REQUIRES

chair ⇌ boat ⇌ chair

Do NOT switch between α & β.

Eq. on left becomes axial on right.
  Eq on right becomes axial on left.
      α or β remain exactly the same.

cyclohexane :
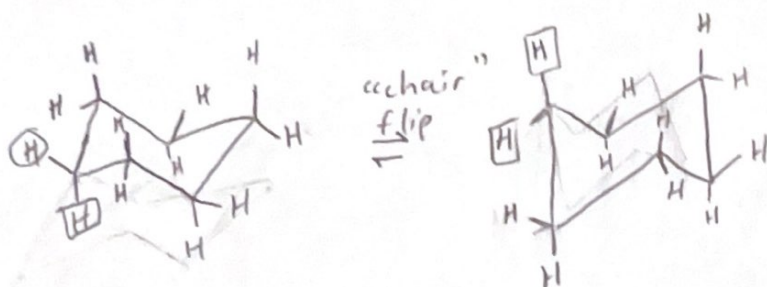
"chair"
flip
1

For unsubstituted cyclohexane :
  → Two forms are identical & equal in
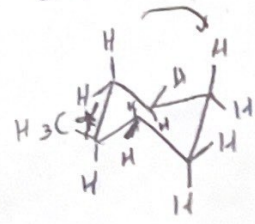   energy.
  Most consider K eq :
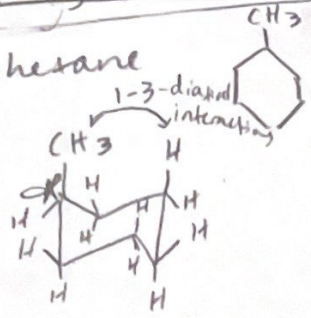   → K eq = $\dfrac{[\text{chair \#2}]}{[\text{chair \#1}]}$

  Keq = 1 for cyclohexane

"Typically, <ins>conformer</ins> : More substituents in equatorial
Equatorial is more stable. pos. = more stable.

$$\Rightarrow K_{eq} \neq 1, \ \Delta G° \neq 0$$

Also depend on substituent size.

Case of <u>Monosubstituted Cyclohexanes</u>

Ex. => Methylcyclohexane

1-3-diaxial interactions

CH₃

1,3-diaxial interactions => "repulsive-like"

$$\frac{\Delta G°}{\rightleftharpoons}$$

More stable conformer
=> CH₃ is equatorial.

$\Delta G° > 0$

More Staggered.

=> "cost" of switching CH₃ from equatorial to axial is 1.74 kcal/mol.

(+)$\Delta G°$ ($k_{eq} < 1$): Unfavorable.
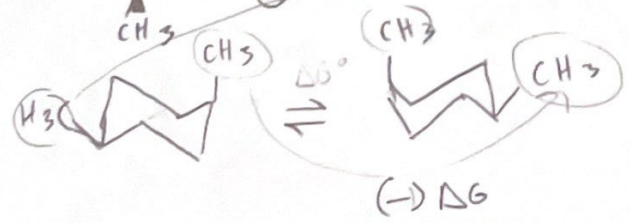(−)$\Delta G°$ ($k_{eq} > 1$): Favorable.

$\Delta G°$ - describes to what extent equatorial form is favored.

Disubstituted Cyclohexanes: Conformational Energetics

Ex. ①

(cis-1,4-dimethylcyclohexane)

(+) ΔG

(recall cis + trans isomers)

Occurs due to π bond rotating restriction.

(−)ΔG

$$\Delta G° = 1.74 + (-1.74)$$
$$= 0$$
$$k_{eq} = 1$$

Nomenclature of Cycloalkanes

1) Monosubstituted
    - Exactly what you expect
        - Es: Methyl cyclohexane
2) Disubstituted

1- ethyl - 2 methyl pentane

3) 3+

Stereoisomers and Cycloalkanes

Take
Note of Rotation