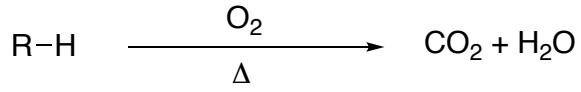
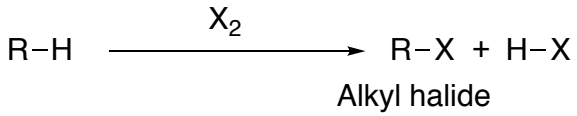
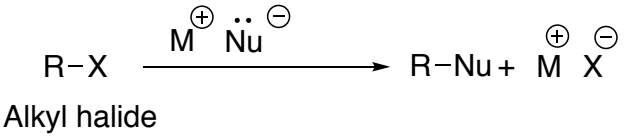
Recall:

Alkane Reactions:

-Combustion, Radical Substitution, Nucleophilic Substitution



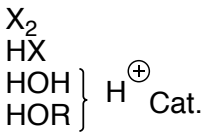


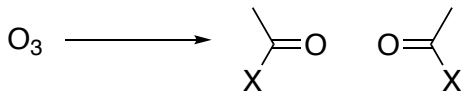


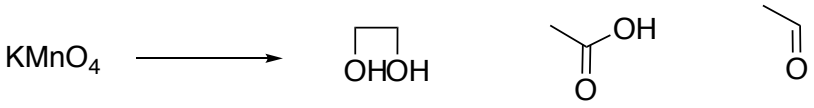
S_N2 occurs on 1°/2° subtrates
S_N1 occurs on 3° substrates

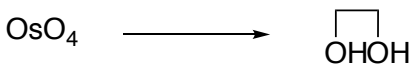
Alkene/Alkyne Reactions:

-Addition, Oxidation

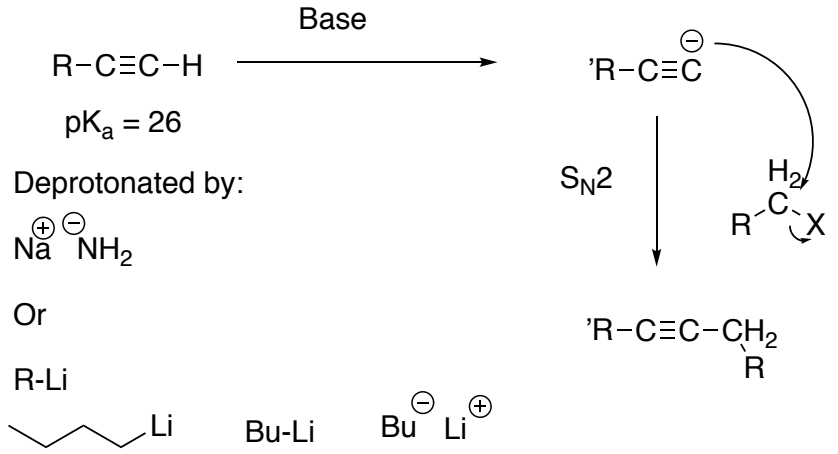






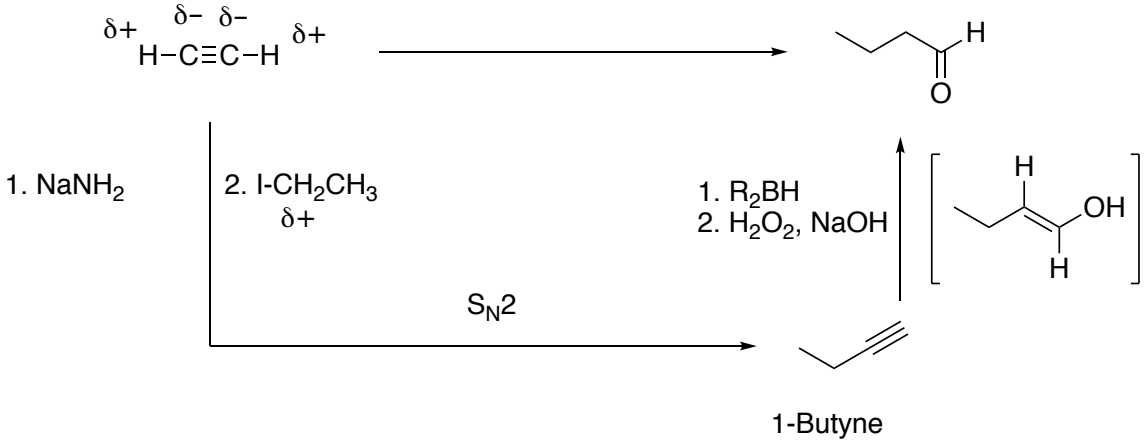


Generating an Acetylide anion:

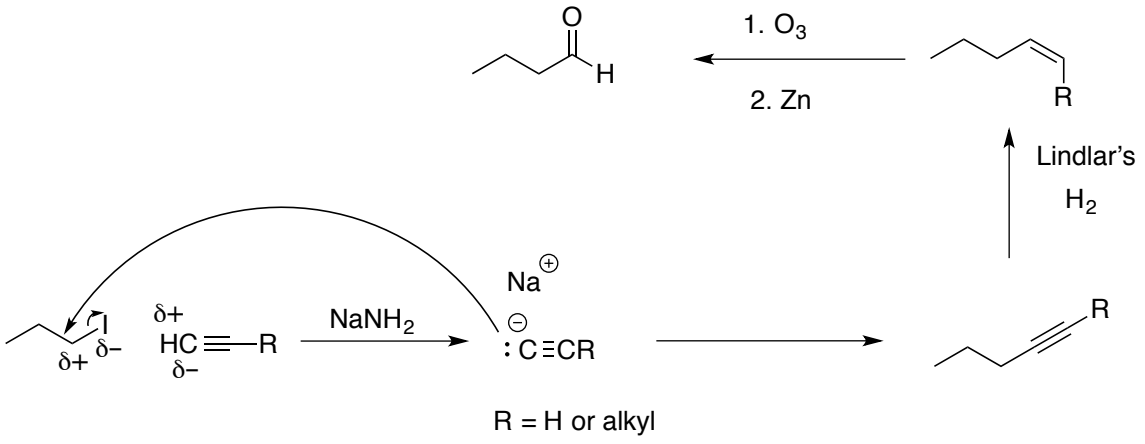


The resulting acetylide anion can be used in the synthesis of other acetylenes by substitution reactions.

Example:

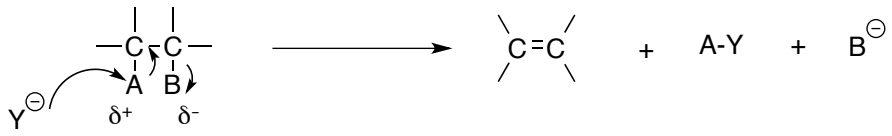


Alternative solution to above problem:



Elimination Reactions:

2 Types of Mechanisms: E_1 and E_2



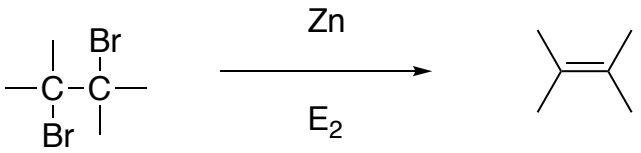
Base vs. Nucleophile:

Base — Nucleophile

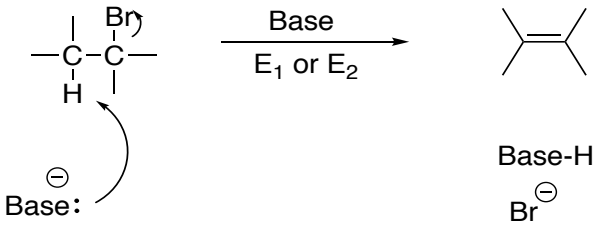
Elimination (E_1 and E_2) — Substitution (S_N1 and S_N2)

Types of Elimination Reactions:

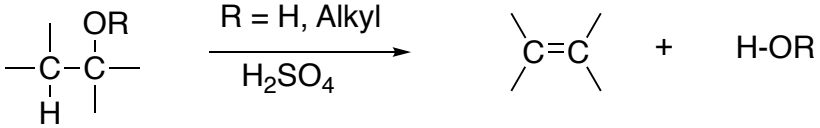
1) Dehalogenation



2) Dehydrohalogenation



3) Dehydration



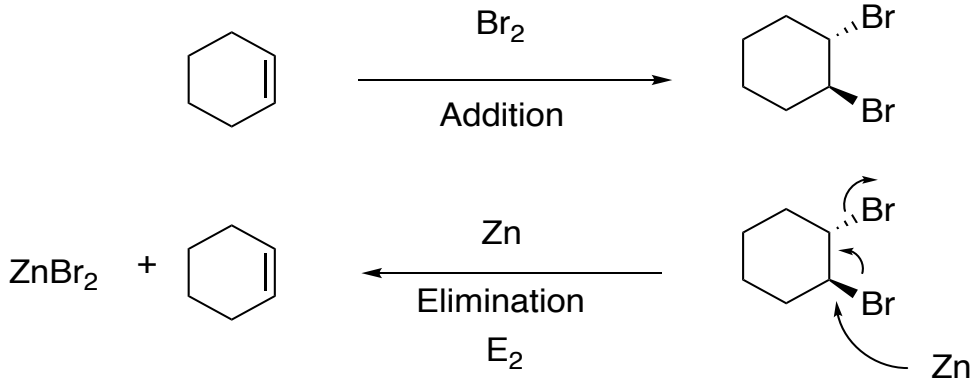
E_1 Or E_2

E_2 Reaction (E=Elimination)**:**

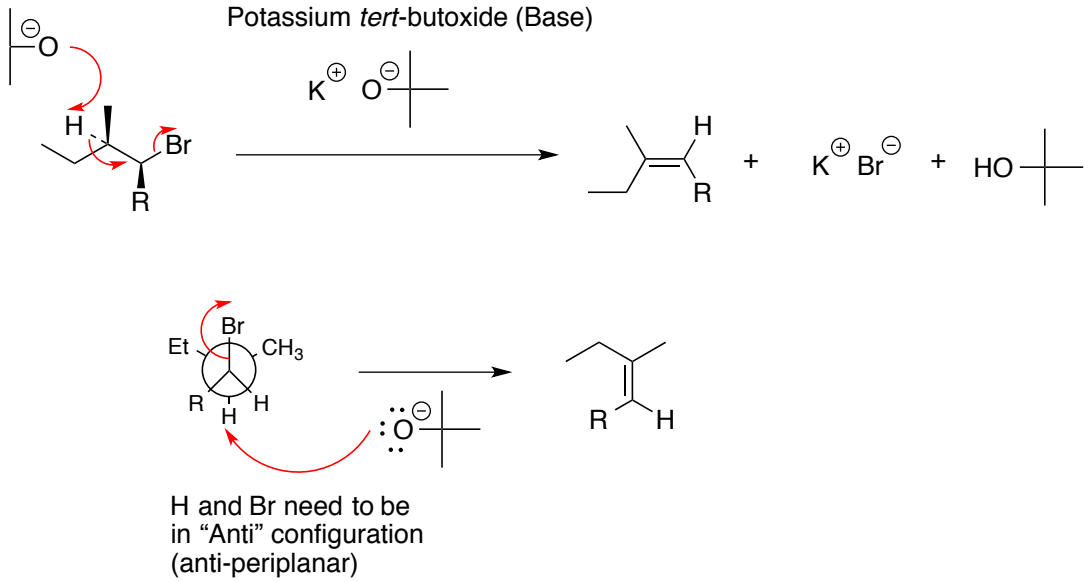
- Rate depends on two concentrations
- Stereospecific
- Concerted (bonds being formed and broken at the same time)
    - No intermediate
- Anti-periplanar geometry

Example #1:

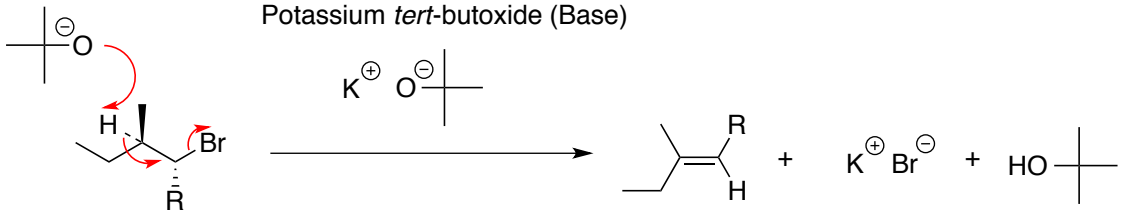
- Zinc mechanism always proceeds via E_2

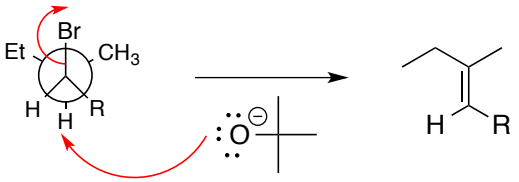


Example #2 A:



Example #2 B: Start with different sterochemistry get different product stereochemistry (a diasteromer)

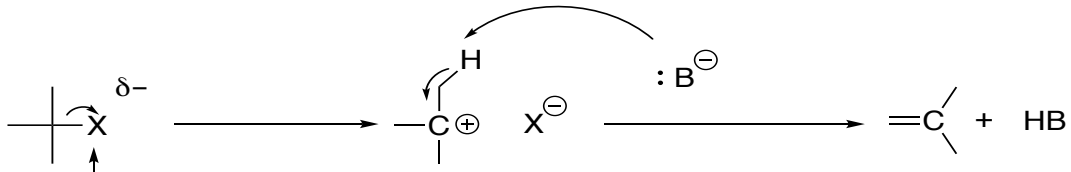




H and Br need to be in "Anti" configuration (anti-periplanar)

E_1 Reaction:

- Rate depends on one concentraion
- Not concerted (carbocation intermediate)
- Not stereospecific
- Favoured with leaving group being 3º

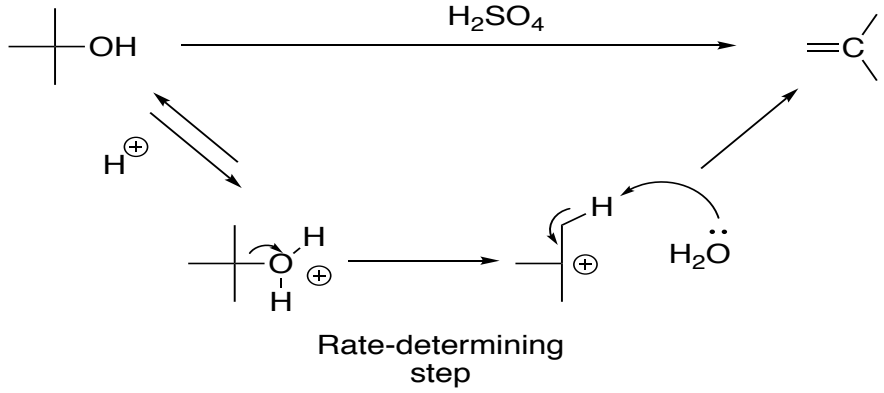


Leaving group

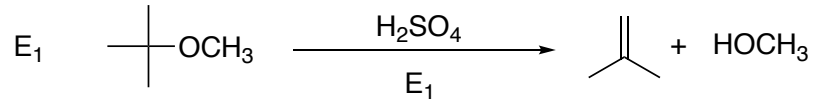
carbon attached to leaving group must be 2º or 3º

Planar carbocation intermediate (sp^2)

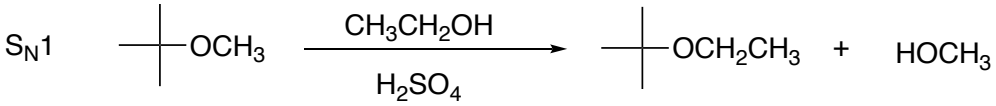
Example #1:



Example #2:



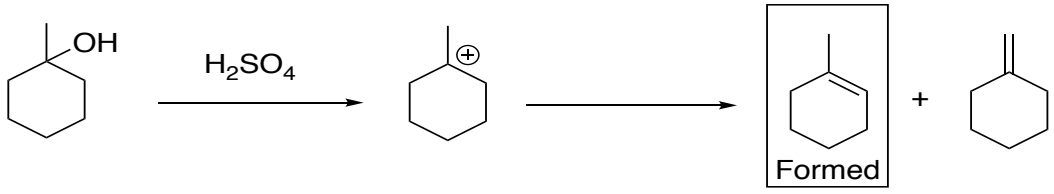
vs.



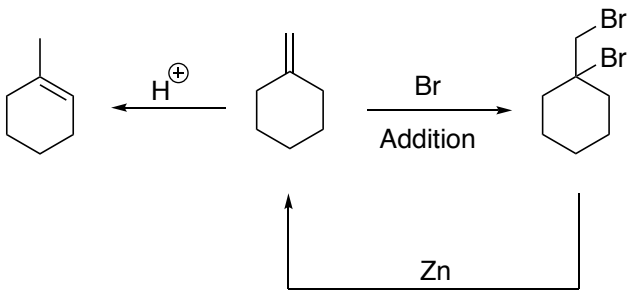
Substitution	vs.	Elimination:
- Low Temp		- High Temp
- Weaker Base		- Stronger Base
- Dilute H^+		- Conc. H^+
- Leaving group on 1º carbon		- 2º, 3º
- Small Nucleophile		- Large Nucleophile

Zaitsev Rule: Get the more substituted alkene

Example #1:



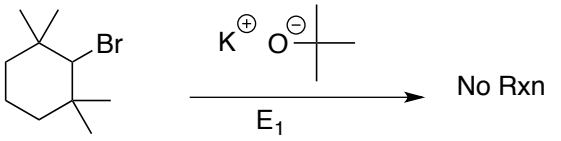
Example #2:

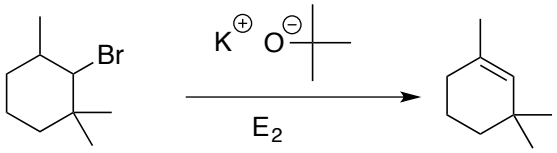


Due to mechanism of Zn, the double bond is stuck at less substituted end.

Double bond can go to more substituted if it is left in aced

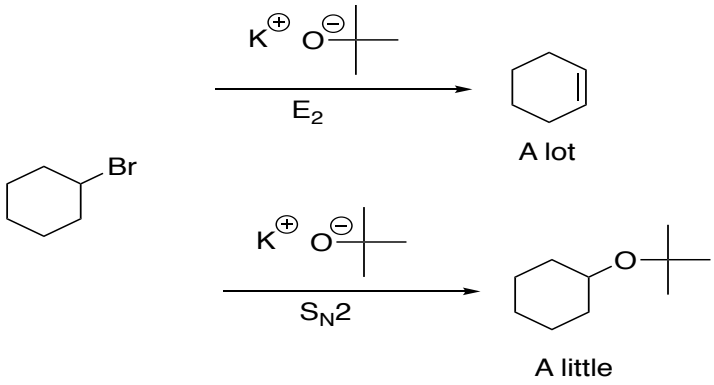
Example #3:



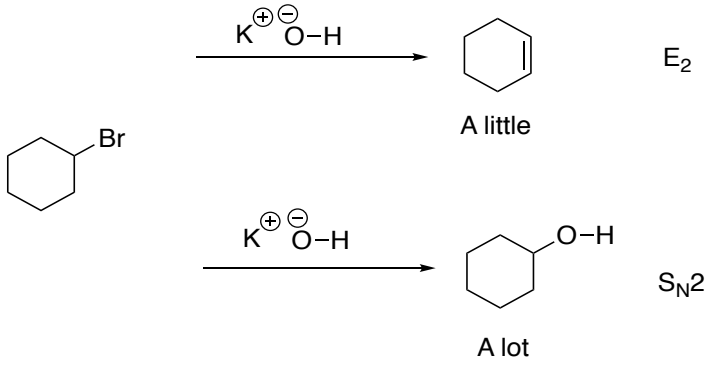


need hydrogen on adjacent carbon for loss of HBr

Example #4: bulky nucleophiles/bases favour elimination



Example #5: small nucleophiles/bases favour substitution



Bredt Rule: Bridged alkenes are only okay if one of the bridges is a "zero" (0) bridge in small rings <9

Example: