

Today

Nomenclature

Review ~~Degrees of Unsaturation~~ Section 5.1

Sections 5.2 - 5.3, 5.5

Alkene nomenclature and structure, and how alkenes react

Next Class

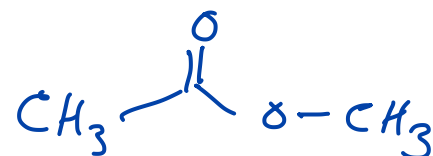
Sections 5.5 - 5.13

How alkenes react

Kinetics, thermodynamics, reaction coordinate diagrams, and catalysis

Test 2 on Chap 3 and 4 and Sections 5.1, 5.2, and 5.4 (be able to identify and name functional groups from class on Oct 26) on Friday, November 4.

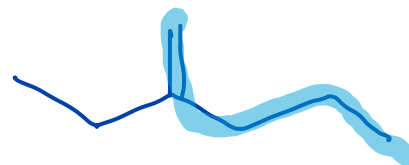
Review session 7:30 pm Thursday, November 3 in Wilson 130.



ester

Alkene Nomenclature

Same rules as alkanes and alcohols...



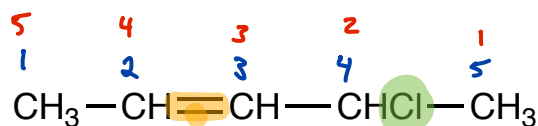
alkenes are a functional group,

the parent hydrocarbon must completely contain the double bond

the position of the double bond gets the lowest possible number

the "ane" ending of parent hydrocarbon is changed to "ene"

substituents are named as before...



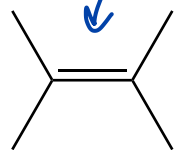
longest chain 5 C atoms long - pentane
Cl substituent - chloro

4-chloro-2-pentene

$\begin{array}{c} 2 \\ 4 \end{array}$ $\begin{array}{c} 3 \\ 2 \\ \text{---} \\ \text{---} \\ \text{---} \end{array}$ ← lowest possible # for functional group

Structure and Reactivity

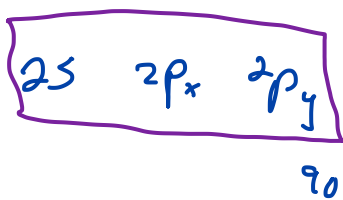
2,3-dimethyl-2-butene



db = 1 σ + 1 π

made by $2p_z$ overlapping with $2p_z$

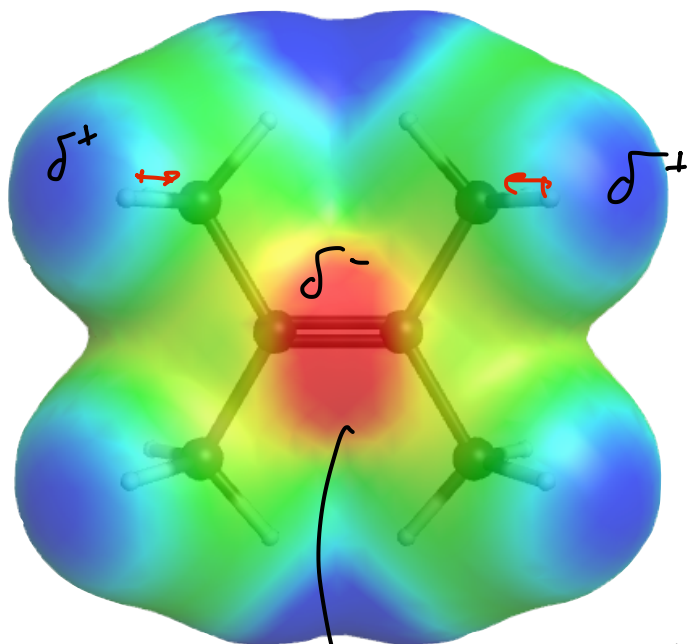
made by sp^2 overlapping with sp^2



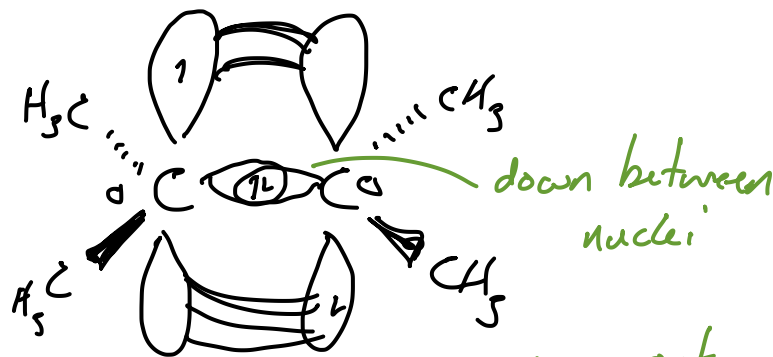
hybridize

$\Rightarrow sp^2, sp^2, sp^2$ $2p_z$ unhybridized

3 H₁s are need to make the three σ -bonds



electron rich

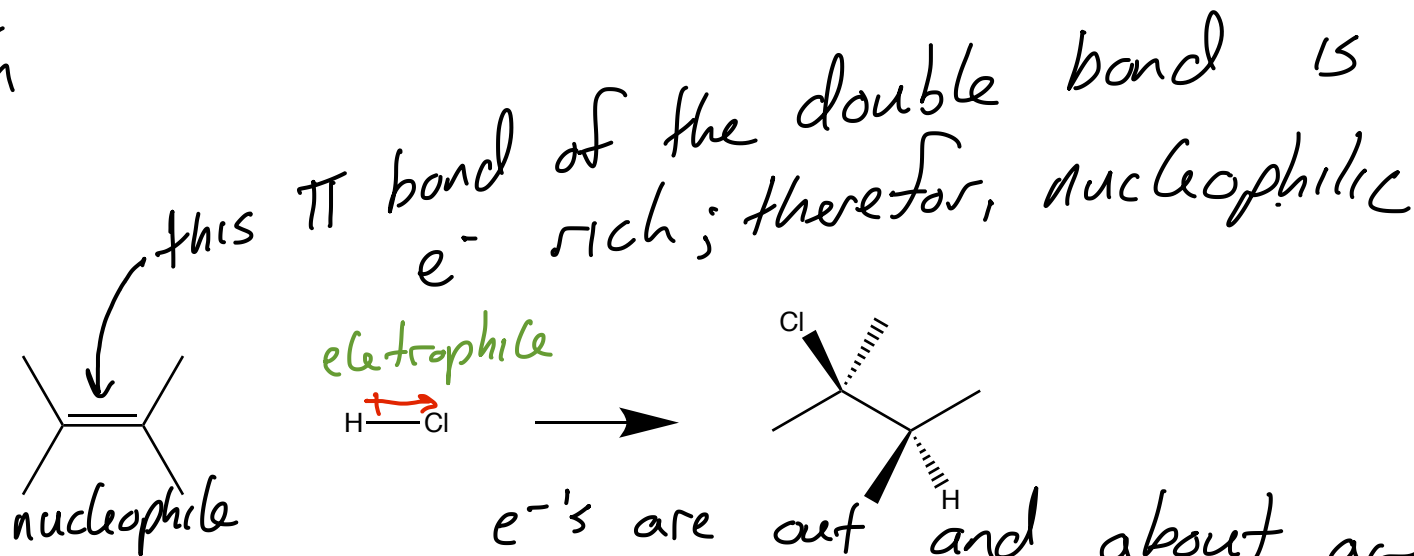


down between nuclei

sticking out away from nuclei

+ alkenes will attract e^- poor atoms or molecules

Nucleophiles are atoms or molecules that are e^- (-) rich



$2 e^-$'s in a π bond - e^- 's are out and about, away from the nuclei so they will be attractive to other atoms

$2 e^-$'s in a σ bond - e^- 's hidden away down between nuclei, so they won't be attractive to other molecules or atoms

Electrophiles

electrophiles are electron loving

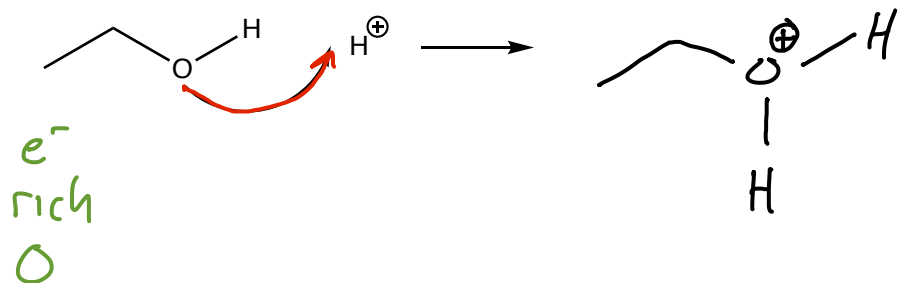
electrophiles are e^- deficient (+)

The partially positive H of $H-Cl$ will be attracted to the πe^- .

Arrows represent the imagined movement of e^- 's. In organic, arrows are **not** used to move atoms.

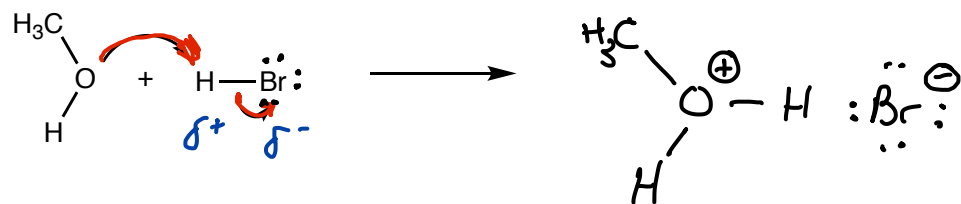
Arrows start at a source of e^- 's (lone-pair e^- 's, a bond) and point to where the electrons will go

From lp e^- 's to in between atoms

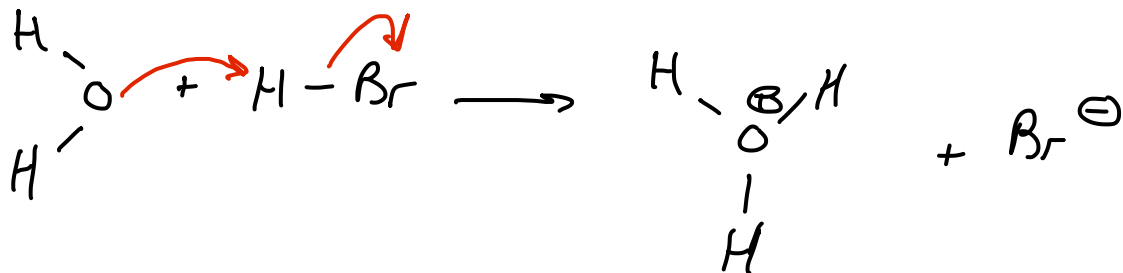


lone pair e^- 's can reach out and make a bond to an atom or molecule

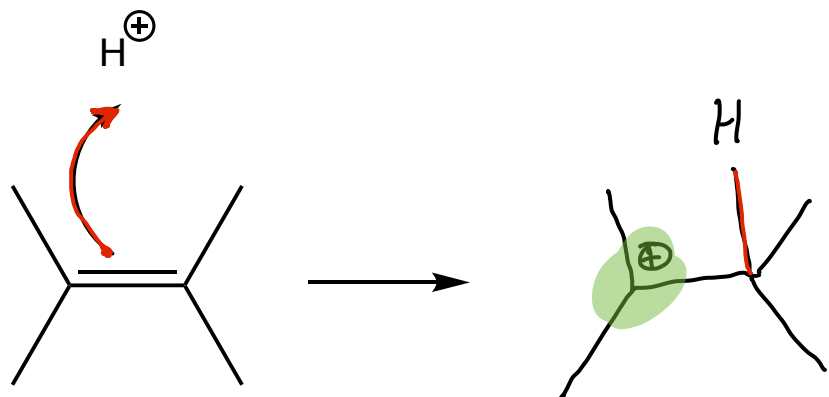
From a bond to an atom in the bond



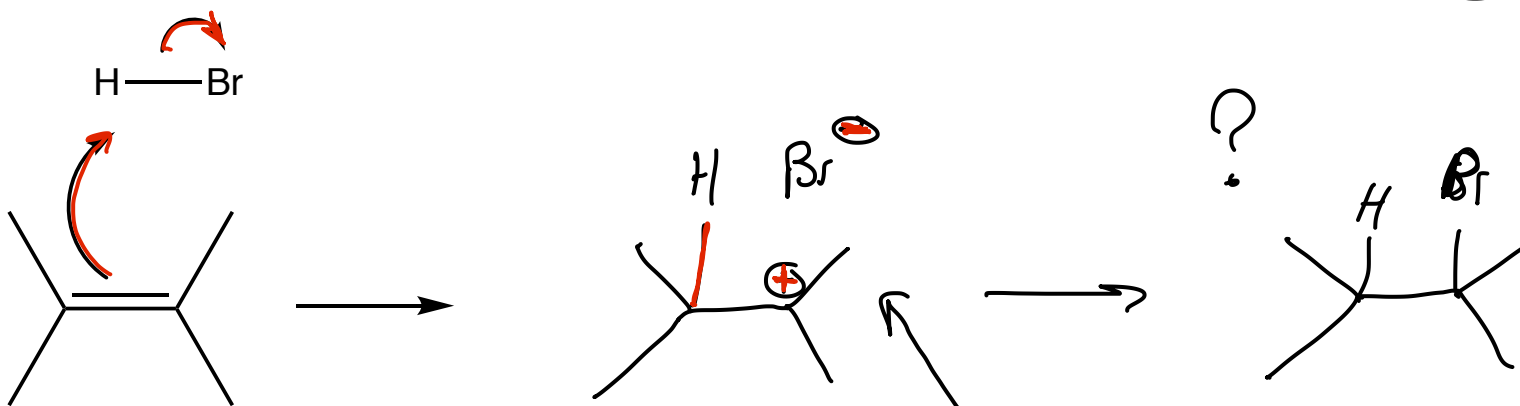
when e^- 's in a bond are moved onto an atom, that atom becomes more \ominus



From a bond to an atom not in the bond



e^- 's from a bond can be used to make a bond to another atom
 make certain to track charge...
 if an atom loses e^- 's it becomes more \oplus

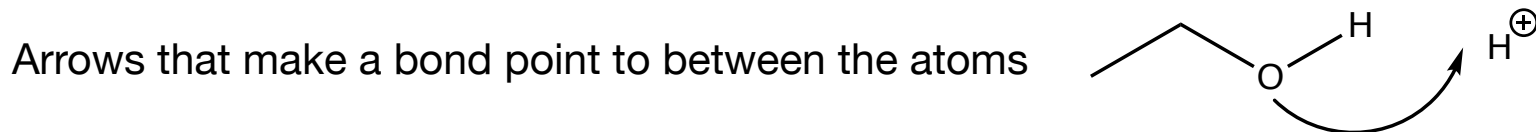
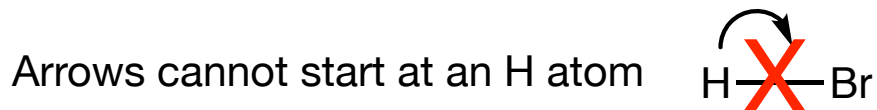
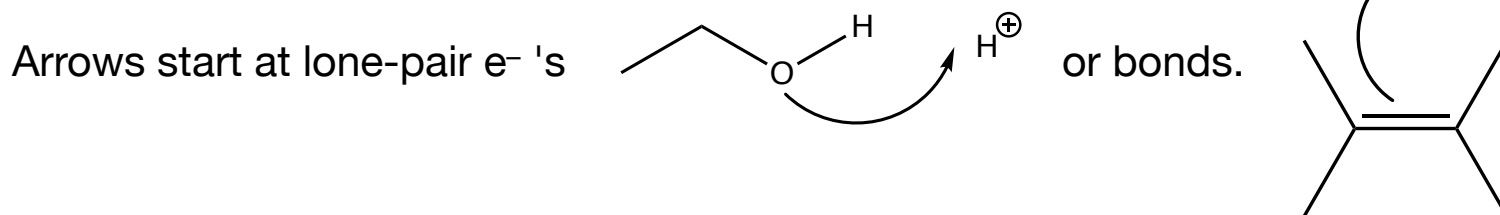


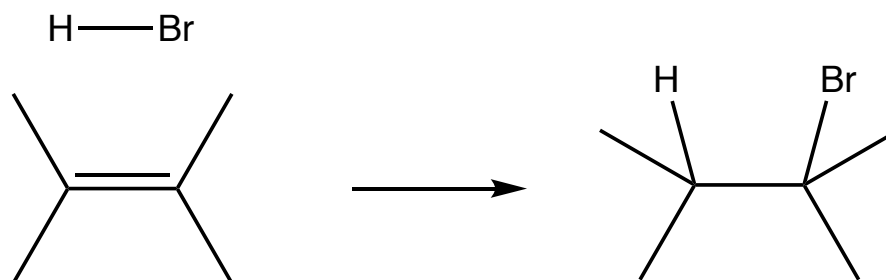
yes the Br^- would be attracted to the \oplus

Arrows start at a source of e^- 's and point to where the electrons will go.

Arrows represent the **imagined movement** of e^- 's. They are not an attempt to show a literal path.

Arrows are **not** used to **move atoms**.

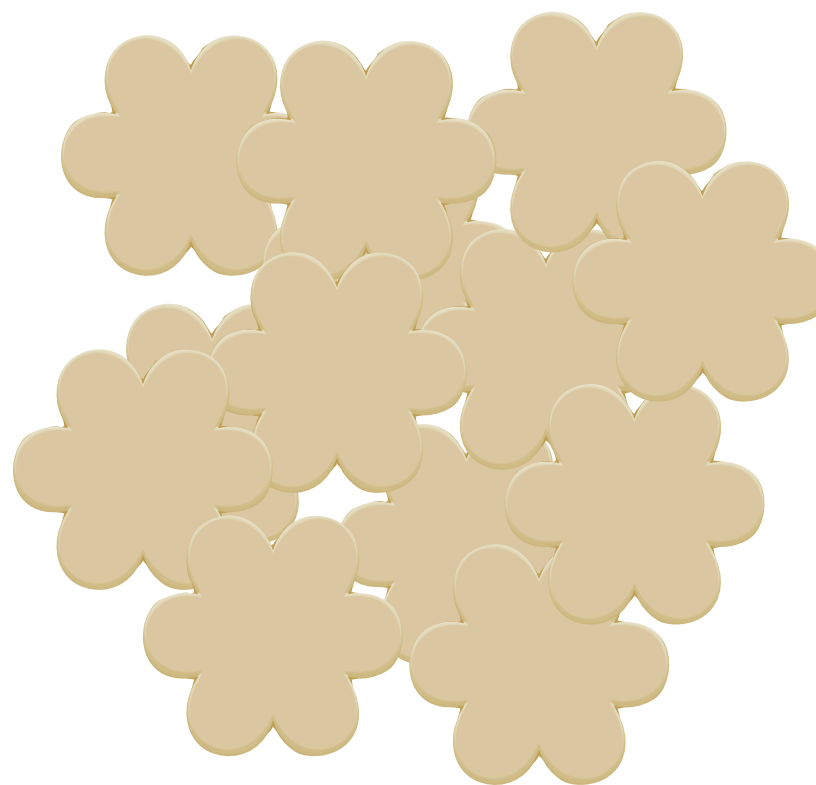




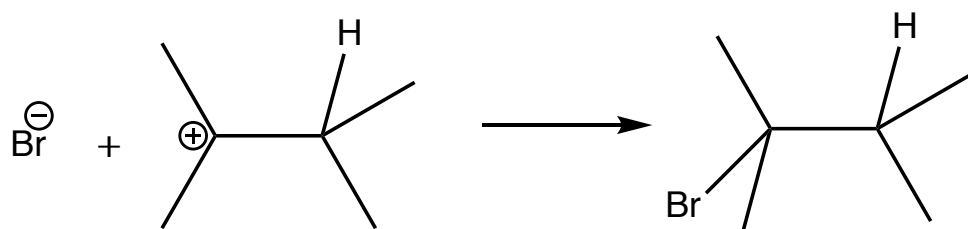
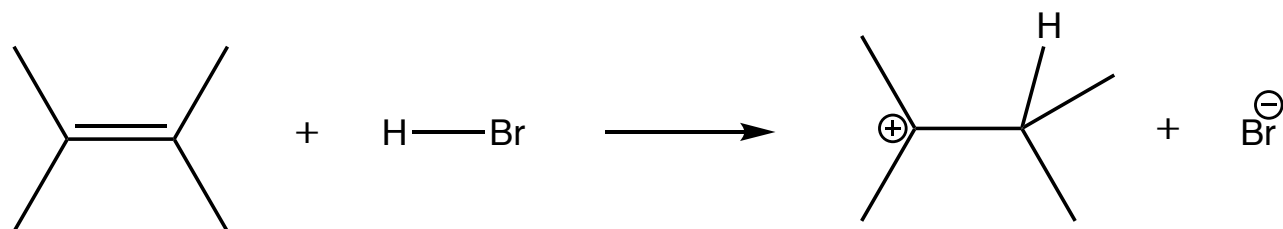
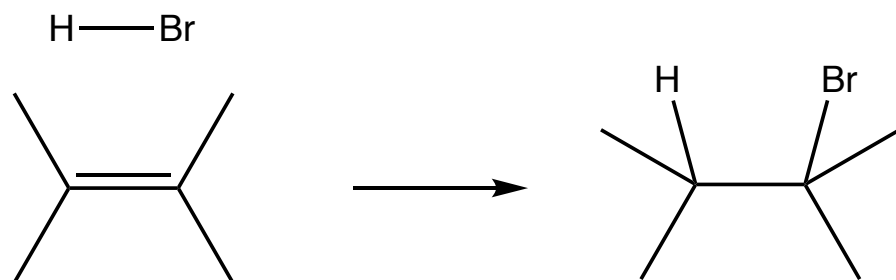
Sugar Cookie *

Menu

- 2 3/4 cups flour
- 1/2 teaspoon baking powder
- 1/4 teaspoon salt
- 2 sticks butter
- 1 1/2 cups sugar
- 1 egg
- 1 teaspoon vanilla

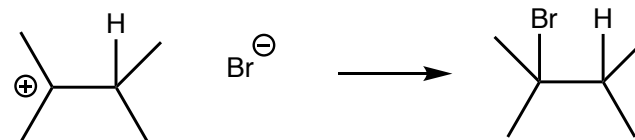
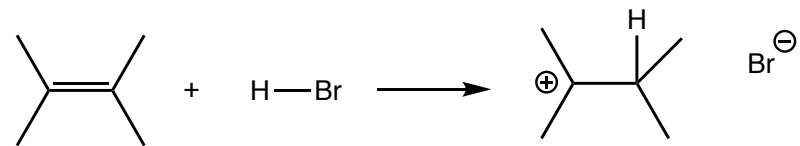
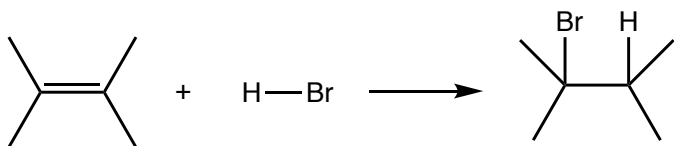


*CookieDoodle <https://apps.apple.com/us/app/cookie-doodle/id342128086>



Mechanism and Reaction Coordinate Diagrams

Section 5.5

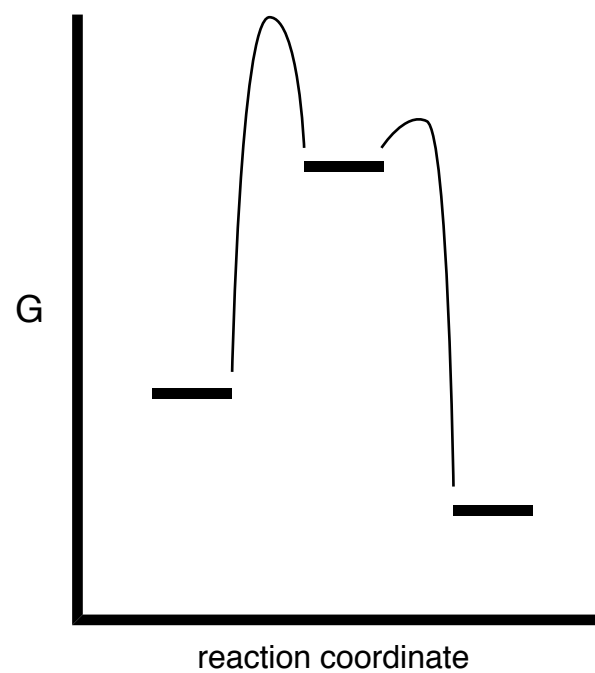
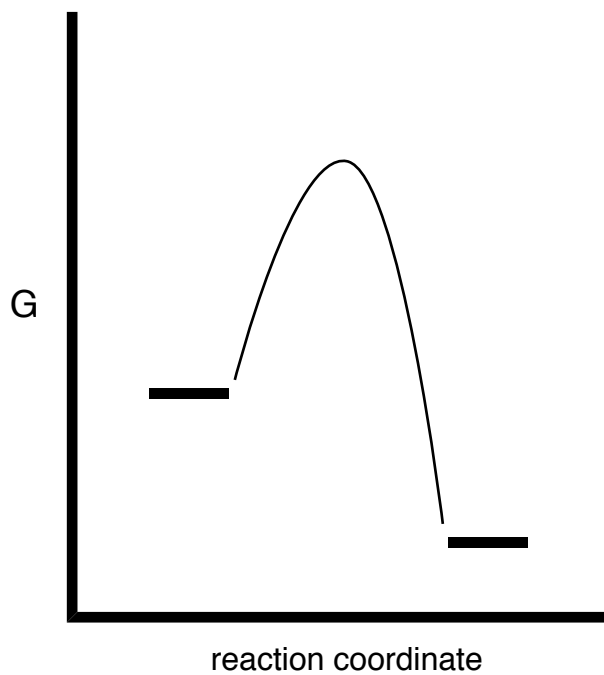


Reactant

Product

Transition State

Intermediate



Activation Energy (Kinetics), ΔG^\ddagger

ΔG and K (Thermodynamics)

