Course 343 | Lecturer Gellman
Day Wed. | Date 9/30/15
Notes Taken By Kirandeep Deol | Total # of Pages 4

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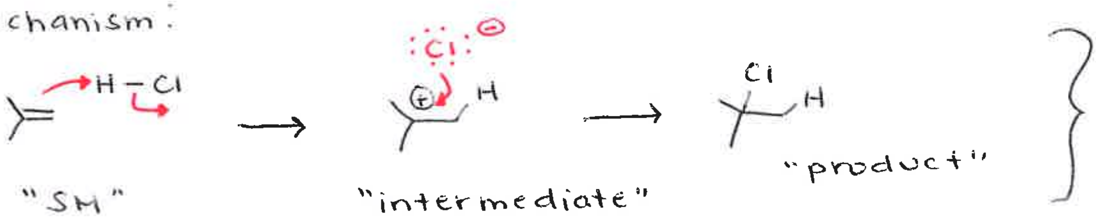
Recall "Rxn Energy Diagram" for:

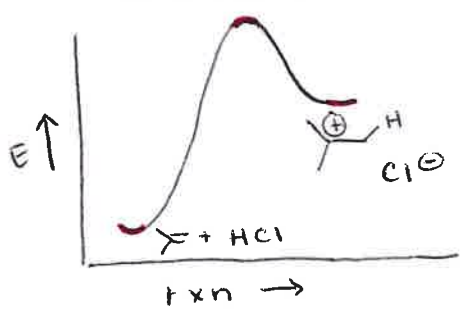
Mechanism:



2 steps

Step 1:

"endothermic"



Step 2:

"exothermic"

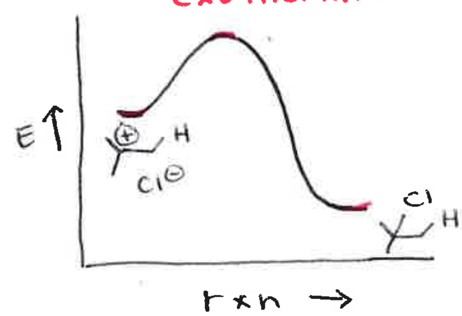
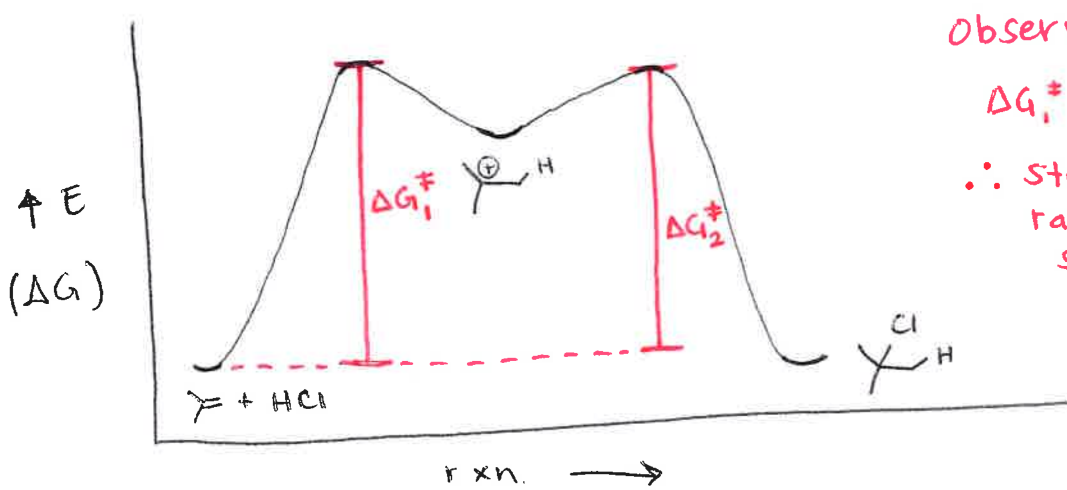


Diagram for entire process:



Observe:

$\Delta G_1^{\ddagger} > \Delta G_2^{\ddagger}$

∴ Step 1 is the rate determining step (RDS).

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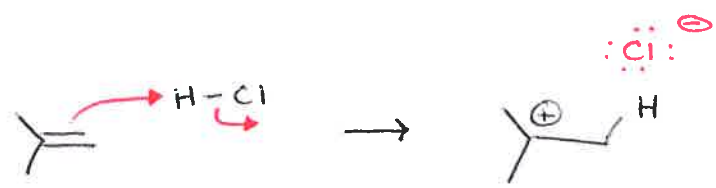
Hammond postulate:

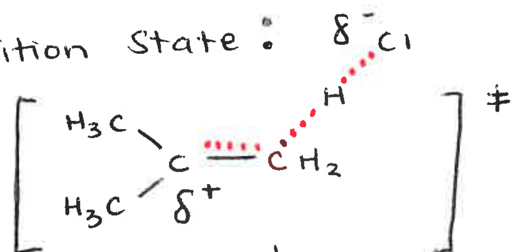
one can extrapolate from knowledge of high energy intermediates (e.g. carbocation) to behavior/stability of transition states that are adjacent in a mechanism.

Apply Hammond postulate to our example of HCl addn.

RDS

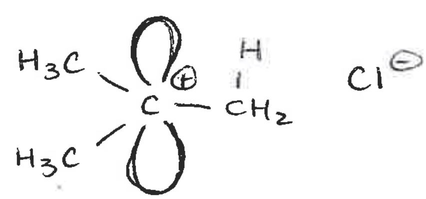


Transition State:

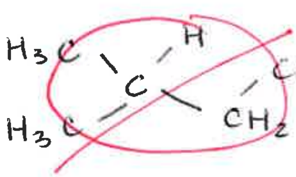


like a 3° C⊕ ("good")

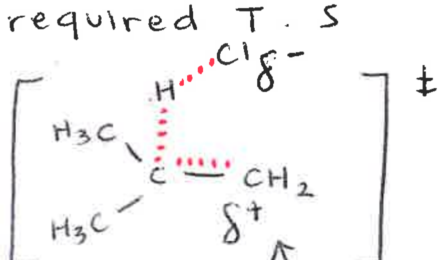
• ok to draw conclusions about TS from knowledge of carbocation.



H.P helps us explain isomeric selectivity ... why we do <u>not</u> observe



⇒ required T.S



like a 1° C⊕ ("bad")

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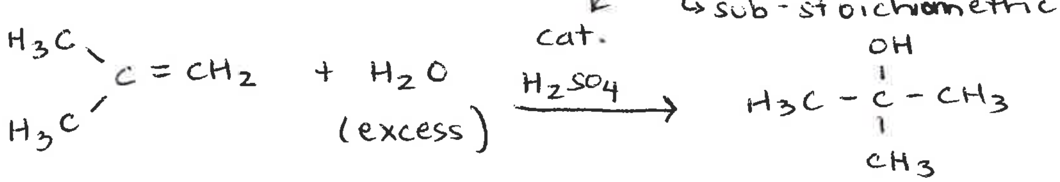
Catalysis

- catalyst is a species that enhances rxn rate w/out being consumed.

Example: Acid-catalyzed hydration of alkene

overall:

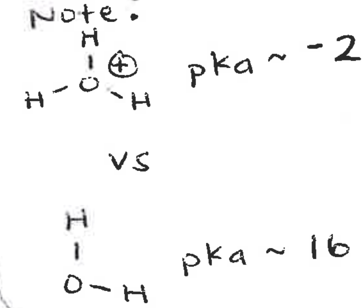
☆ the 2 starting materials do not react unless acid is present ("acid catalysis")

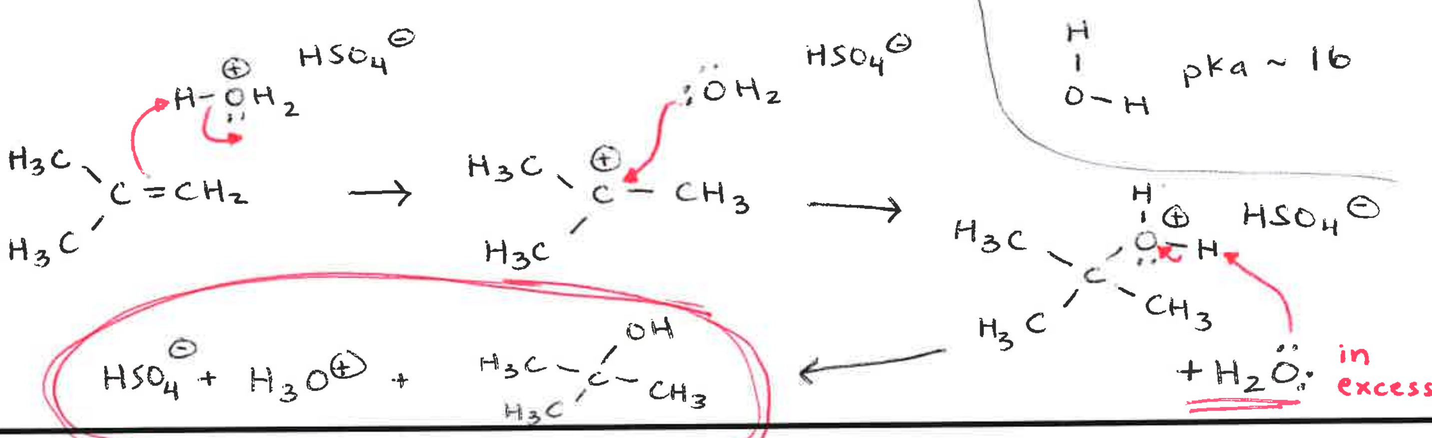


MECHANISM:

prelude: $H_2O + H_2SO_4 \rightleftharpoons H_3O^{\oplus} + HSO_4^{\ominus}$

Note:





final products
- regenerated H_3O^+ ⇒ ∴ catalyst

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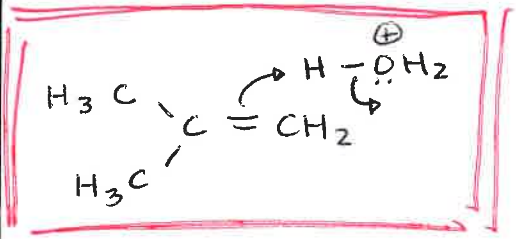
H_2O is not sufficiently acidic for $H^{\oplus}$ to transfer to alkene.

∴ $H_3O^{\oplus}$ required



Note: