

Today

Next Class

Sections 5.5 - 5.13
How alkenes react

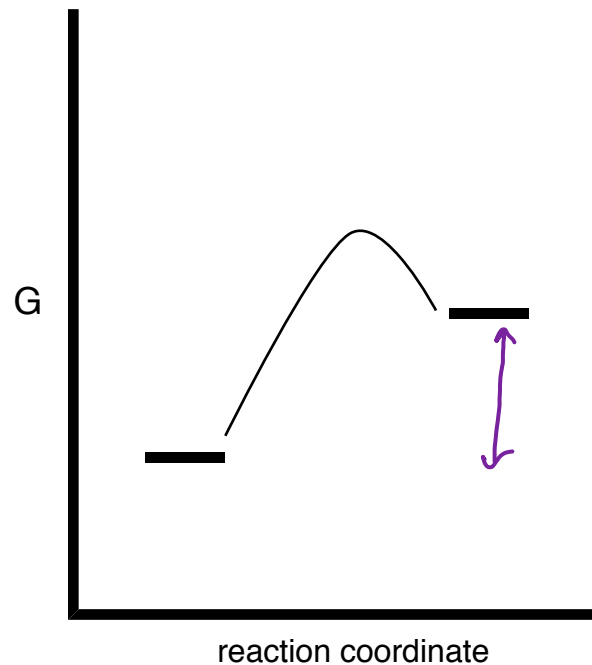
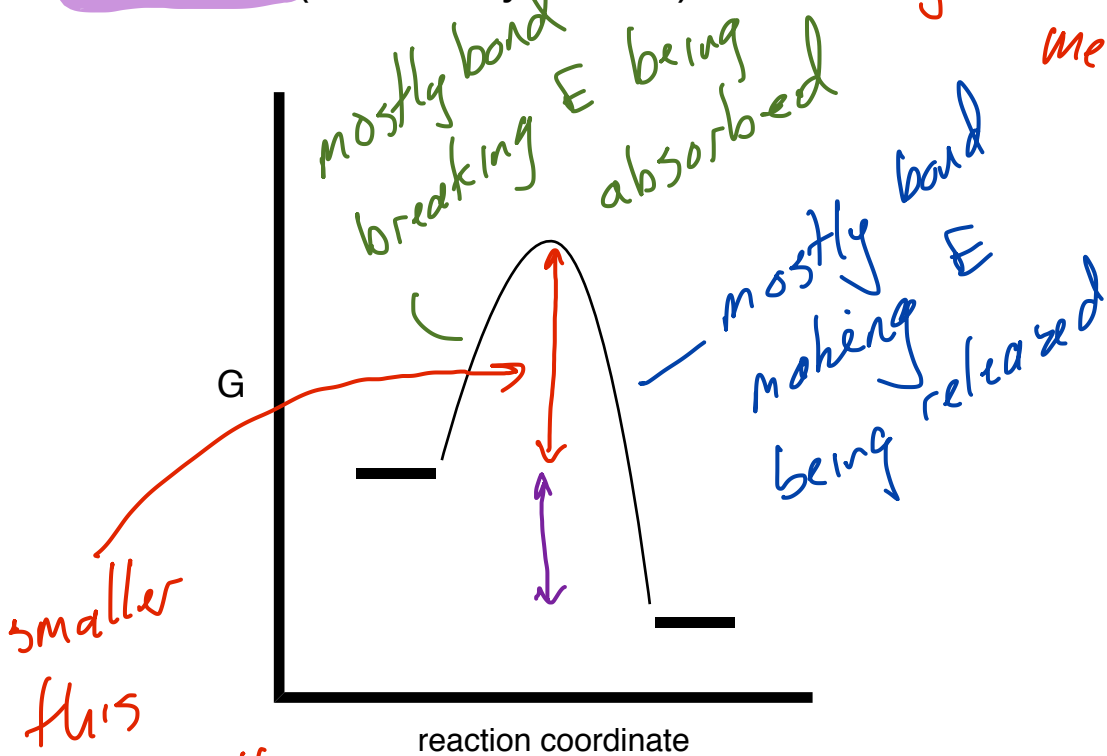
Kinetics, thermodynamics, reaction coordinate diagrams, and catalysis

Section 6.1 and 6.2
Electrophilic Addition and Carbocation Stability

Activation Energy (Kinetics), ΔG^\ddagger

ΔG and K (Thermodynamics)

activation E is the amt. of E required to get the reaction going. Large G^\ddagger means a slow reaction, vice versa



smaller
this
barrier is
the faster
the reaction

$\Delta G < 0$ releasing E

K Favorable

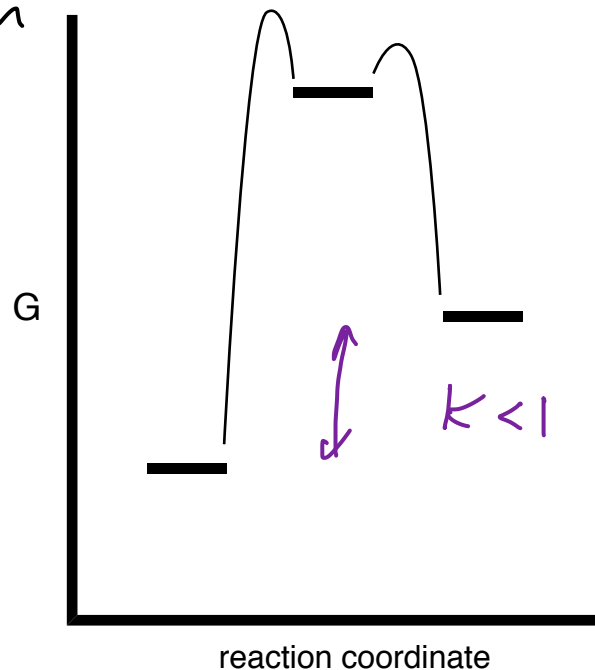
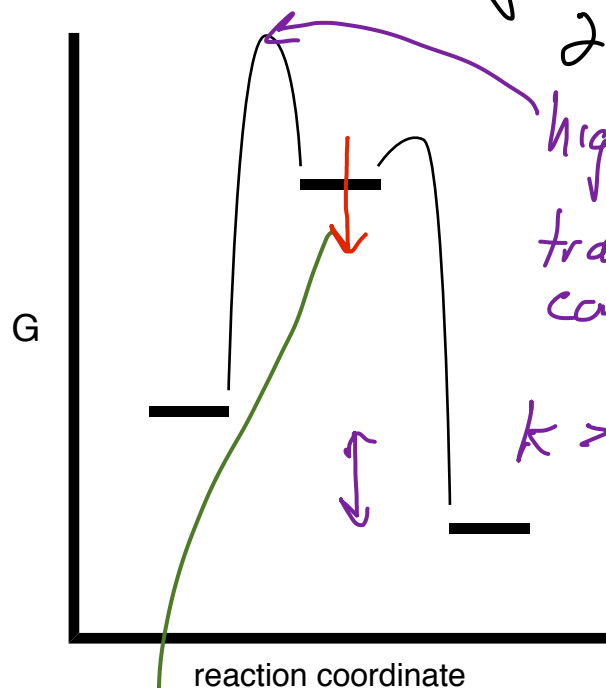
$K > 1$

$\Delta G > 0$ requires E

K unfavorable

$K < 1$

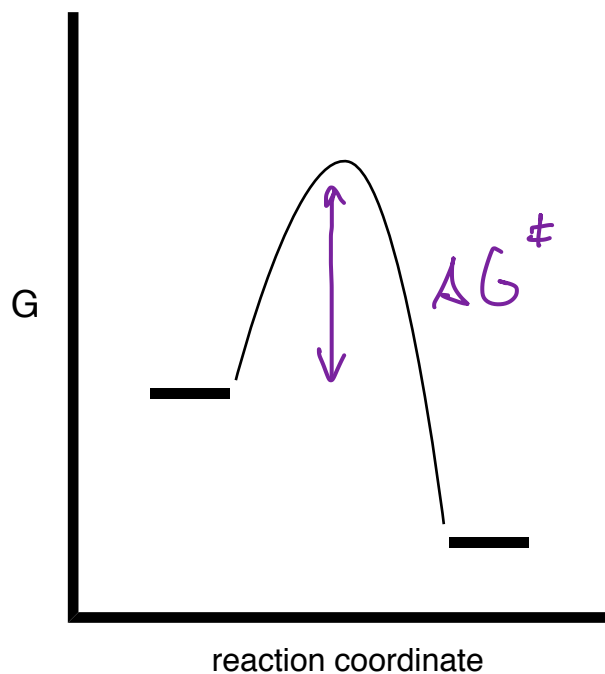
These are diagrams for reactions with a 2 step mechanism



intermediates indicate we have a 2-step reaction

How can we speed up the reaction?

Can we stabilize the intermediate? The reaction rate will increase if we do.

Kinetics: Activation Energy, ΔG^\ddagger 

$$\text{rate} = k [\text{reactant 1}]^x [\text{reactant 2}]^y$$

the x & y have to be
rate constant determined experimentally

is related

to ΔG^\ddagger small ... fast reaction

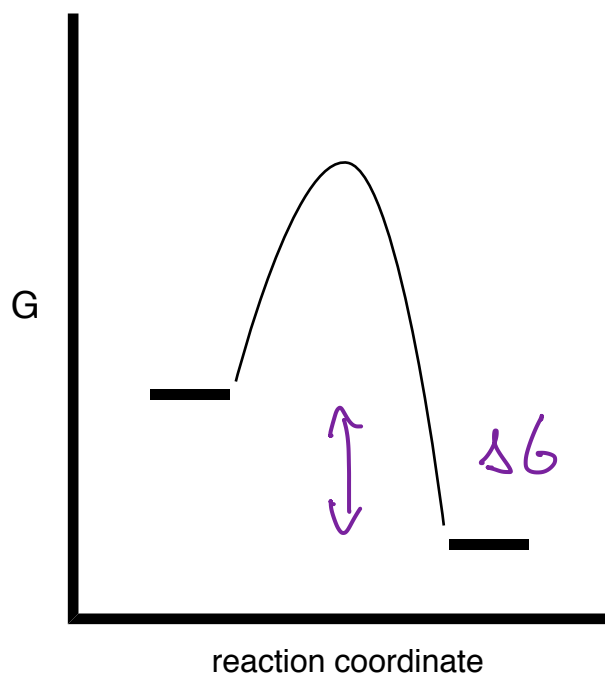
k will be large

Mechanisms make predictions
about rate laws that
can be tested

Thermodynamics: ΔG and K

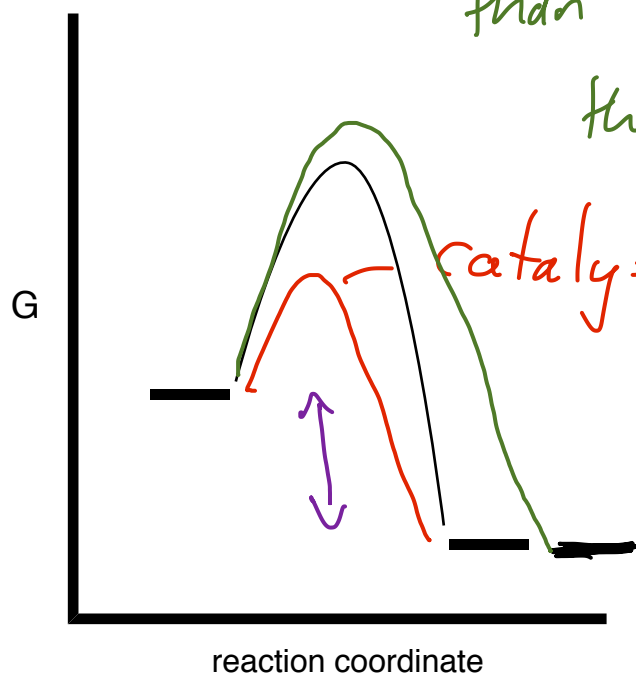
$$\Delta G^\circ = -RT \ln K$$

Determines the extent to which the reaction will occur.



section 5.9 ... we will look at when we make alkenes

Catalysis - catalysts lower the activation E barrier
catalysts don't change the thermodynamics
catalyst can make 1 product form faster than another product and change the product distribution



the K will remain the same