Today

4.12 and 4.14 Molecules with more than one chirality center

Sections 5.2 - 5.3, 5.5
Alkene nomenclature and structure, and how alkenes react

Next Class

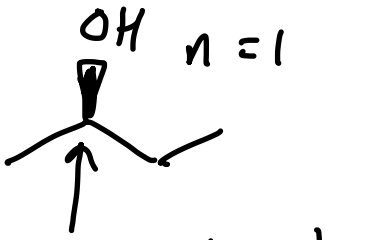
Sections 5.5 - 5.13
How alkenes react

Kinetics, thermodynamics, reaction coordinate diagrams, and catalysis

Molecules with more than one chiral center

Sections 4.12 and 4.14

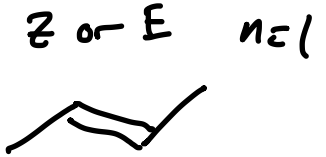
Molecules with one chiral center are chiral.



chiral center

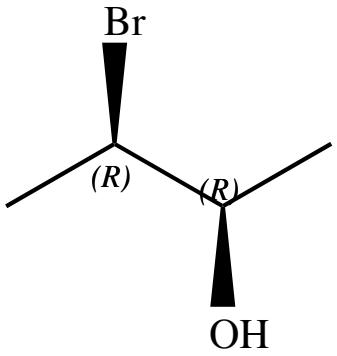
stereogenic center

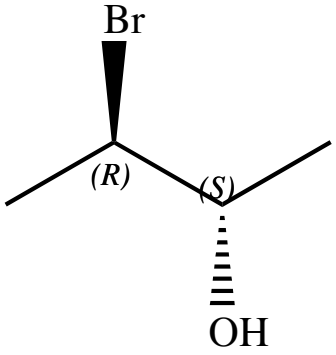
Molecules with more than one chiral center may be chiral.

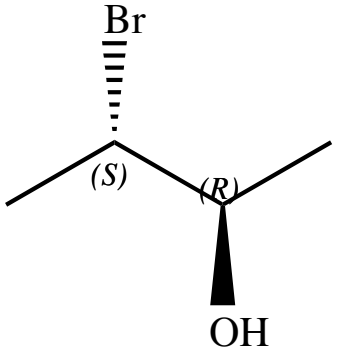


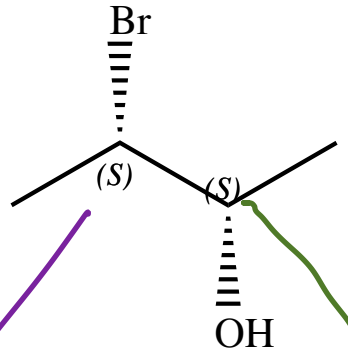
also a stereogenic center

Maximum number of stereoisomers is 2^n where n is the number of stereogenic centers.









$2^2 = 4$

Br, H, CH_3, CHOH/CH_3

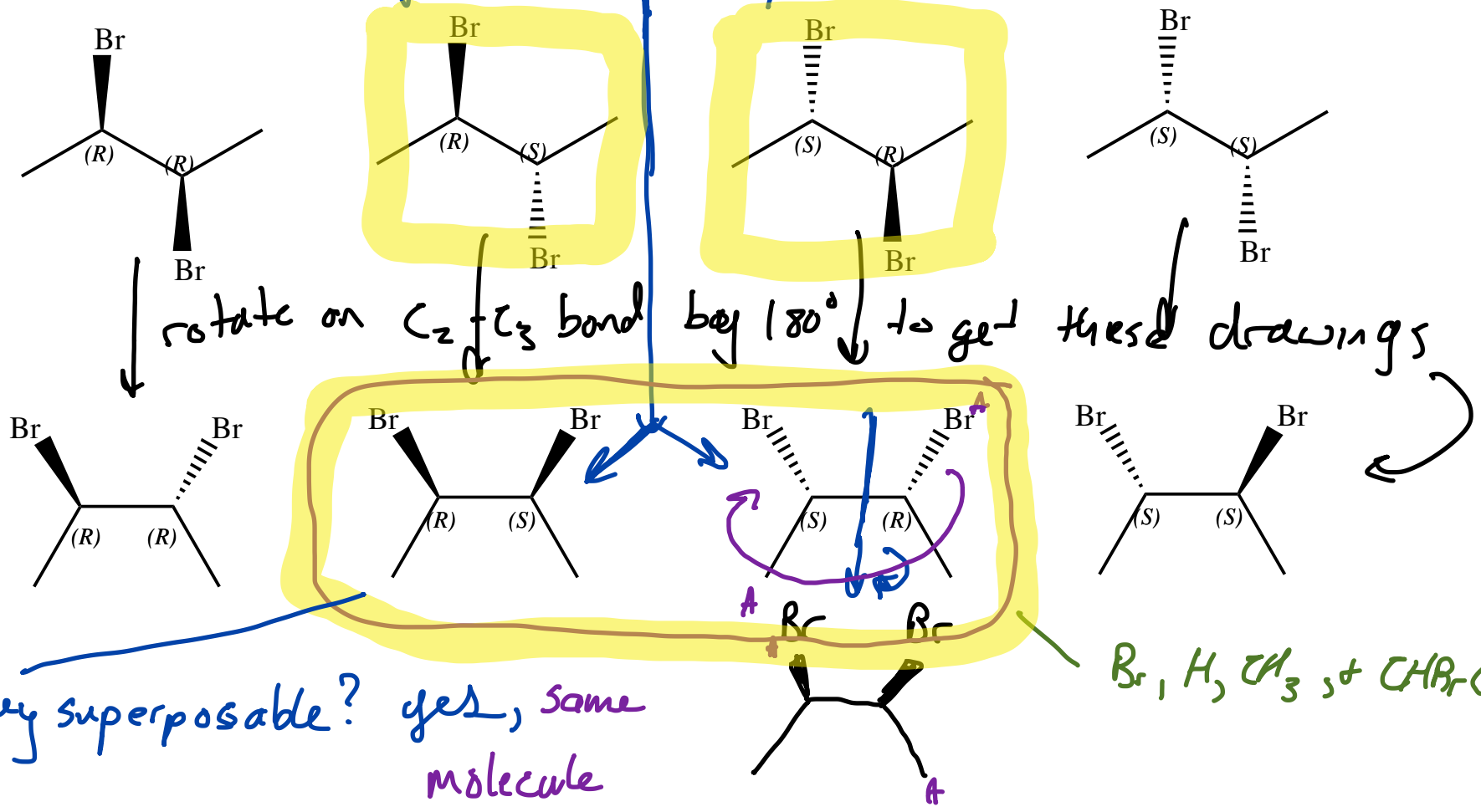
CH_3 > H, OH, CHBrCH_3

Molecules with more than one chiral center may be chiral. When the same groups are bonded to two chiral carbons there is the possibility of forming a **meso complex**. An achiral molecule that contains chiral centers.

Meso complexes can be cut in half an remade using a mirror plane.

Maximum number of ~~stereoisomers is 2^n~~ where n is the number of stereogenic centers.

these two are mirror images. Use a front/back mirror to do reflection.



Molecules with more than one chiral center

Sections 4.12 and 4.14

all chiral centers switch configuration

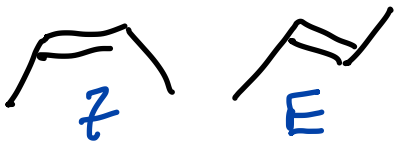
Z + E switch also

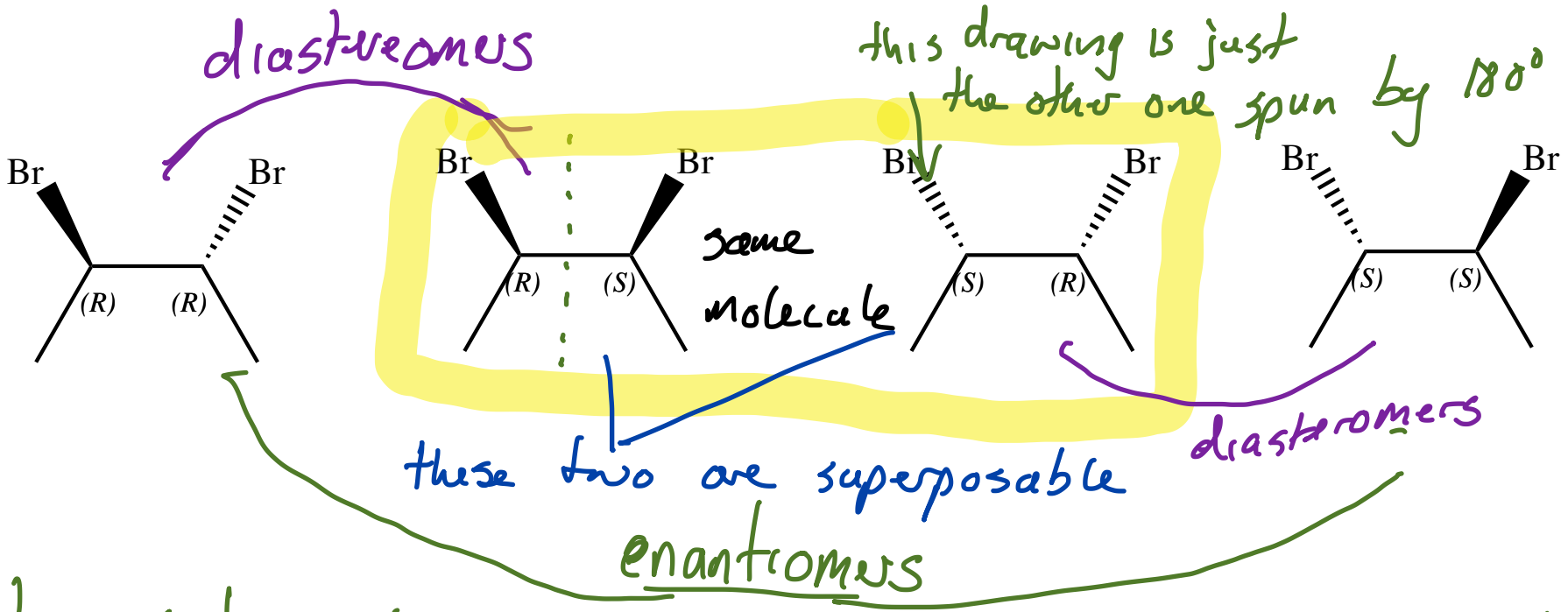
diastereomers

Enantiomers: stereoisomers that are non superposable mirror images.

at least 1 but not all chiral centers switch

Diastereomers: stereoisomers that are non-superposable but not mirror images.





Enantiomers have the same physical properties ... mp, bp, solubility

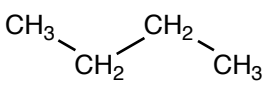
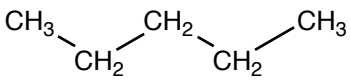
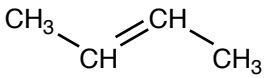
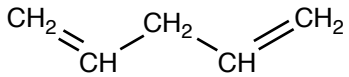
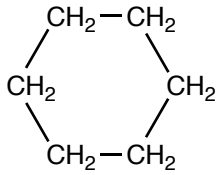
only difference is how they interact with polarized light

cannot be separated by distillation or recrystallization.

Diastereomers have different physical properties ... mp, bp, solubility

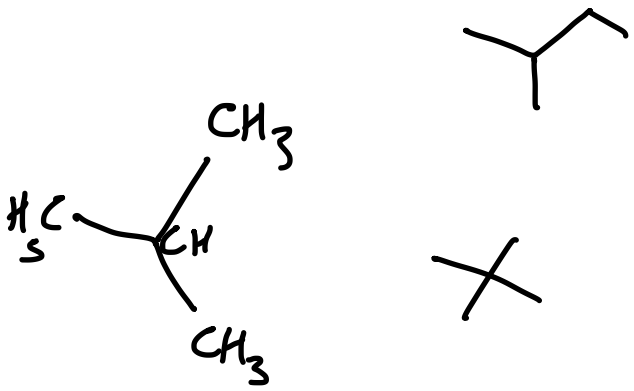
tells us # of π bonds or rings present in a molecule

C_4

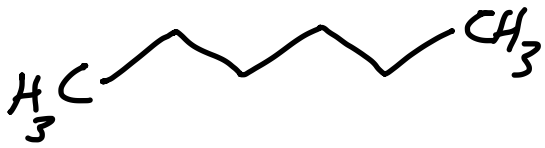






alkane

alkene



C_4H_8



C_5H_8

C_4H_{10}

C_5H_{12}

alkane formula

$C_nH_{(2n+2)}$

$$\text{DoU} = \frac{\#\,H\text{'s in alkane with } n \text{ C atoms} - \#\,H\text{'s in your molecule}}{2}$$

$$= \frac{(2\cdot 4+2)-8}{2}$$

$$= \frac{10-8}{2} = 1 \text{ degree of unsaturation}$$