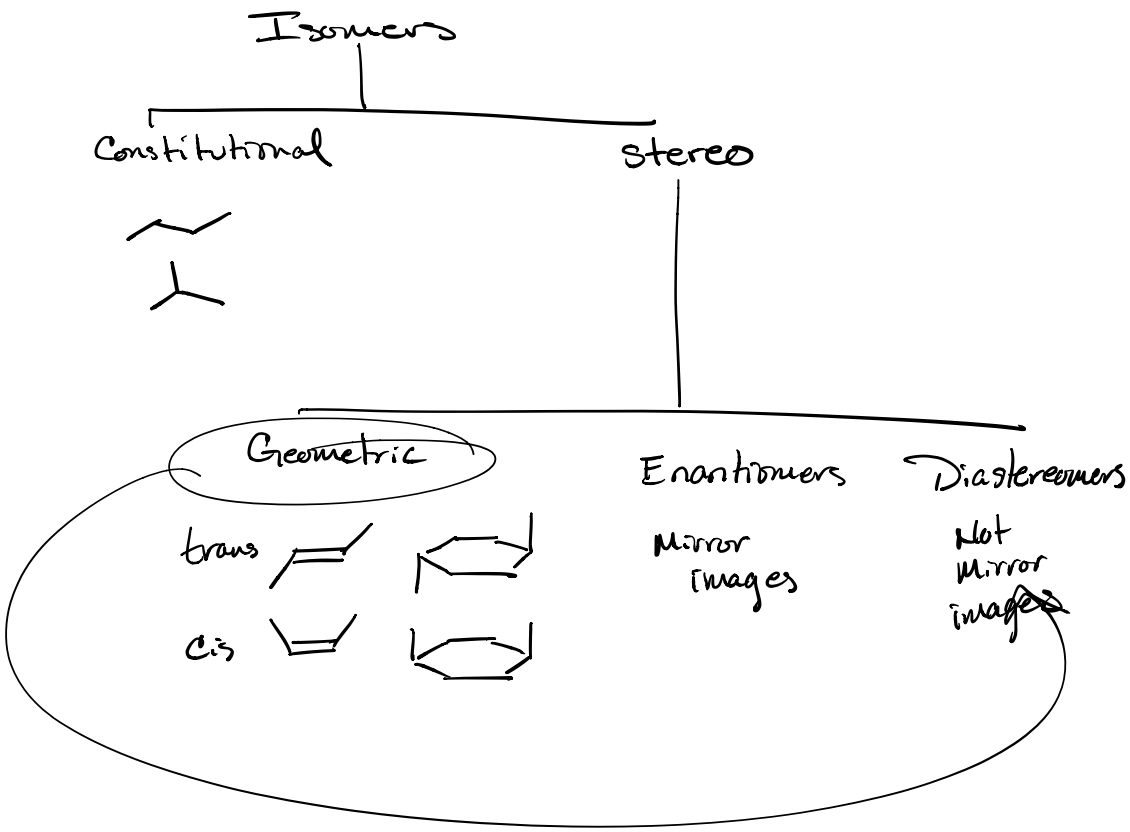
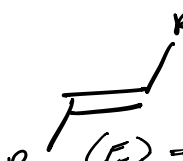
Stereochemistry

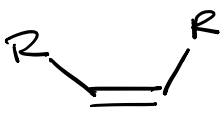


Cis/Trans Isomerism



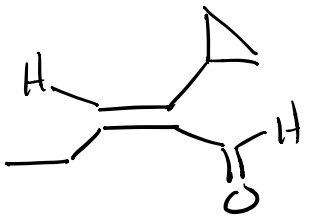
trans = opposite sides

(E) = Entgegen = "Opposite"



Cis = same side

(Z) = Zusammen "Together"

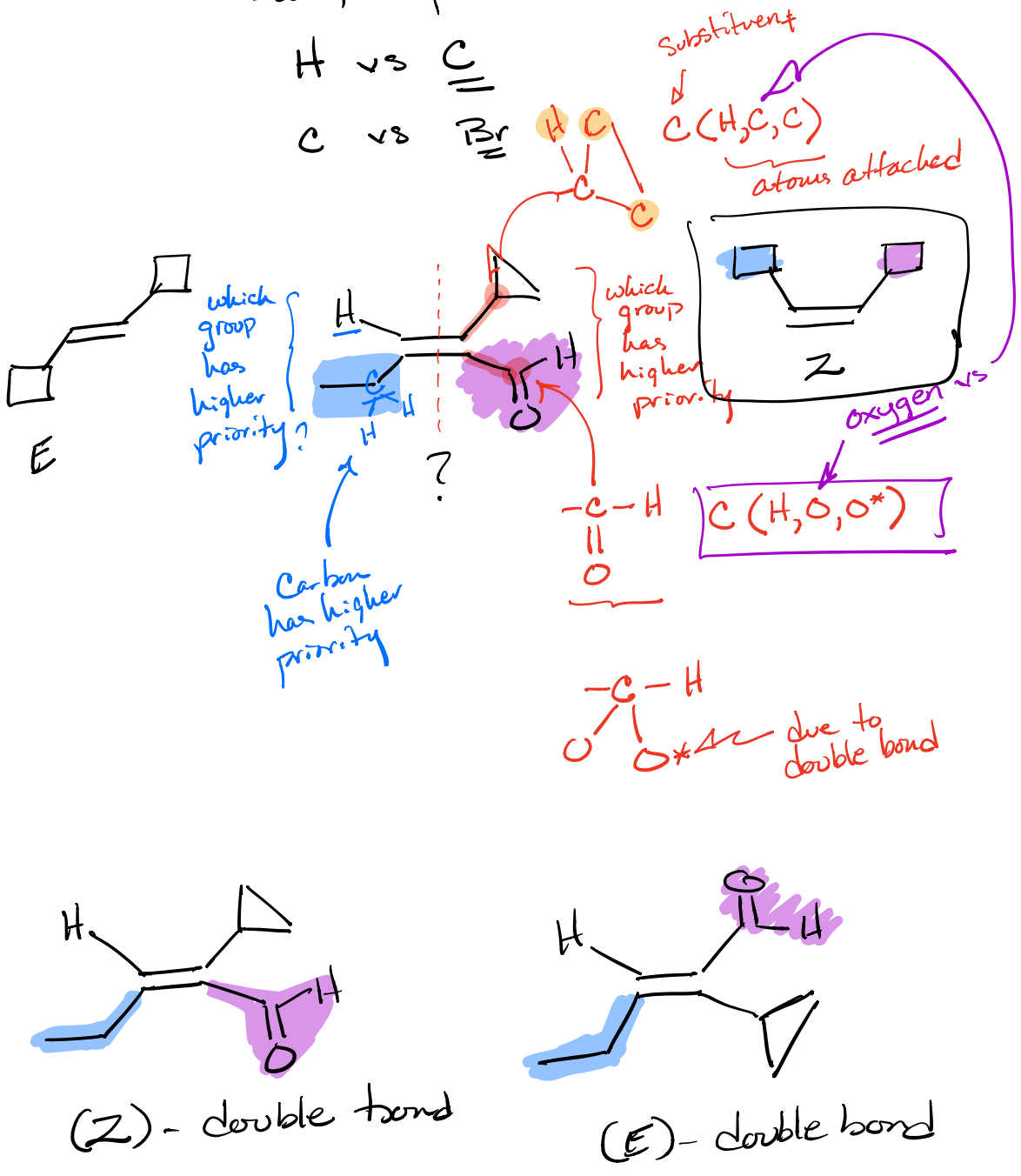


cis/trans?

Cohn-Ingold-Pralog Rules

Prioritization of Substituents

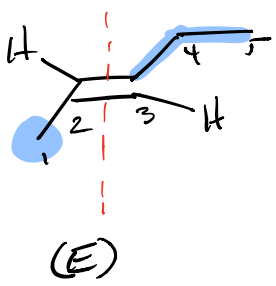
- Higher atomic # has higher priority
  ⇒ at first point of difference



(Z)- double bond

(E)- double bond

H vs C



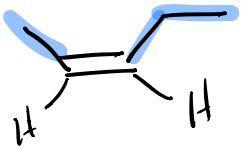
H vs C

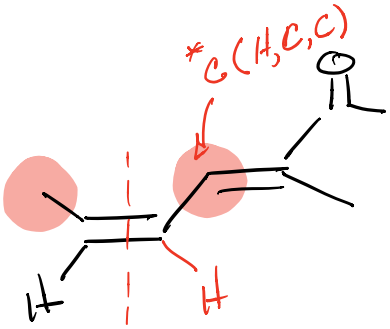
pent-2-ene

(E)

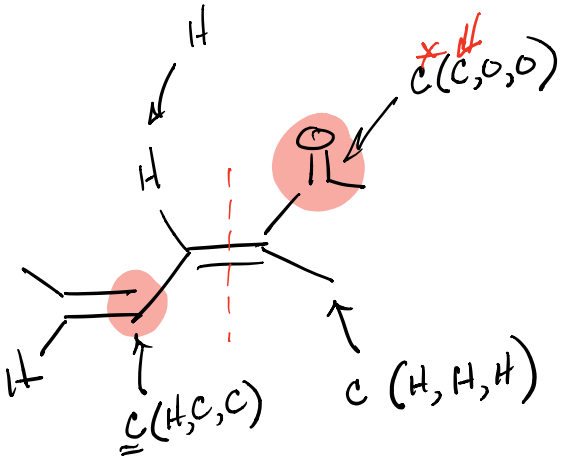
(E)-pent-2-ene

(Z)-pent-2-ene





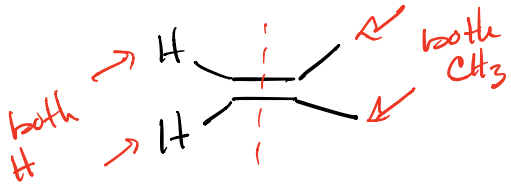
#2 (Z)

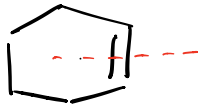


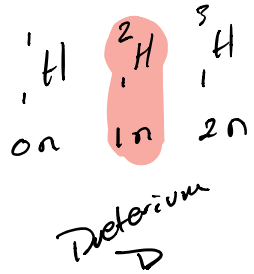
#4 (E)

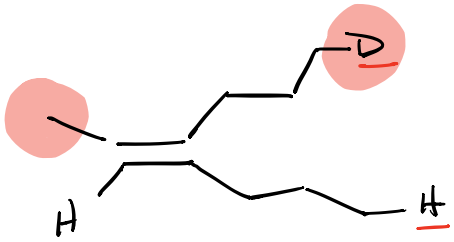
(2Z,4E)-

What about Symmetrical double bonds ?

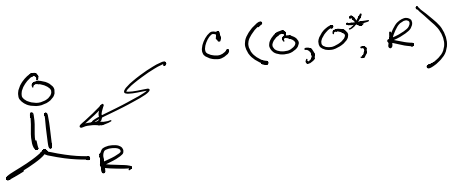


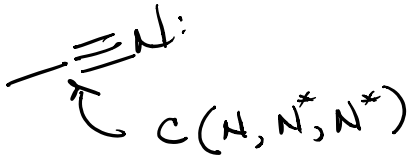






(Z)



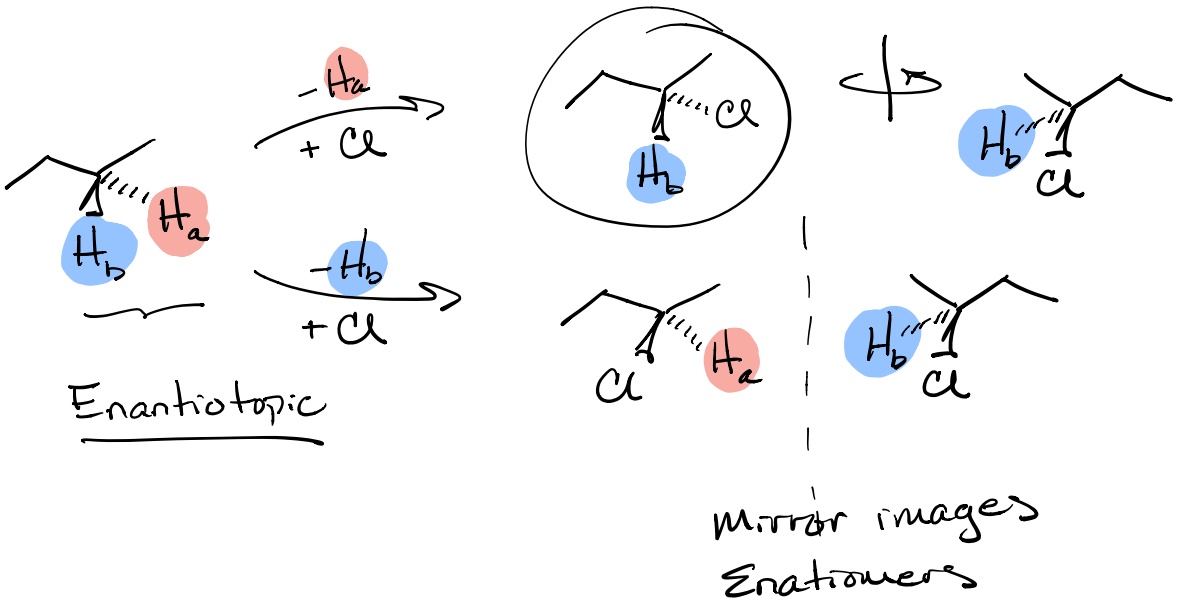


Enantiomers & Diastereomers

Chiral – Handedness

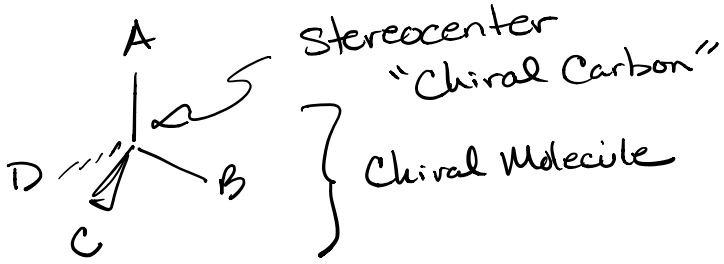
Enantiomers – Mirror images

Diastereomers – not Mirror images



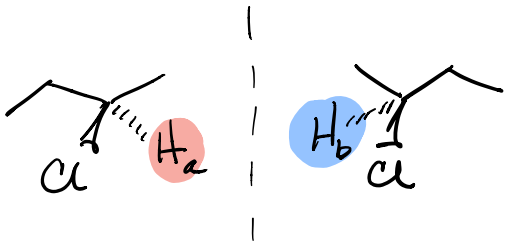
Enantiotopic

Mirror images
Enatiomers



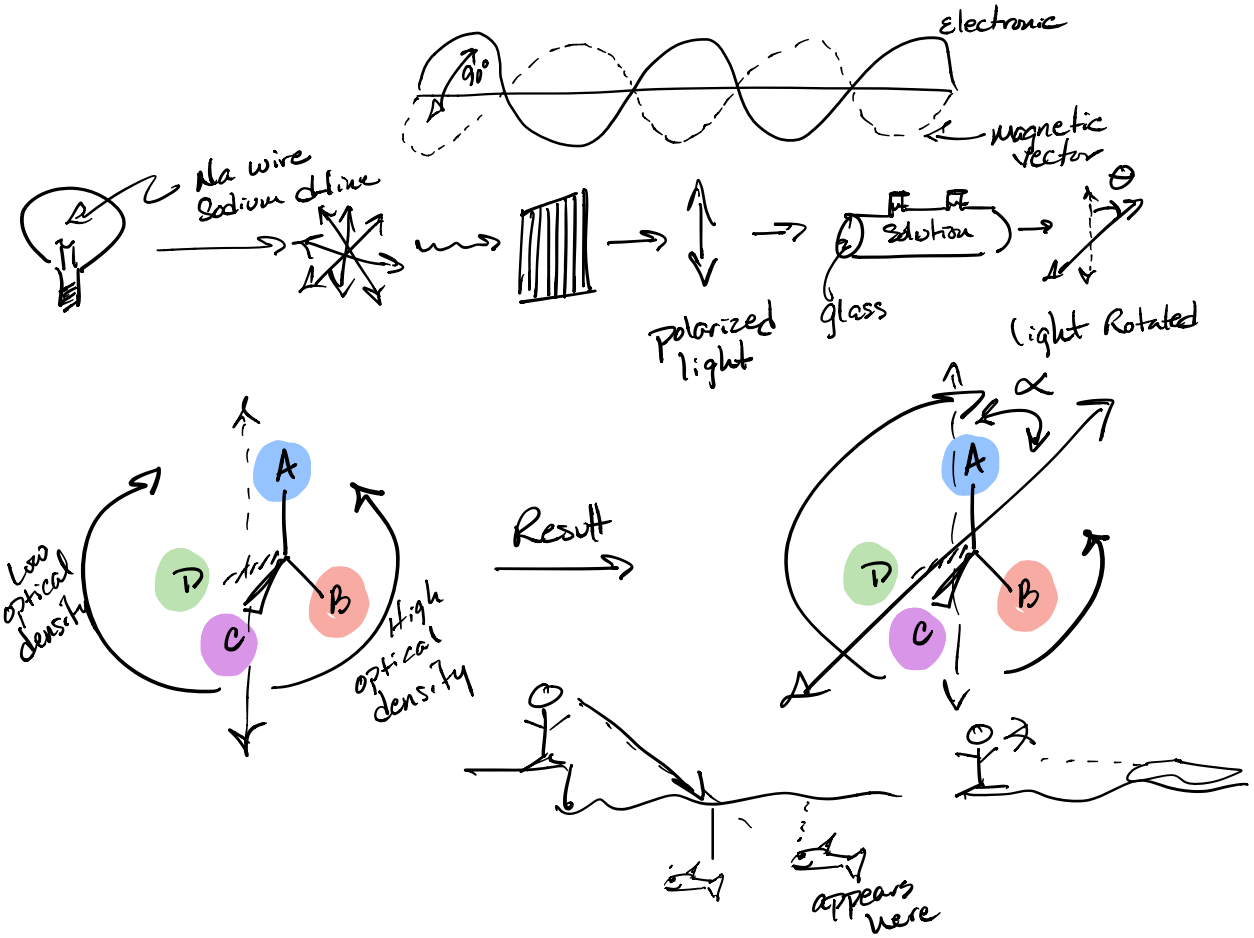
Stereocenter
"Chiral Carbon"

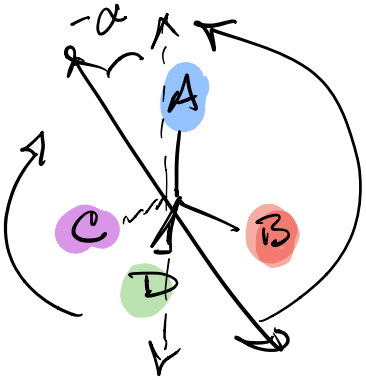
Chiral Molecule



Enantiomers

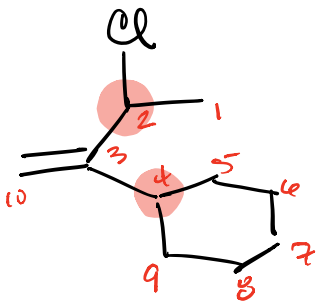
- Same Molecular formula
- Same mass
- Same boiling pt, Melting Pt.
- Same polarity
- Interact w/ plane polarized light differently
  ⟹ optical isomer

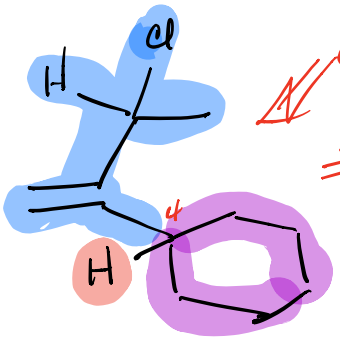




Enantiomers Rotate plane polarized light equally but in opposite directions

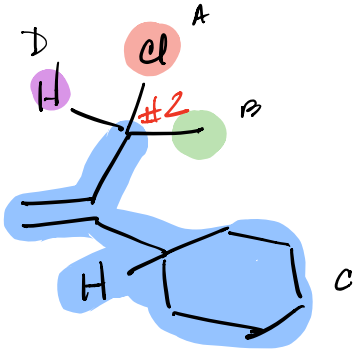
Identify Stereogenic center (a carbon w/ 4 different groups attached)



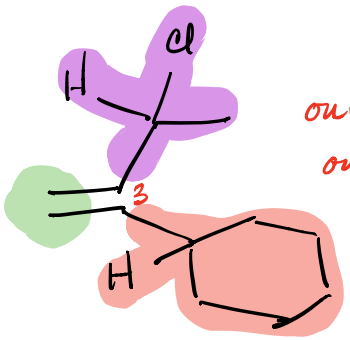


only 3 groups ⇒ Ring Symmetrical

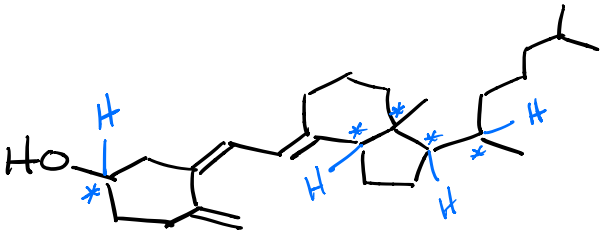
No #4 is not stereogenic



yes #2 is stereogenic



only 3 groups on Carbon 3 & not Stereogenic



Vitamin D_3

5 Stereogenic Centers

* Stereogenic Center must be sp^3 hybridized $\Rightarrow$ tetrahedral