

ORGANIC CHEMISTRY 1 LECTURE GUIDE 2019

BY RHETT C. SMITH

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By Rhett C. Smith, Ph.D.

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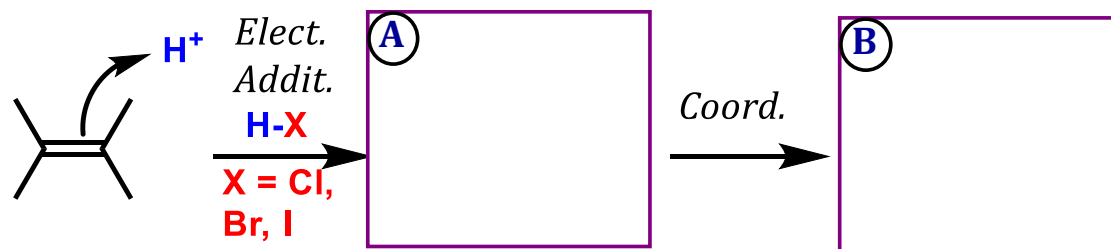
Organic Chemistry 1 Reactions and Practice Problems 2019

by Rhett C. Smith

Organic Chemistry 1 Primer 2019,

by Rhett C. Smith, Andrew G. Tennyson, and Tania Houjeiry

Lecture Topic III.3-5: Reactions Involving Electrophilic Addition of a Proton
Hydrohalogenation



The mechanism is the reverse of **C**

The rate limiting step is

D

The carbocation can:

E

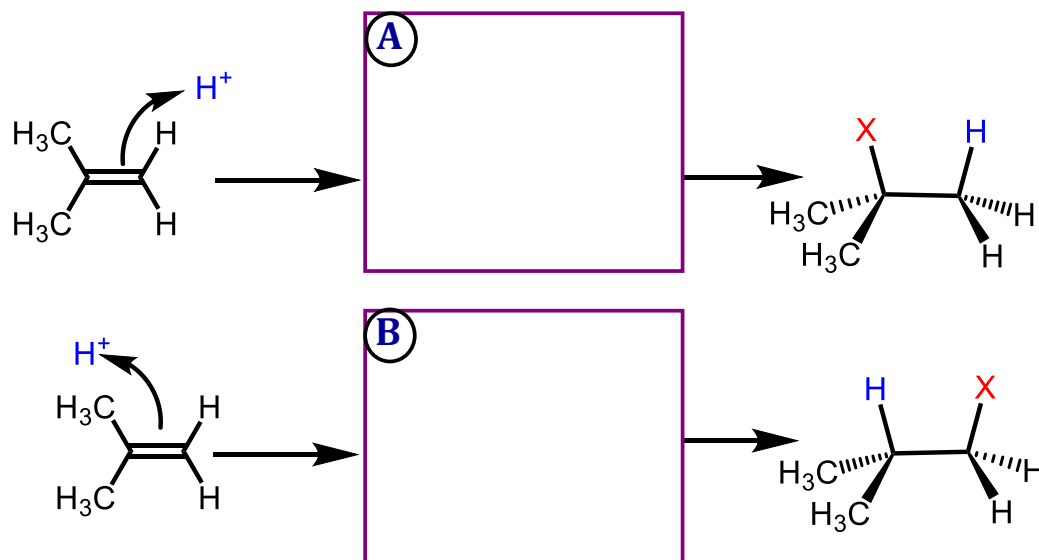
Addition is:

F

Notes

Lecture Topic III.3-5: Reactions Involving Electrophilic Addition of a Proton
The More Stable Intermediate Forms More Rapidly

If the two pi-bonded carbon atoms are differently-substituted, there will be two choices for carbocation formation upon electrophilic addition:



The **major product** is that derived from the more stable carbocation, in this case the tertiary cation.

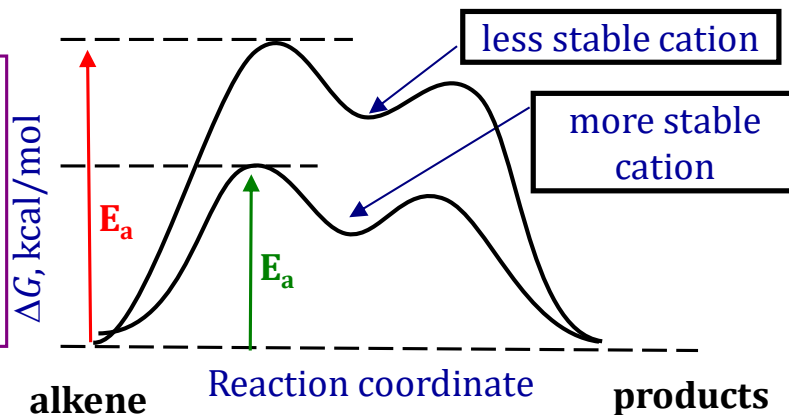
Notes

OBSERVATION= Markovnikov's rule:

(A)

EXPLANATION=

(B)

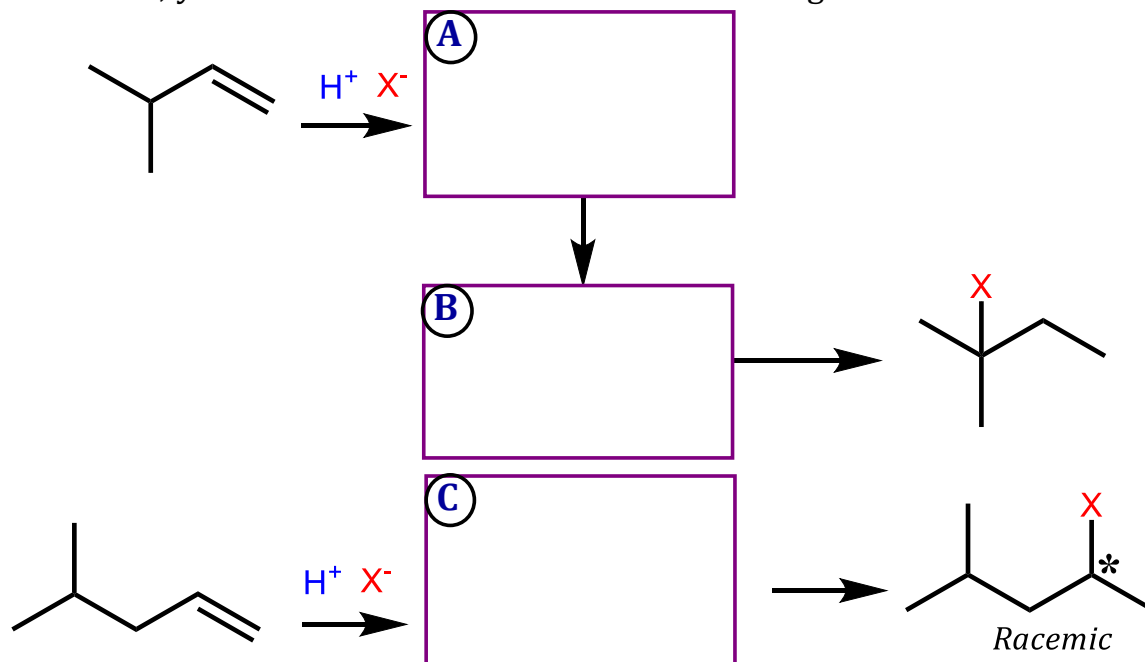


We can use the same type of energy-based arguments to rationalize Markovnikov's rule as we did to rationalize Zaitsev's rule.

Notes

Lecture Topic III.3-5: Reactions Involving Electrophilic Addition of a Proton
Carbocations can Rearrange to More Stable Species

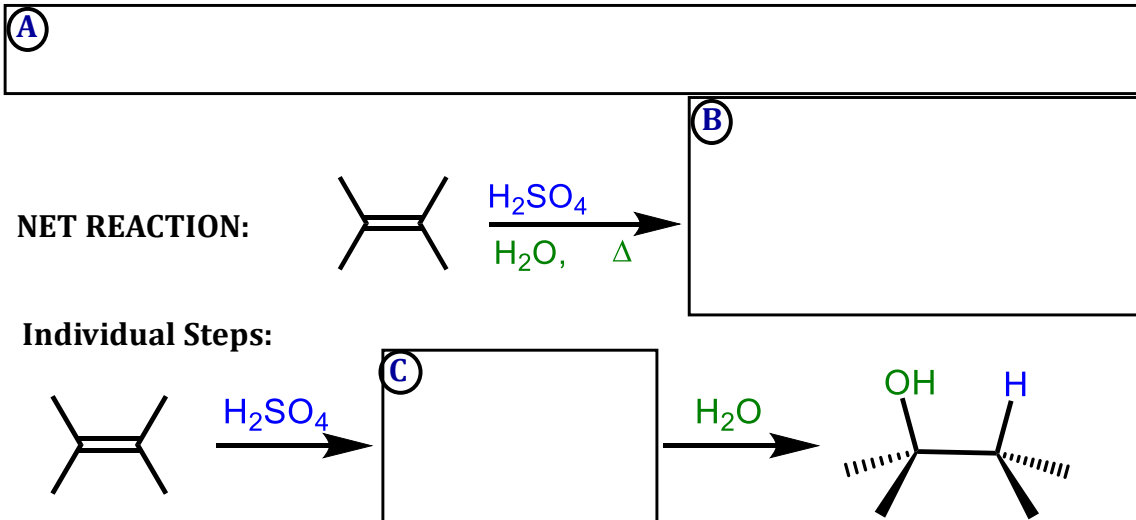
Remember that any time a carbocation is formed in the course of a reaction, you will need to assess whether it rearranges.



Notes

Lecture Topic III.3-5: Reactions Involving Electrophilic Addition of a Proton
Hydration

Addition of HX to an alkene is the reverse of E1 on an alkyl halide. We can also do a **hydration reaction** (addition of water to an alkene), which is the reverse of the dehydration (E1) of alcohols:



This reaction gives the Markovnikov product and has 50:50 syn-anti addition. The carbocation can rearrange just as for hydrohalogenation.

Notes