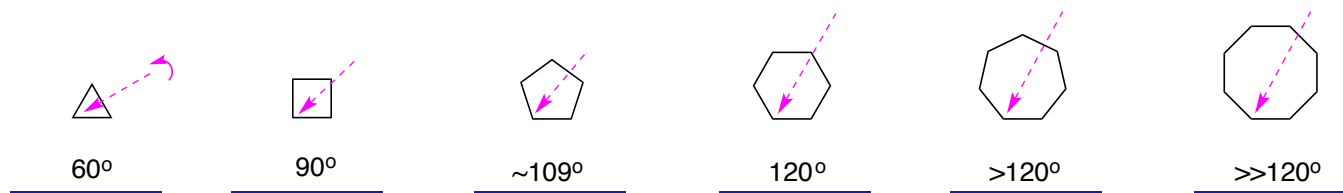


Conformations Of Cyclic Hydrocarbons

from chapter(s) _____ in the recommended text

A. Introduction

B. Angle Strain



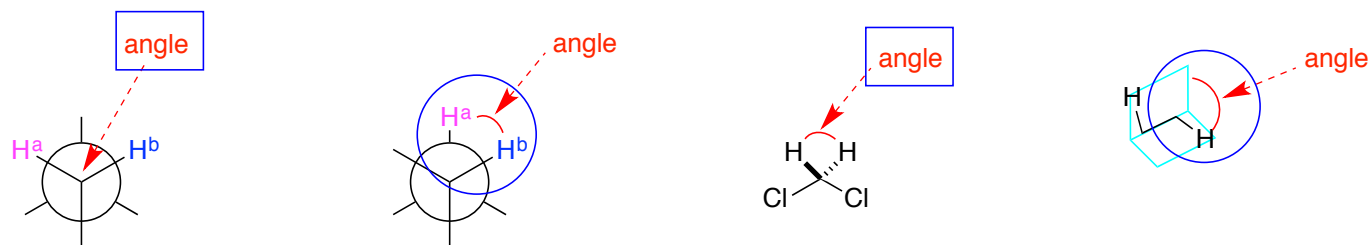
is around 109°.
has angle strain.

: cyclopropane / cyclobutane.

cyclohexane / cycloheptane / cyclooctane.

most compressed and expanded angles are: cyclopropane and cyclooctane.

C. Bond Strain

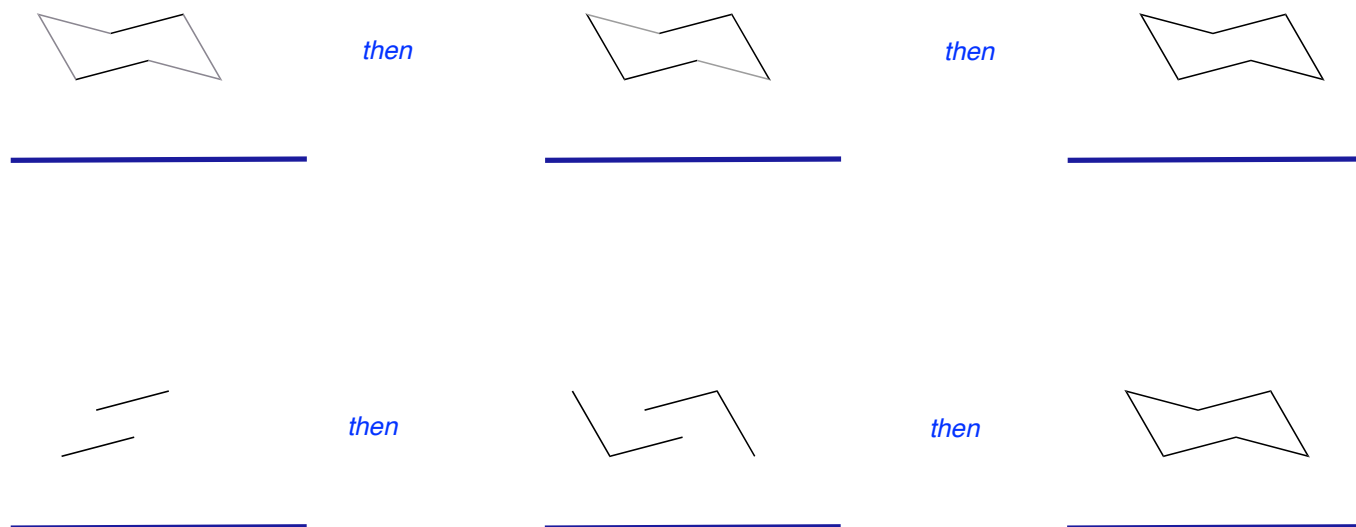


3 atoms, whereas torsional angles involve 4.
e⁻ in bonds and is minimized as

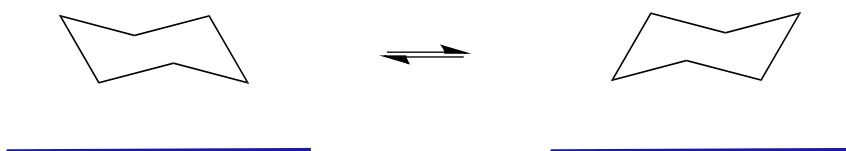
high torsional strain.

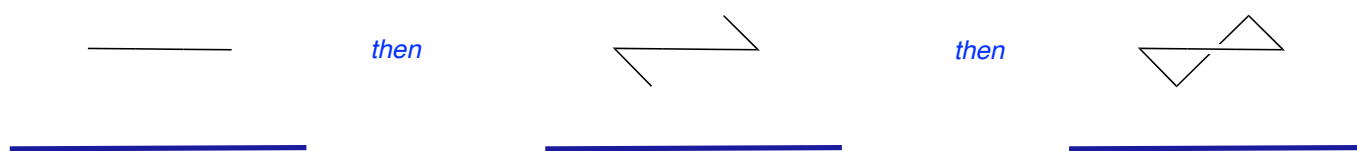
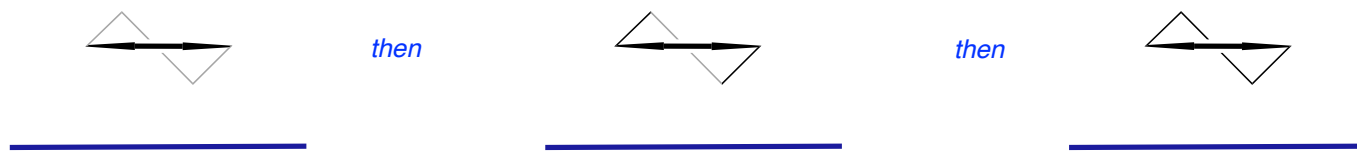
D. Cyclohexane

have less angle strain because the internal angle is closer to the ideal sp^3 angle.
to torsional strain.

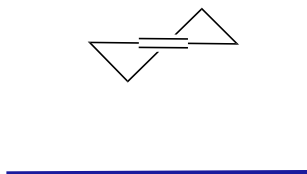


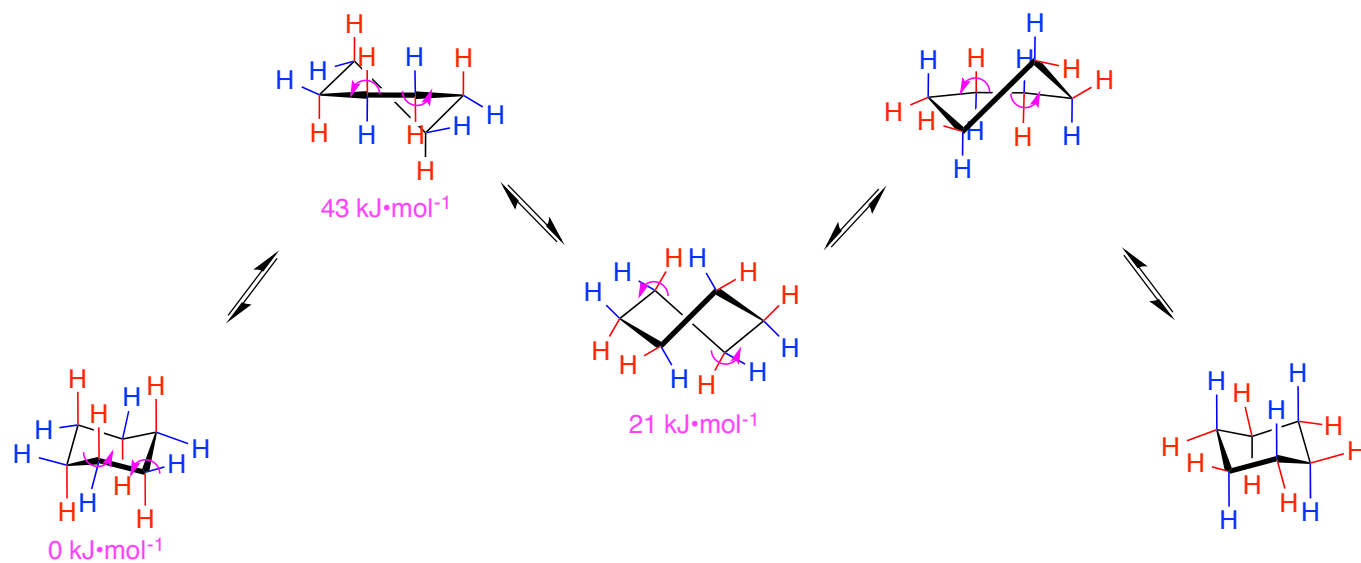
have exactly the same energies.

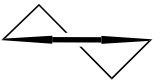
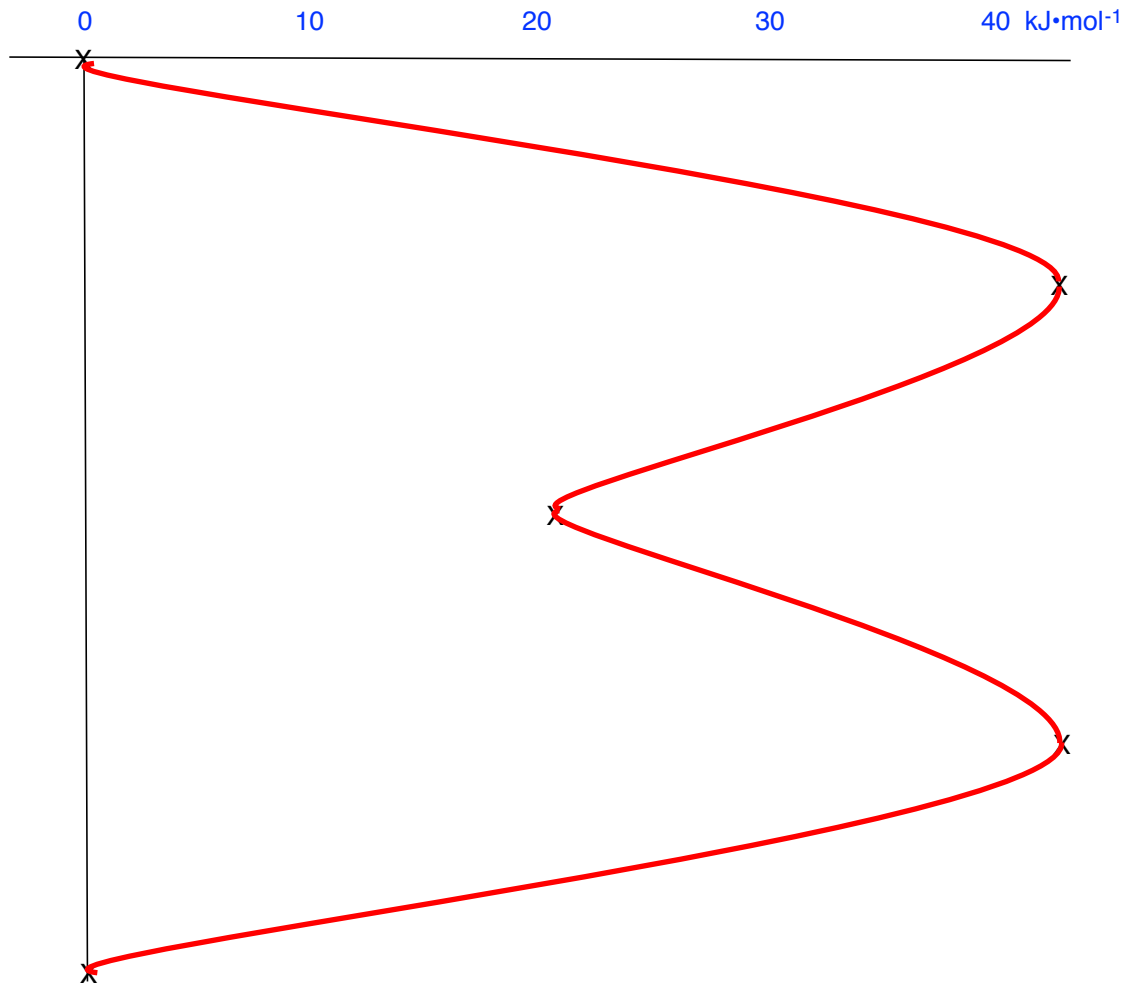




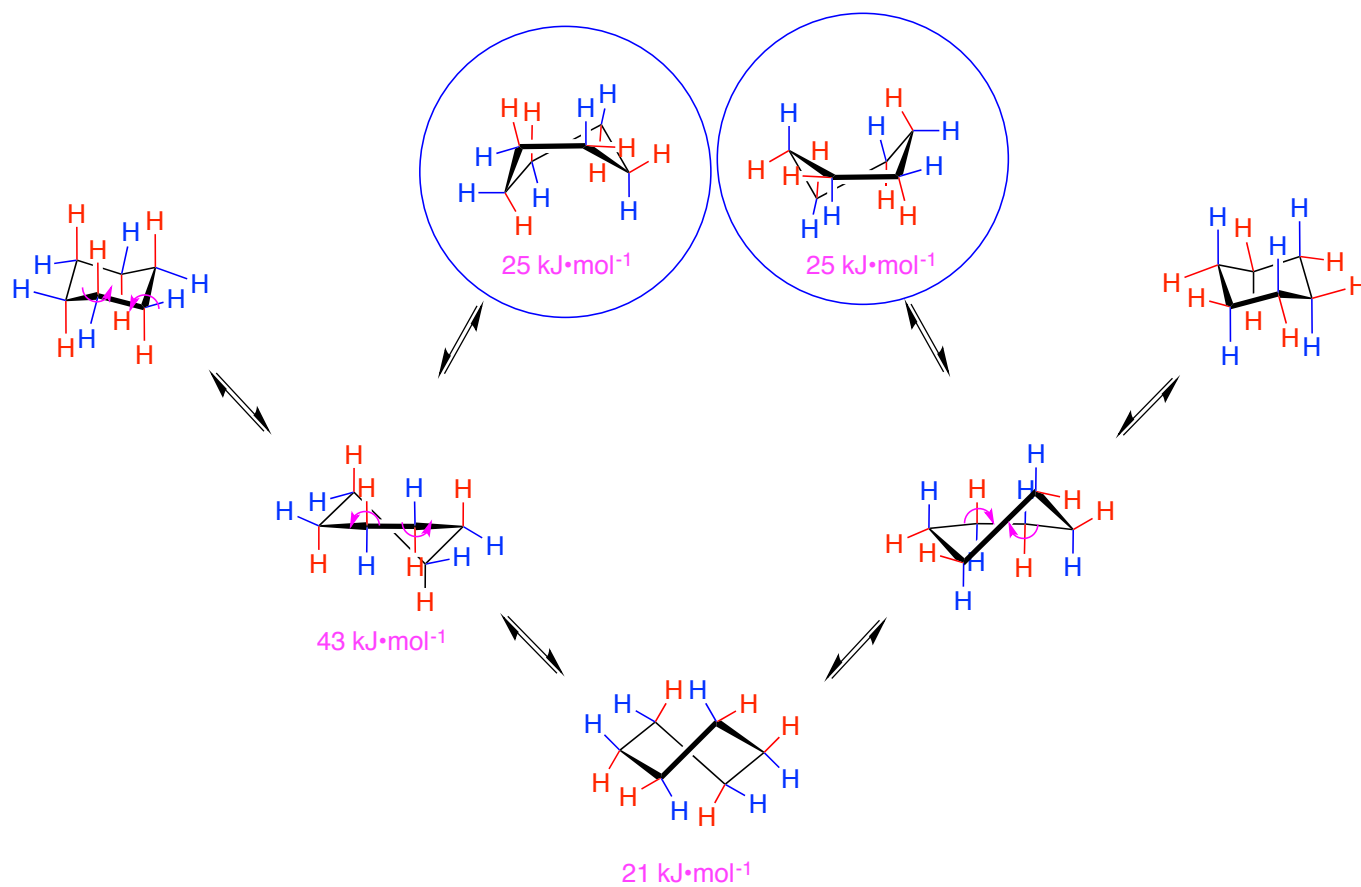
Cyclohexene







Boat conformers are not necessarily



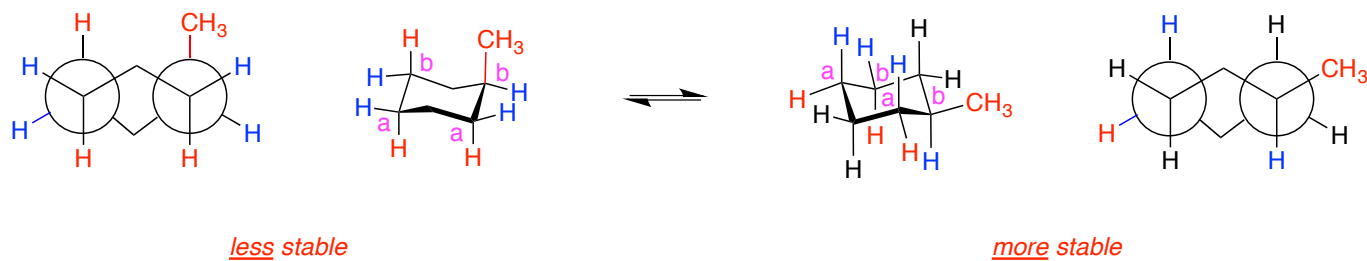
are three dimensional.



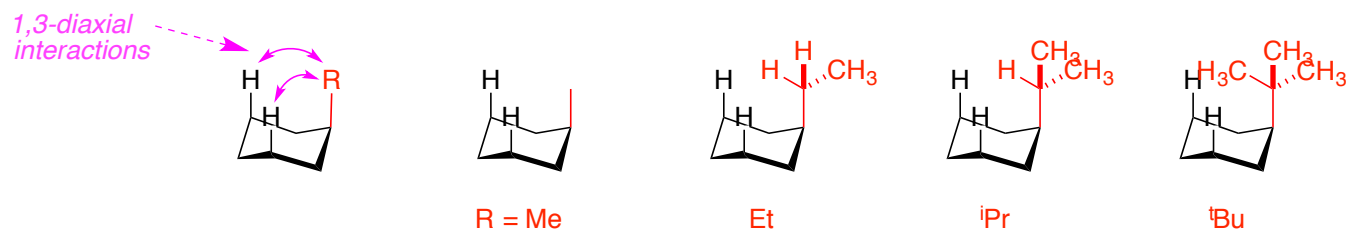
like the antiperiplanar conformation of butane,

gauche conformer.

Monosubstituted Cyclohexanes



has 1 gauche interaction,
0 such interactions



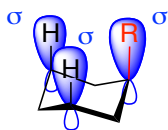
because _____ 1,3-diaxial interactions between the axial hydrogen atoms and the tert-butyl group is higher than others, because of the extra methyl.

equatorial conformer is observed.

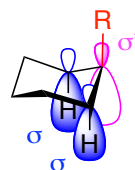
NMR does not

1,000 times per second.

lower σ - and σ^* -orbitals

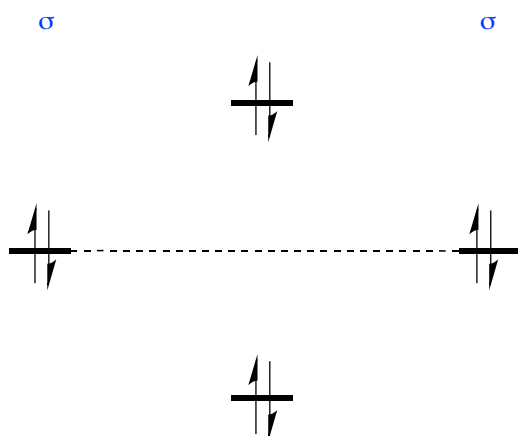


repulsive

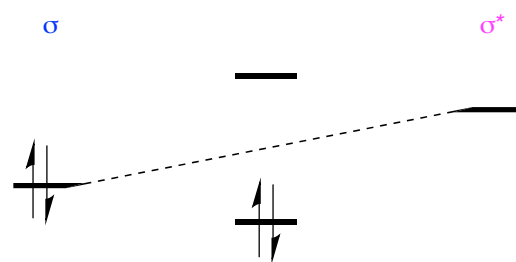


attractive

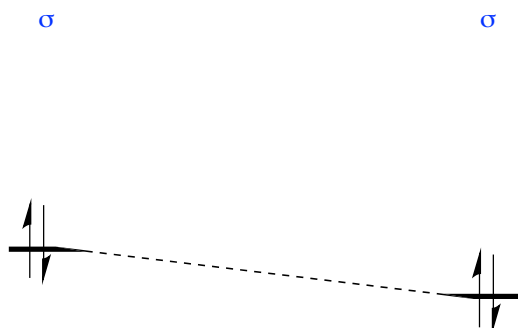
R = Me



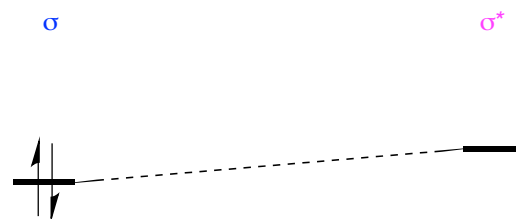
R = Me



R = OMe



R = OMe

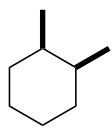
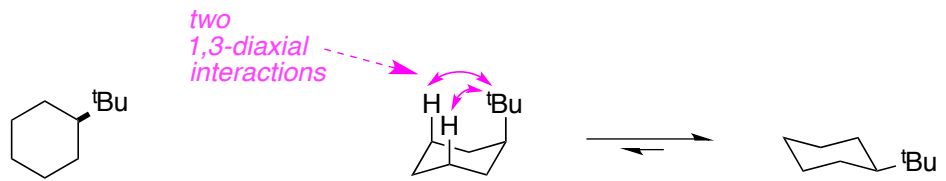


involve less overlap than the corresponding σ -to- σ 1,3-interactions, and, based on the orbital energy levels, the 1,2-interaction for the σ -to- σ^* is less R = Me than it is for R = OMe.

because _____ C – O bonds have lower σ - and σ^* -orbitals, stabilizing σ -to- σ^* interaction.

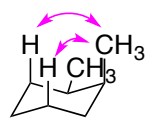
Disubstituted Cyclohexanes

example

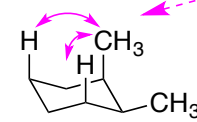


how many 1,3-diaxial interactions?

two

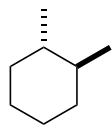


equilibrium position

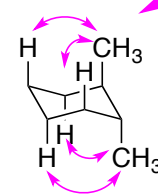
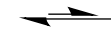
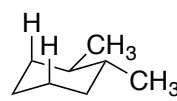


how many 1,3-diaxial interactions?

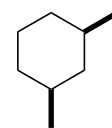
two



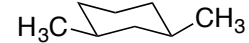
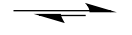
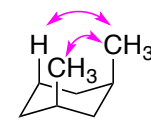
no 1,3-diaxial interaction



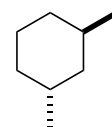
four 1,3-diaxial interactions



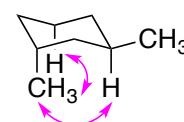
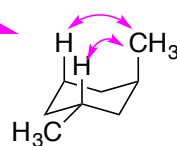
two 1,3-diaxial interactions



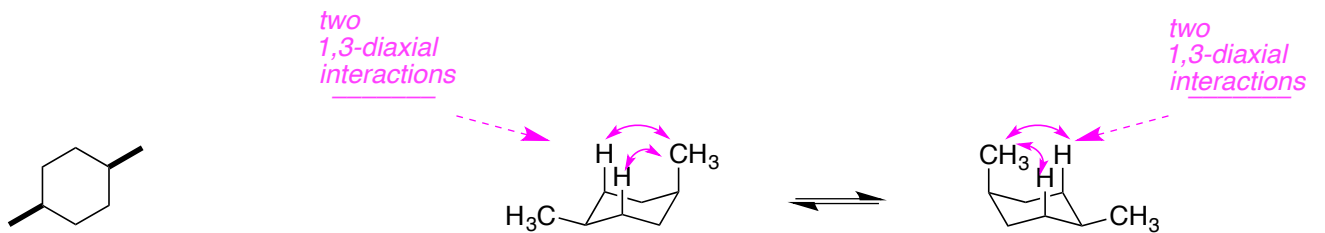
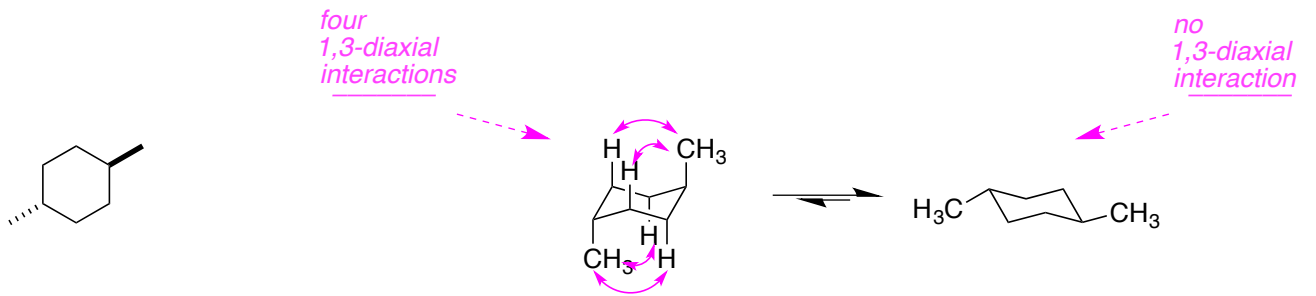
no 1,3-diaxial interaction



two 1,3-diaxial interactions

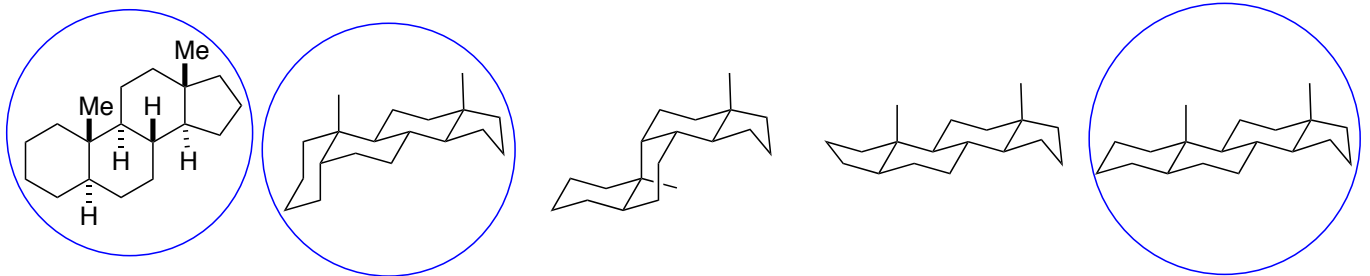
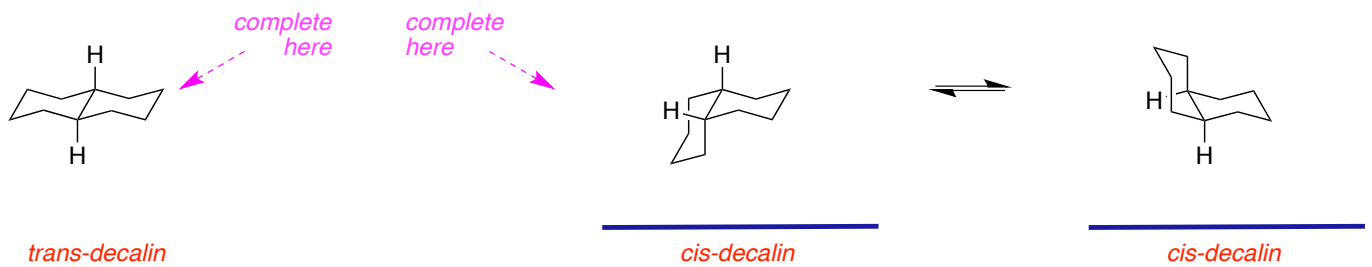


two 1,3-diaxial interactions

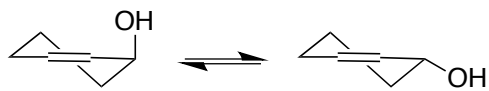
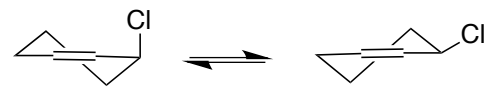
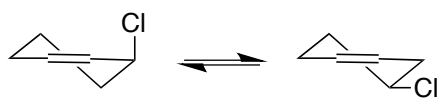
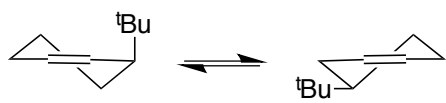
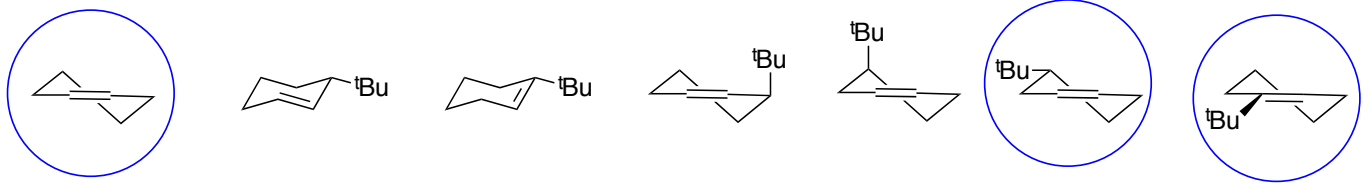


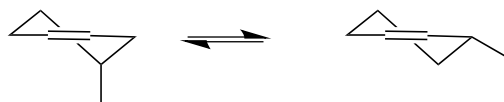
Decalins

a bond; look up the structure in Wiki.

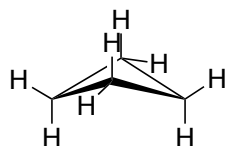


Cyclohexenes

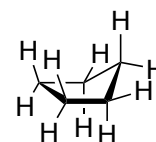




E. Other Rings



cyclobutane



cyclopentane

do rapidly interchange (on the NMR time-scale)
are rigid and flat.
eclipsed