



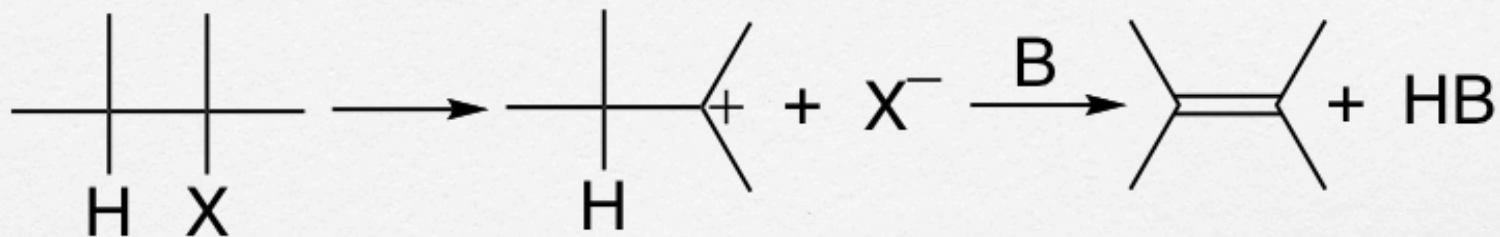
E1 Mechanism

UCI Chem 51A
Dr. Link

Goals

- After this lesson you should be able to
 - Identify and draw the E1 mechanism
 - Describe the experimental evidence that supports the E1 mechanism
 - Identify alkyl halides that are likely to undergo E1 reaction
 - Identify bases that promote the E1 mechanism
 - Identify solvents that promote the E1 mechanism
 - Explain the regioselectivity of the E1 mechanism
 - Predict the outcome of E1 reactions

E1 Fundamentals



$$\text{rate} = k [\text{R-X}]$$

$$\text{RDS} = \text{1st order}$$

How Do We Know?

- Kinetics

- $\text{rate} = k [\text{R-X}]$

- RDS 1st order

- Intermediates

- Experimental evidence of carbocation intermediate

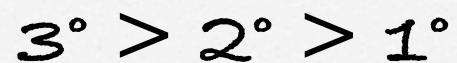
- Regiochemistry

- Unexpected products of carbocation rearrangements

The Alkyl Halide

β -H REQUIRED!

Reactivity Order



The Base & Solvent

□ E1 favored by weak base!

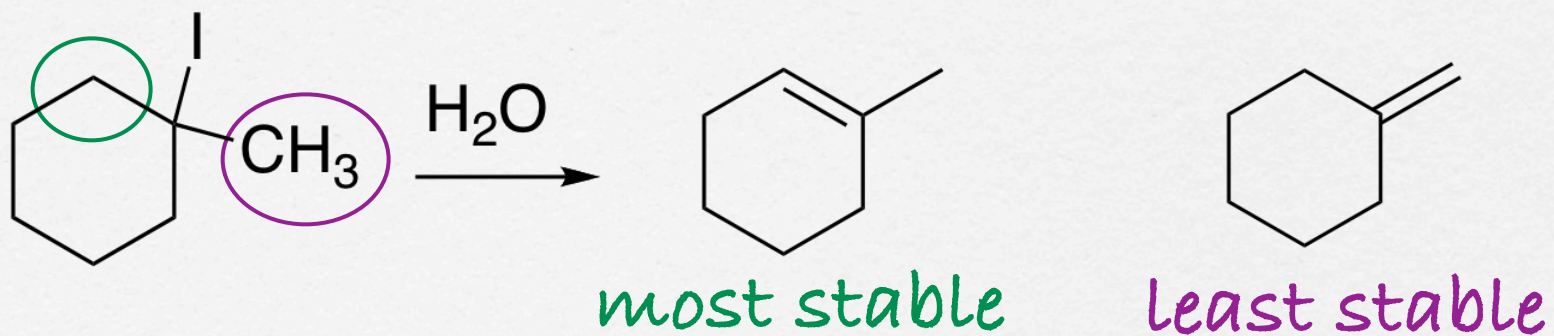
□

□ E1 favored by polar protic solvents

Solvents can also be used as bases!

Zaitsev Rule

- Zaitsev rule: Most stable alkene will be major product



E1 & sp^2 Carbons?

□ NO!!!

sp^2 carbocation \approx 1° carbocation!

E1 Summary

- Rate = 1st order
- Mechanism = 2 steps
- LG = good LG required
- R-X = β -H required. Benzylic, allylic, $3^\circ > 2^\circ$
 - no 1°
- Base = weak base favors E1
- Solvent = polar protic solvent favors E1
- Regioselectivity = most stable alkene favored

Wrapping Up

- Practice drawing E1 mechanism
- Practice identifying alkyl halides that can undergo E1 reactions
- Practice drawing products of E1 reactions
- Practice identifying major and minor products of E1 reactions