(35) **Today**

Section 7.7 Electrophilic Addition Reactions

Next Class (36)

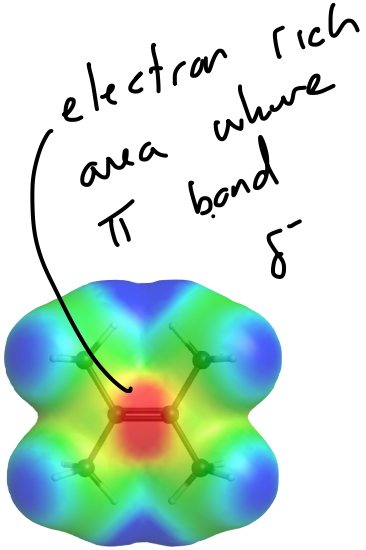
Section 7.7 - 7.11 Electrophilic Addition Reactions

(37) **Second Class from Today**

Section 8.2 and 8.3 Halogenation and Halohyrins

Test 3 corrections due Dec 13

The reactions are called electrophilic additions because the are initiated by an electrophile and two groups/atoms are added across the double bond.

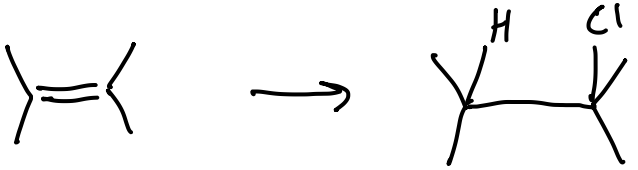


$H_2C{=}CH_2 \xrightarrow[\text{rxn}]{\text{E Add}} E{-}CH_2{-}CH_2{-}Nu$

E = generic electrophile Nu = generic nucleophile

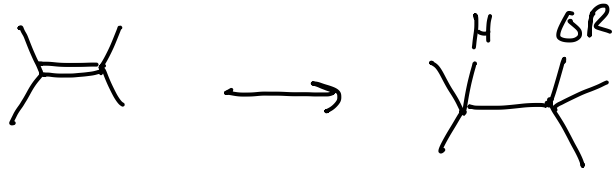
E - Nu

H - Cl



H - OSO_3H

Nu



H^+ OSO_3H

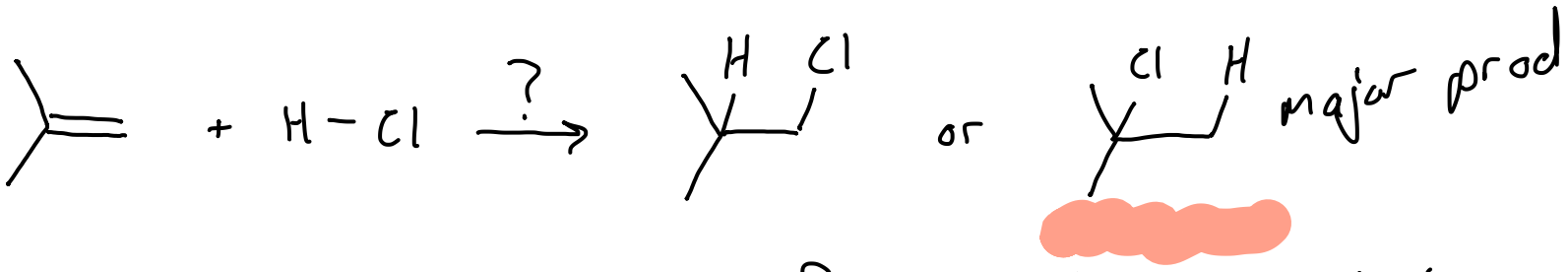
Nu = I^-

= ROH ... CH_3OH, HOH

Orientation of Electrophilic Additions: Markovnikov's Rule

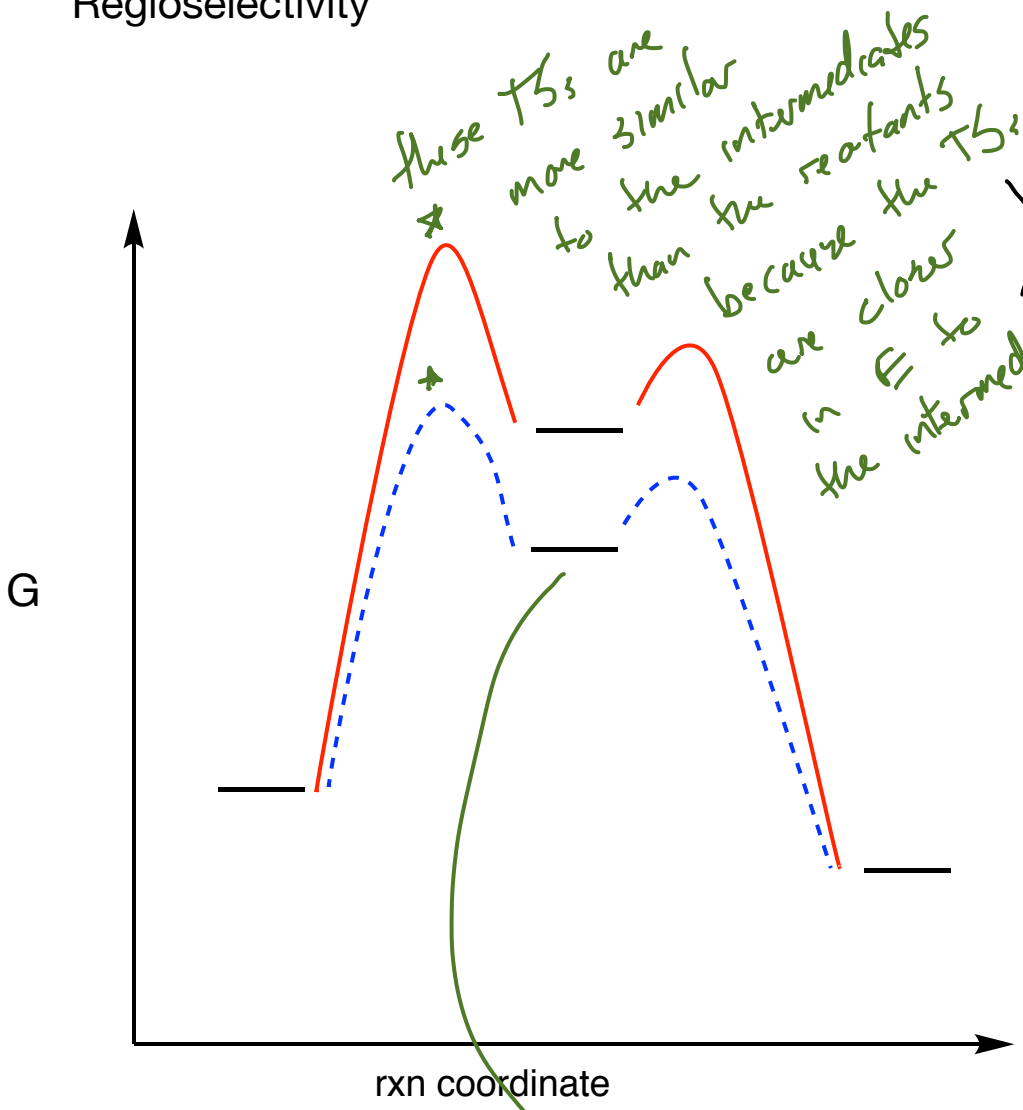
Section 7.8

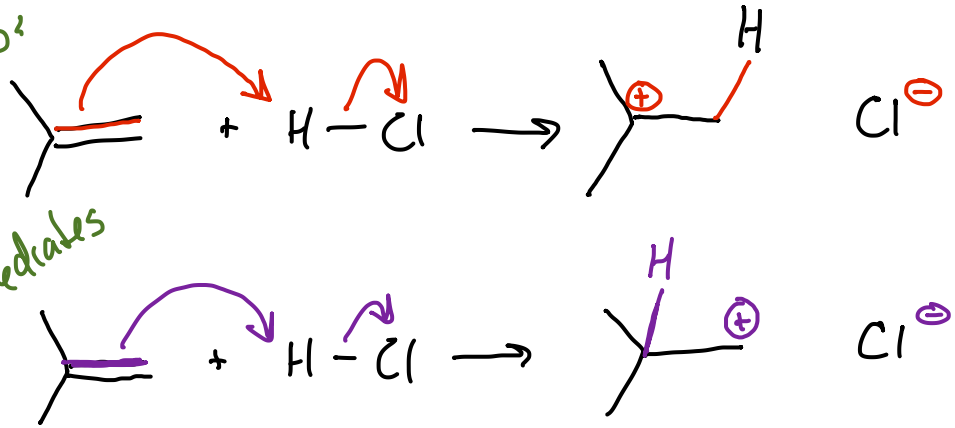
Regioselectivity: The ability of a reaction to prefer the formation of one constitutional/structural isomer over another.



If this reaction produces more of 1 possible product than the other the reaction is regioselective

- The H atom of the electrophile goes to the end of the db where there are more H atom

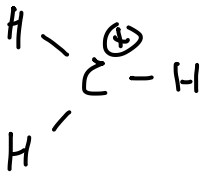




* the transition state is more similar to the molecules that it is closer in energy to.

so the question becomes... which intermediate... which C^+ is lower in E?

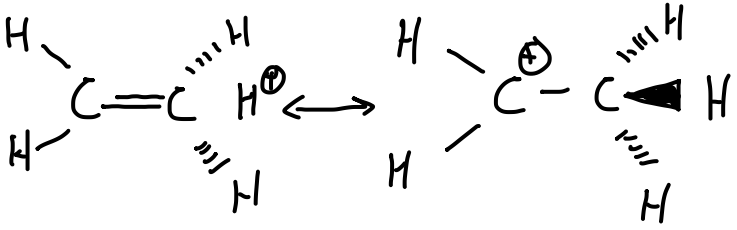
C+ Stability



no extra help from my neighbors

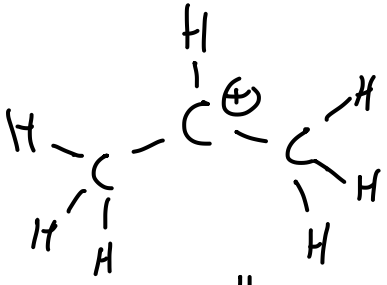
extremely unstable, will not form under typical lab conditions

hyperconjugation



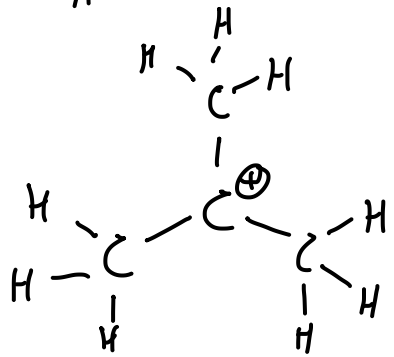
a little help from one neighbor

extremely unstable, will not form under typical lab conditions



more help from my friends

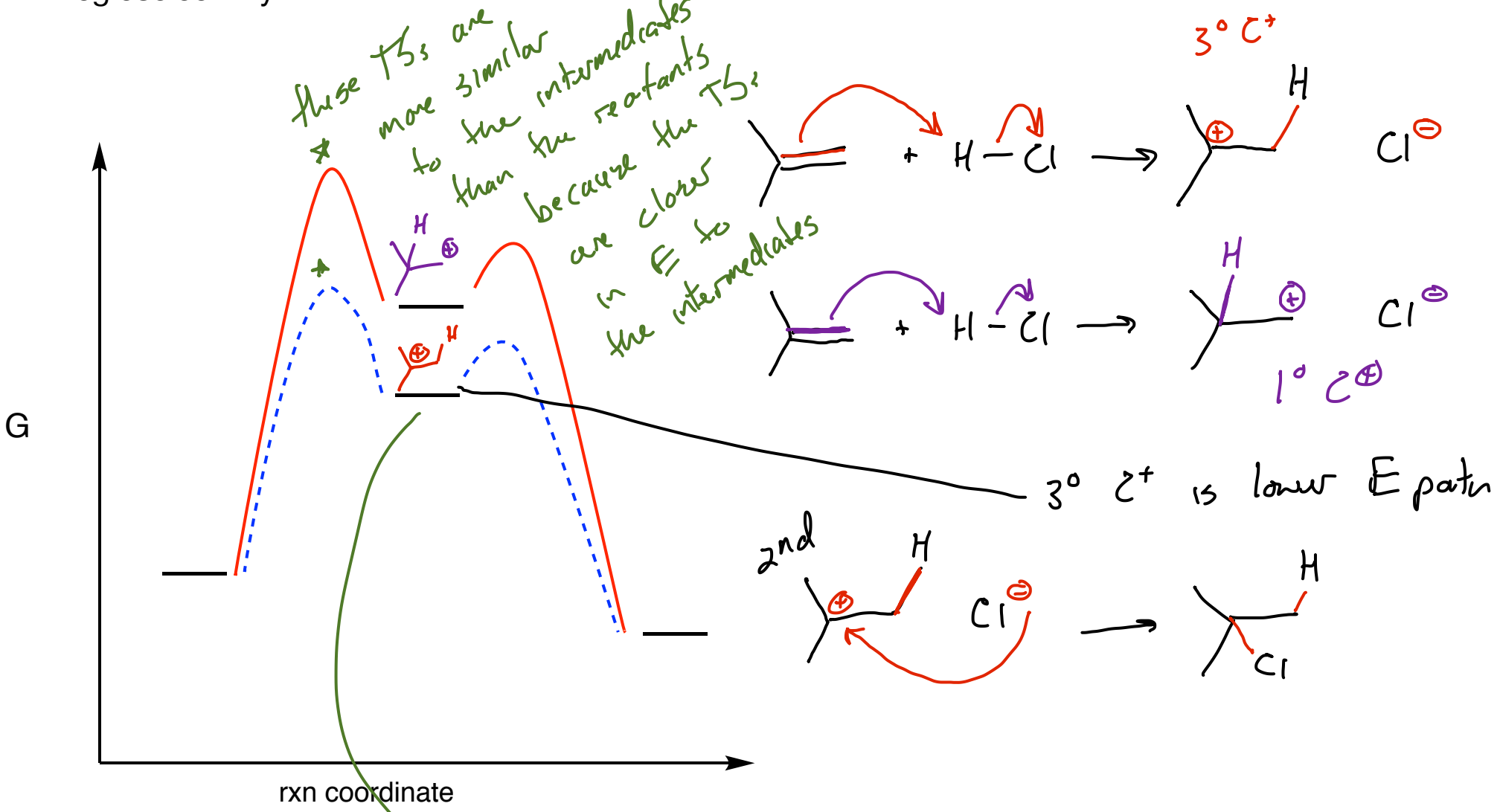
can form under typical lab conditions



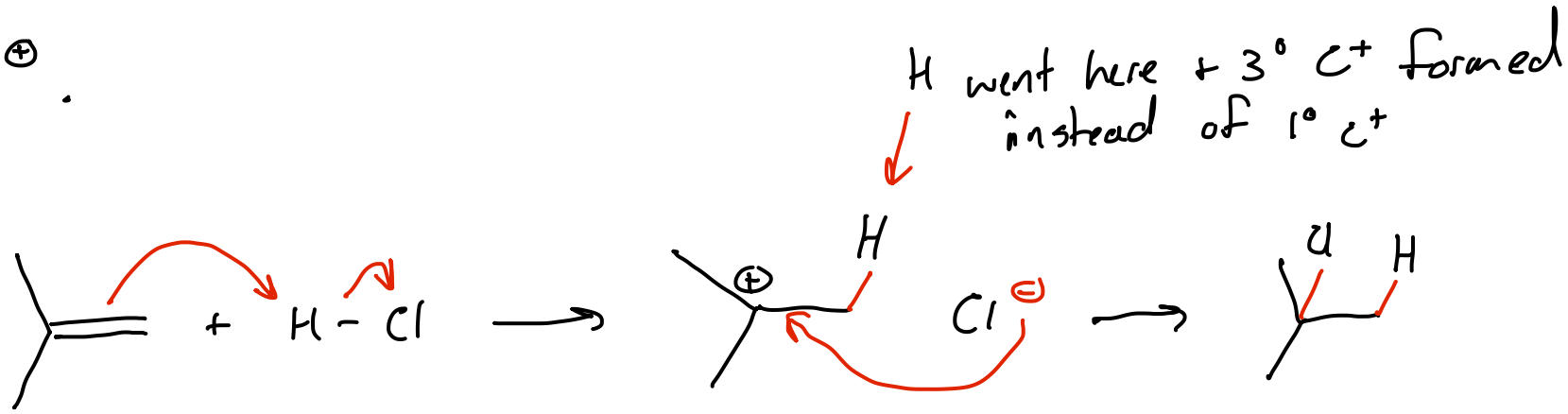
even more help from my friends (σ bonds on neighboring C's)

readily form under typical lab conditions

https://www.westfield.ma.edu/cmasi/organic/carbocation_stabilization/carbocation-lumo-plain.html


these TS's are more similar to the intermediates than the reatants because the TS's are closer in E to the intermediates
3° C+
H
Cl⊖
1° C⊕
G
rxn coordinate
3° C+ is lower E path
2nd
so the question becomes... which intermediate... which C+ is lower in E?

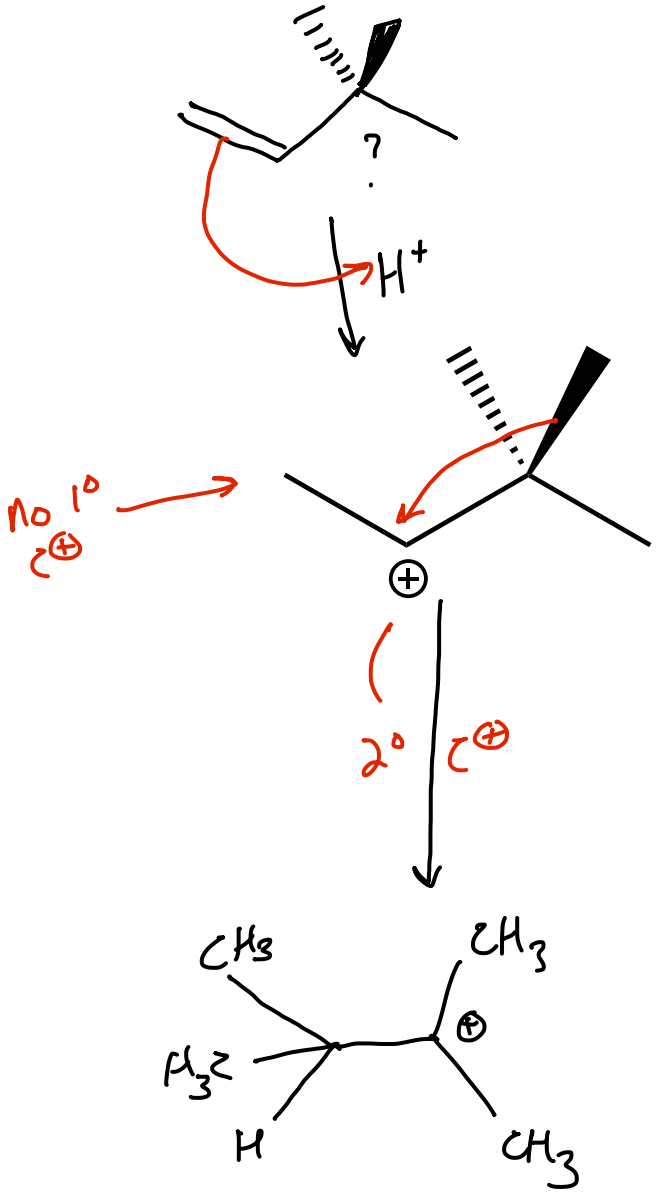
The electrophile (H^+ for example) goes to the end that results in the formation of the more stable $C^{\oplus}$.

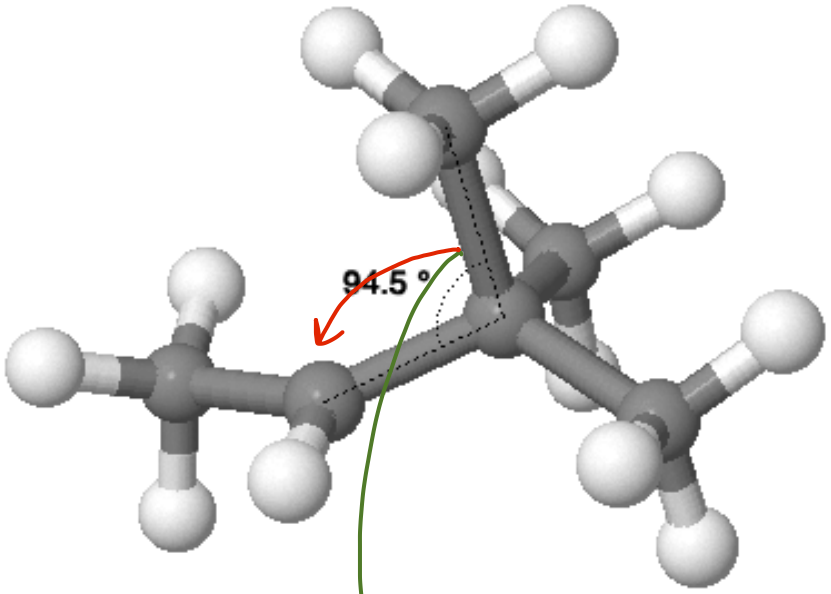


Initiate rxn and determine which end would be more stable C+

→ another step gets added here

Add Nu to end that is more stable C^+





this calculation is showing that these e's are being drawn to the C⊕

2°