

Stereochemistry and Molecular Models – Experiment 7

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CHM1321 Section A03

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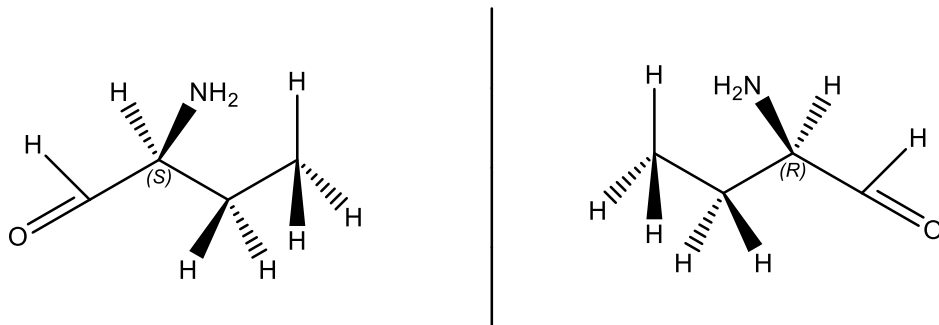
February 17th, 2017

Department of Chemistry

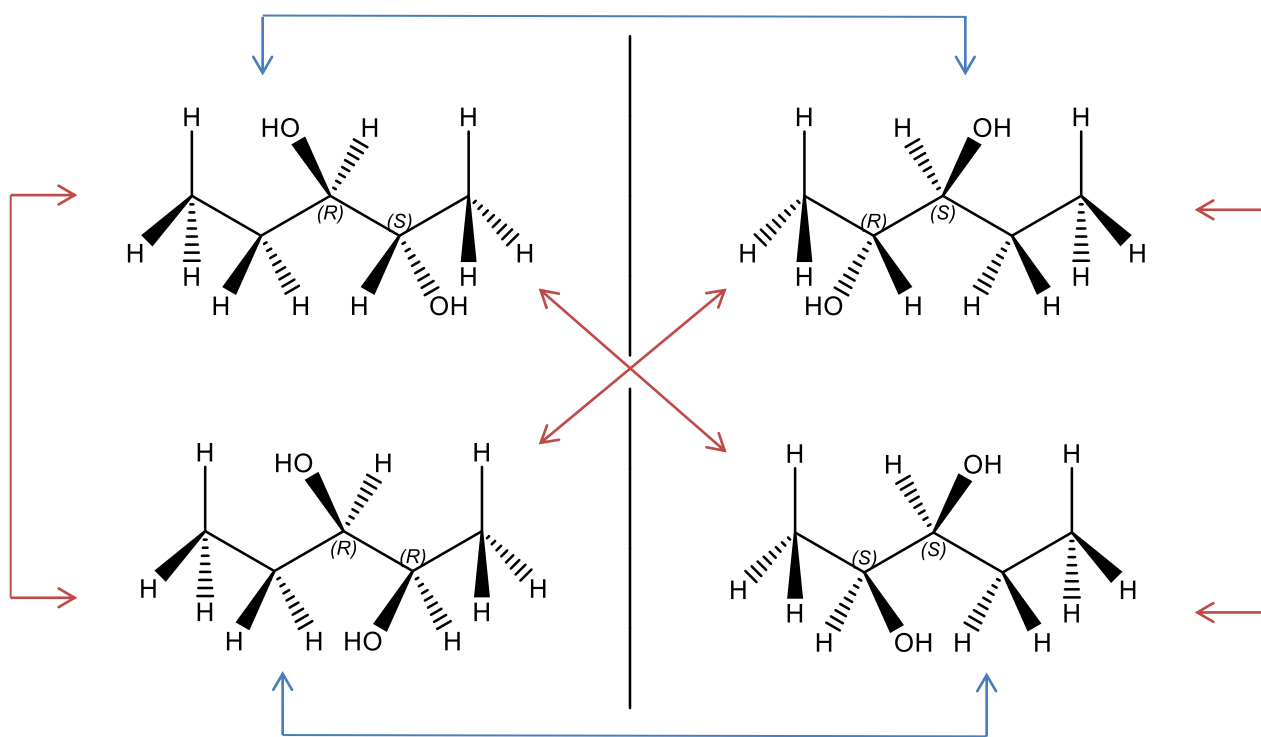
University of Ottawa

Diastereomers/Enantiomers

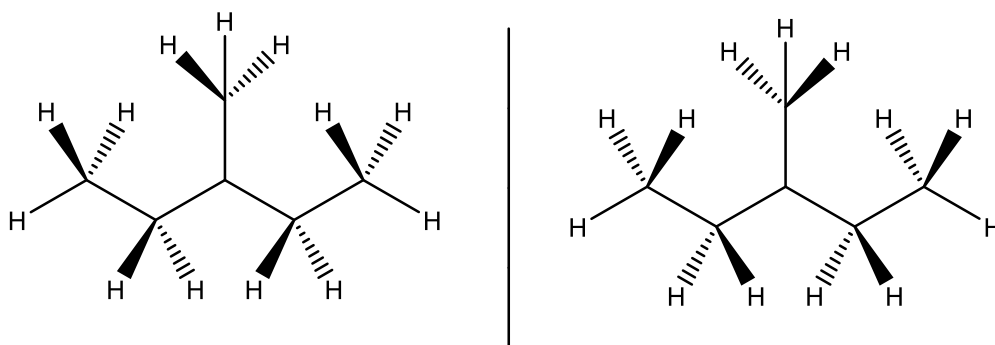
1. These molecules are non-superimposable mirror images, thus they are enantiomers.



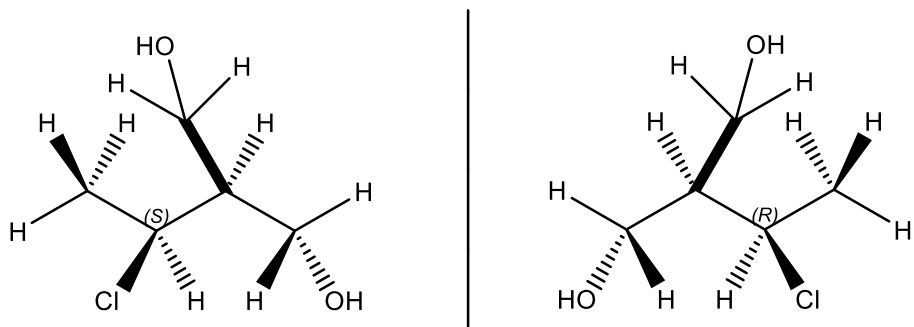
2. Blue arrows represent enantiomers (non-superimposable mirror images). Red arrows represent diastereomers (non-mirror images with 2 stereo centres).



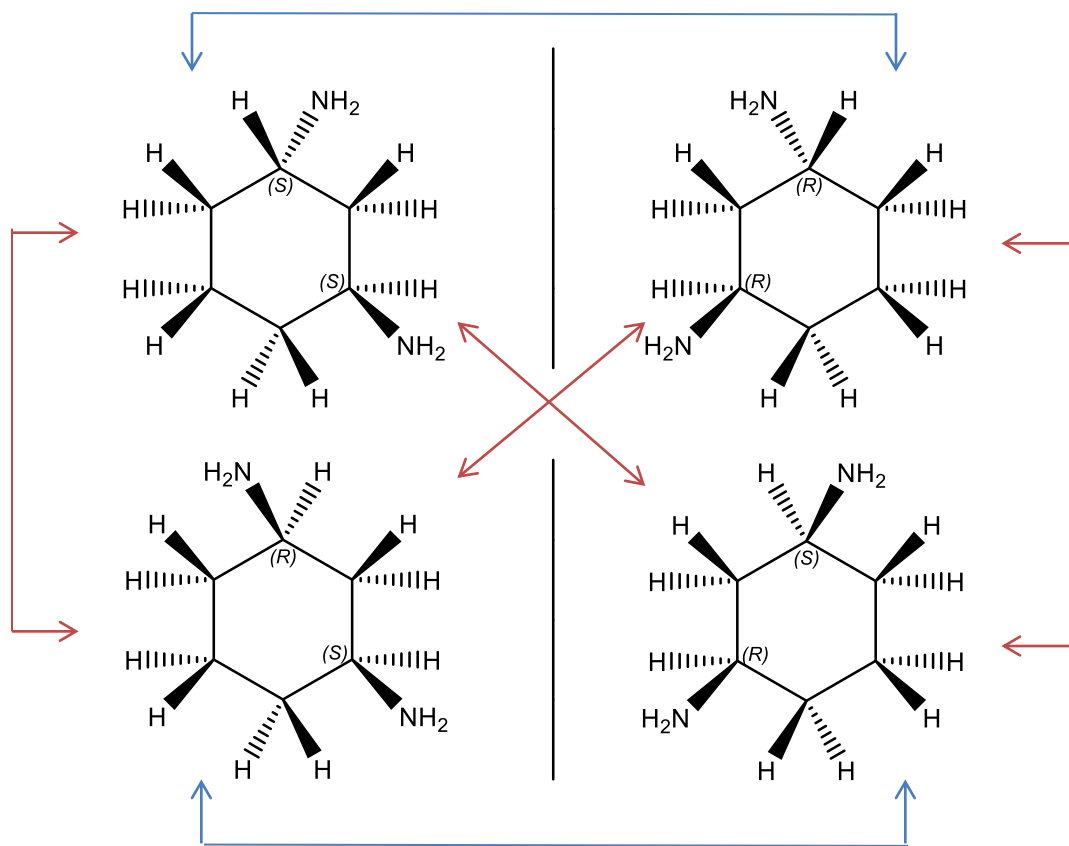
3. These are the same molecules, they are superimposable mirror images.



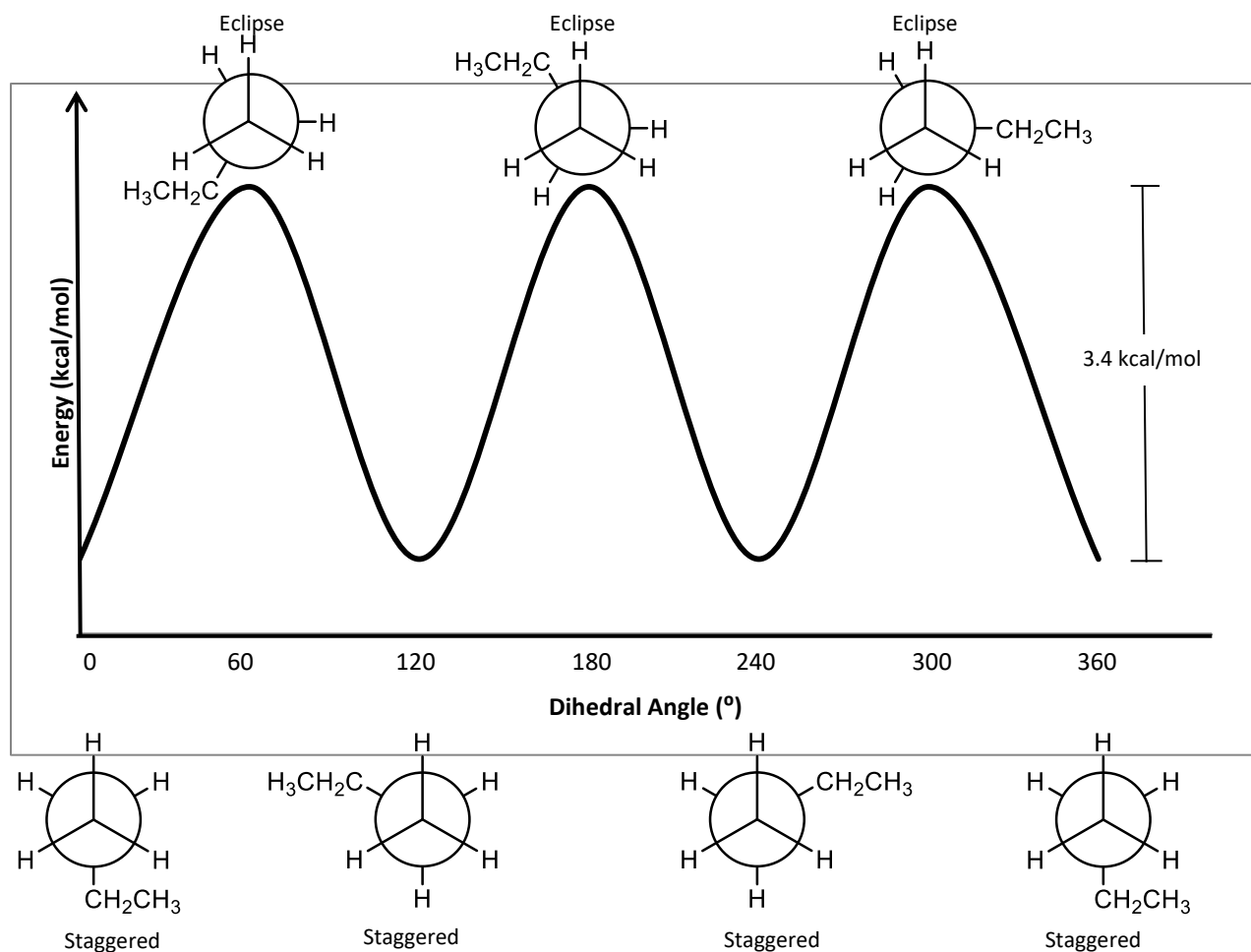
4. These are non-superimposable mirror images, thus they are non enantiomers.



5. Blue arrows represent enantiomers (non-superimposable mirror images). Red arrows represent diastereomers (non-mirror images with 2 stereo centres). The bottom two stereoisomers are also meso compounds.



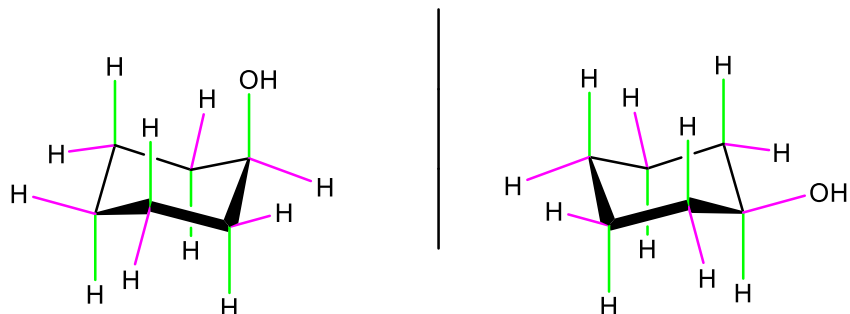
Newman Projections



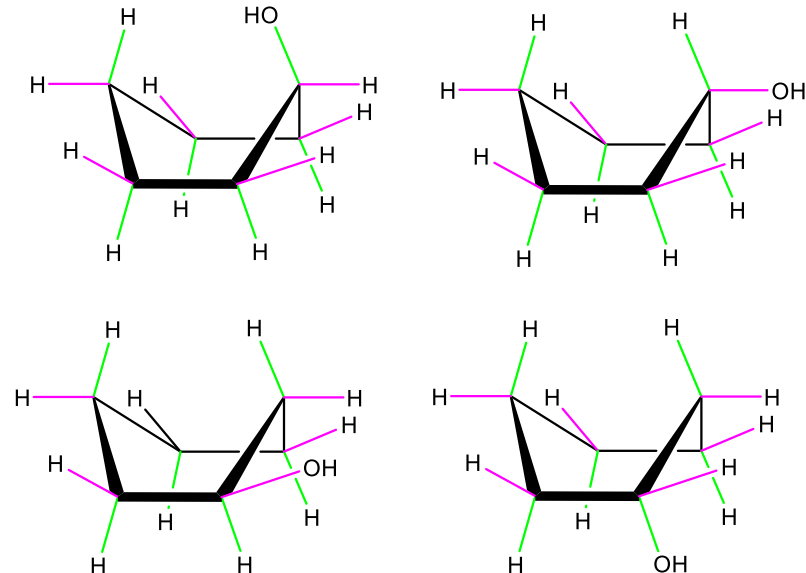
The difference between the two most stable conformers is 0. This is because there is only one substituent group, therefore all the staggered conformers form the same conformer, and thus there is no difference in steric stress (ie. no difference in energy).

Cyclohexanol

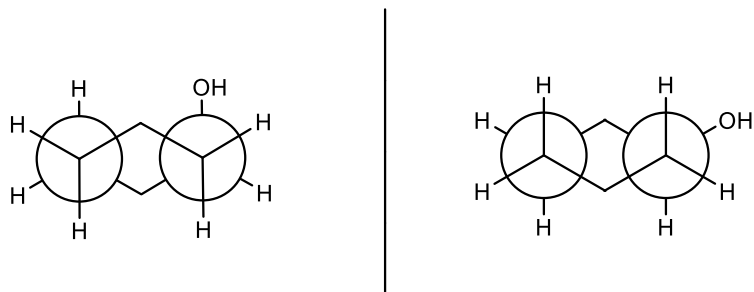
The green bonds represent the axial bonds, whereas the purple bonds represent the equatorial bonds. The conformation with OH in the equatorial position is the most stable.



There are 4 different boat conformations. The green bonds represent the pseudo-axial. The purple bonds represent the pseudo-equatorial bonds.

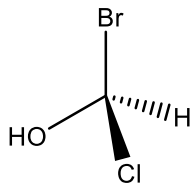


The left Newman projection corresponds with the chair conformation where the OH is in axial position. The right Newman projection corresponds with the chair conformation where the OH is in equatorial position; this is the more stable conformation. In the left Newman projection, has carbons bonding “upwards” in the front and “downward” in the back and vice versa for the right Newman projection.

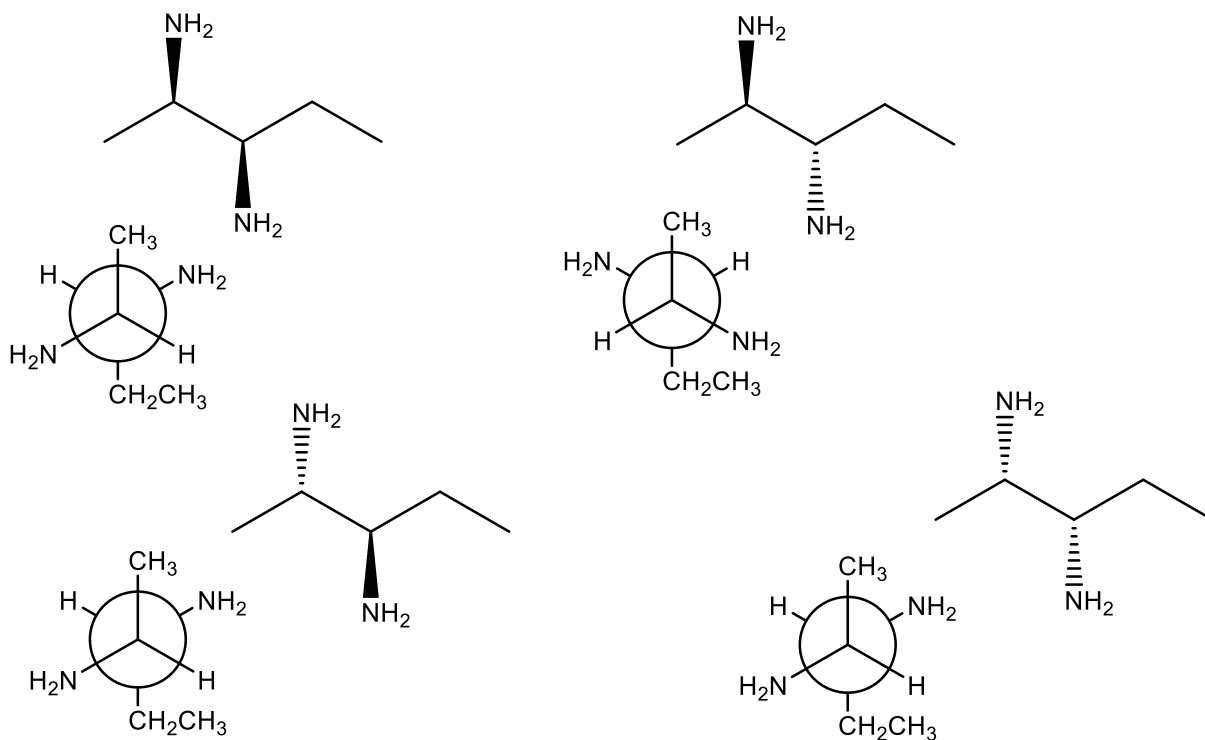


Questions

1. This is the R isomer since the Br has the largest atomic number (1st priority), Cl has the next largest (2nd priority), and OH has the 3rd highest (3rd priority). H has the lowest priority and points into the back, while Br Cl and OH goes in a clockwise direction.



2. Each Newman projection corresponds to the zig-zag structure above it.



3. There are 3 stereo centres on the molecule therefore there would be a max of 8 stereoisomers ($2^3 = 8$)

