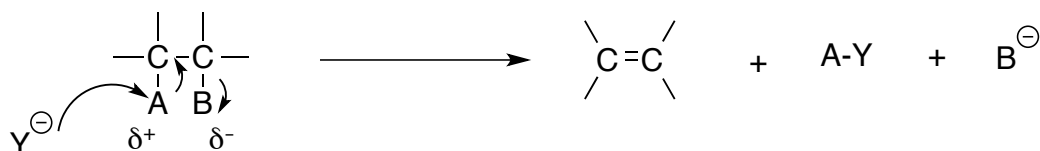
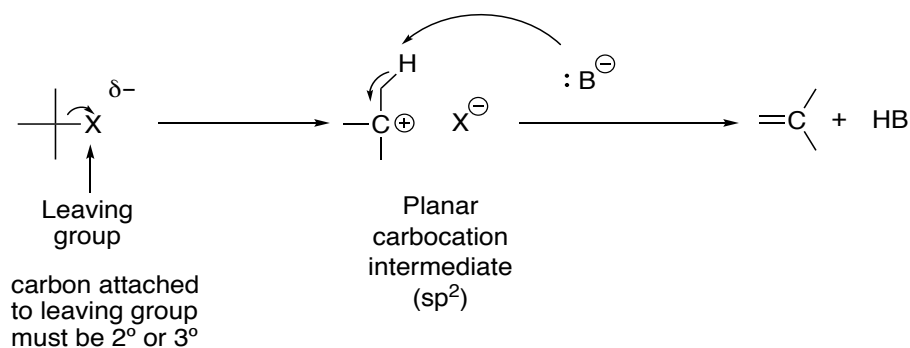


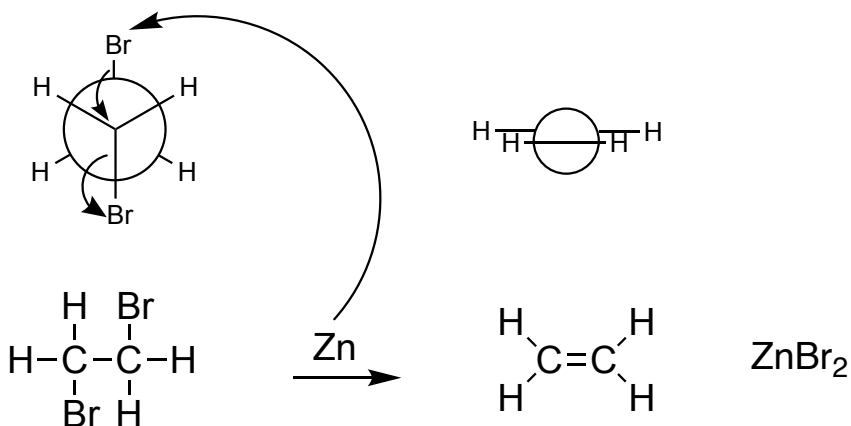
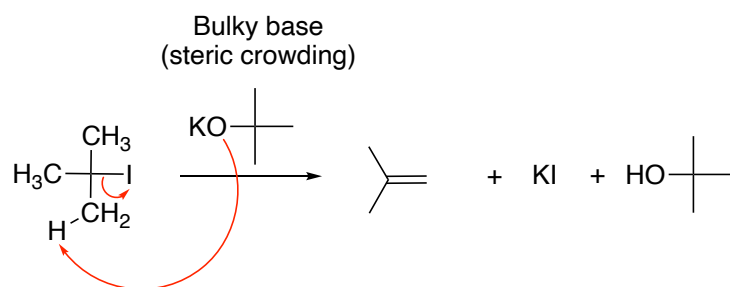
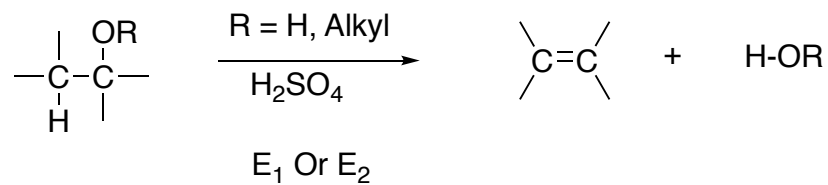
Recall:**Elimination reaction****2 Types of Mechanisms: E_1 and E_2** **E_2 Reaction** (E=Elimination):

- Rate depends on two concentrations
- Stereospecific
- Concerted (bonds being formed and broken at the same time)
 - No intermediate
- follows Zaitsev Rule: most substituted alkene will be the major product
- Anti-periplanar geometry
- 1° , 2° , 3° , but especially primary and secondary

 E_1 Reaction:

- Rate depends on one concentration
- Not concerted (carbocation intermediate)
- Not stereospecific, needs high temperatures
- Favored with leaving group being 3°

**Example:**

Dehalogenation**Example 1:****Example 2: Dehydrohalogenation****3) Dehydration**

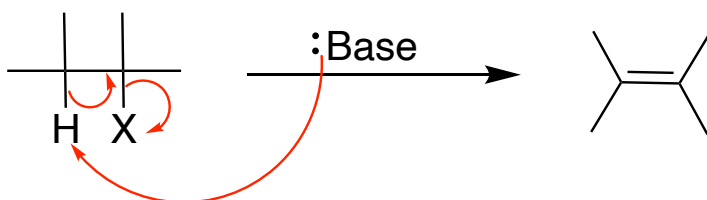
Bredt Rule: Bridged alkenes are only okay if one of the bridges is a “zero” (0) bridge in small rings < 9

Dehydration

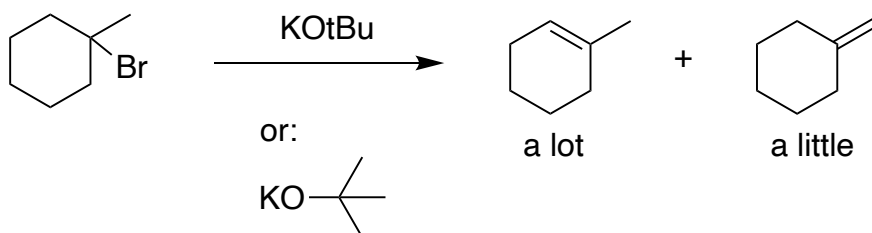
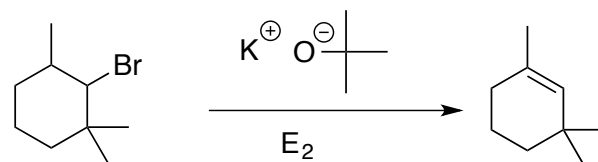
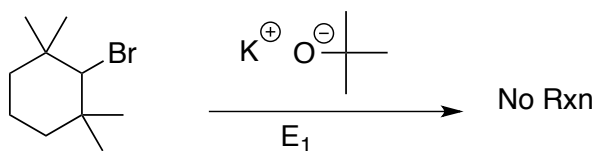
-OH and -OR are not leaving groups, but H-OH and H-OR are okay (they can leave favoured by heat or strong acid)

Dehydrohalogenation

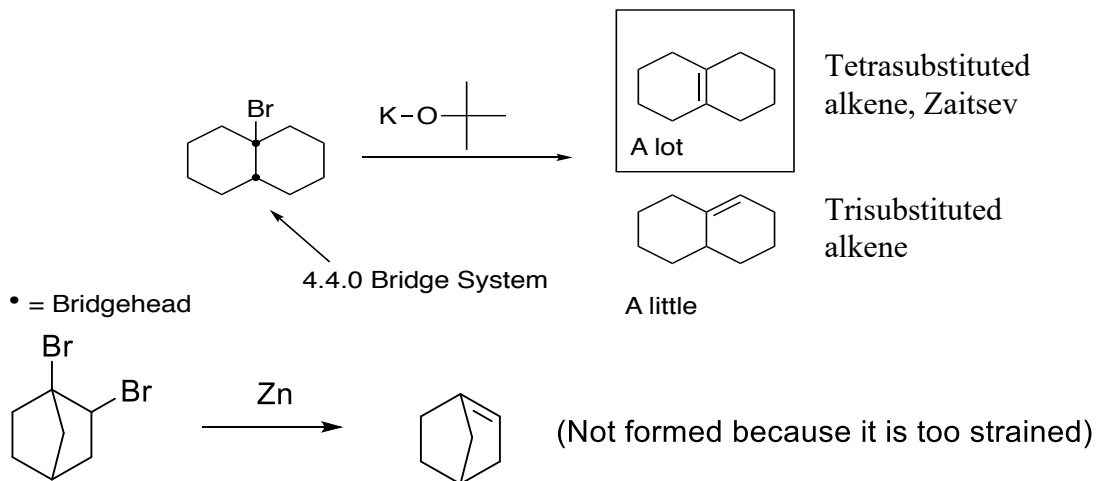
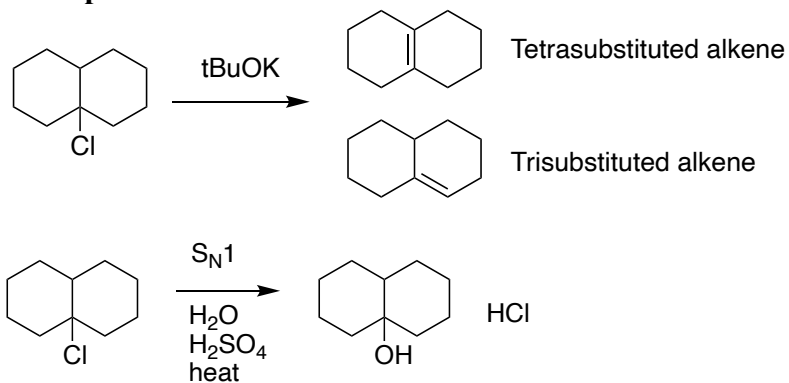
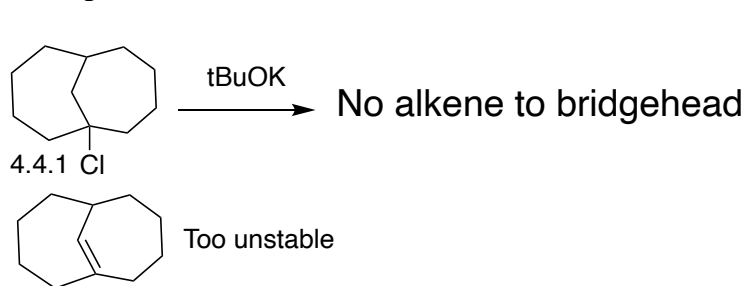
Zaitsev Rule: Get the more substituted alkene

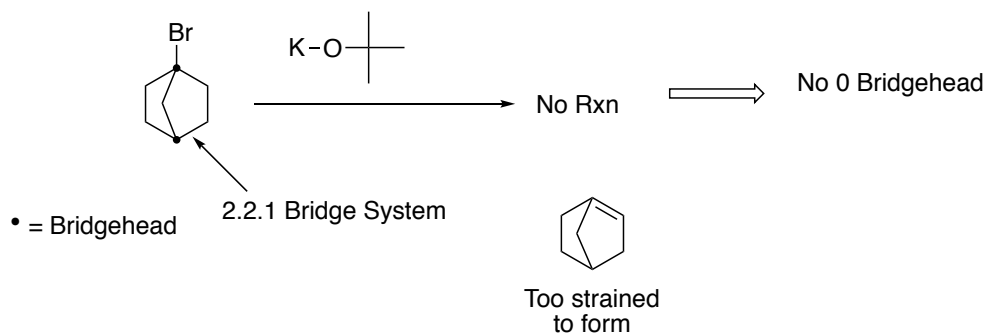
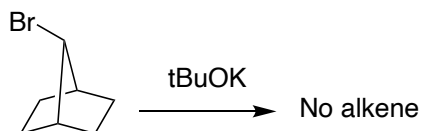


X = Cl, Br, I

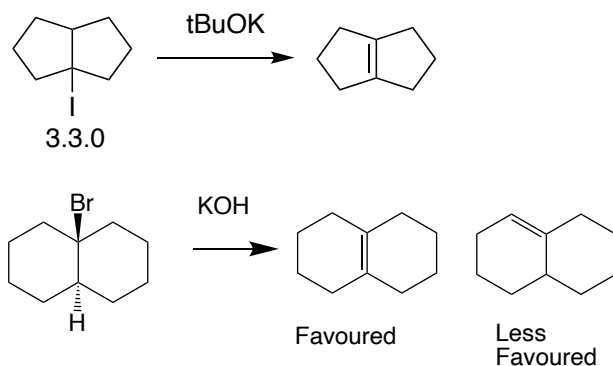
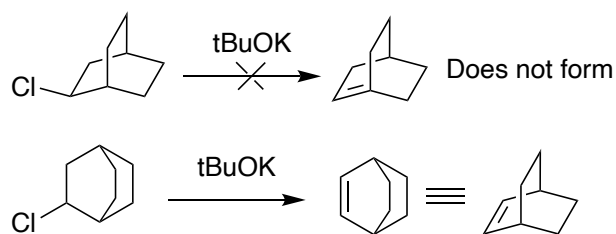
Example 1:**Example 2:**

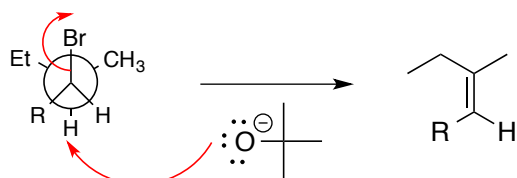
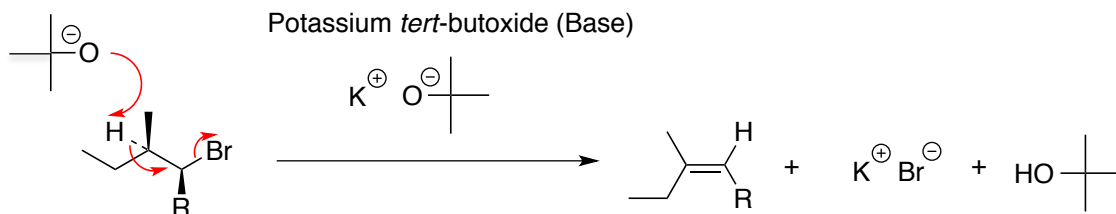
need hydrogen on adjacent carbon for loss of HBr

Example 3:**Example 4:****Example 5:**

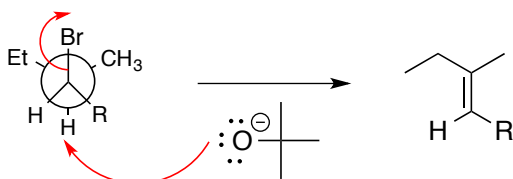
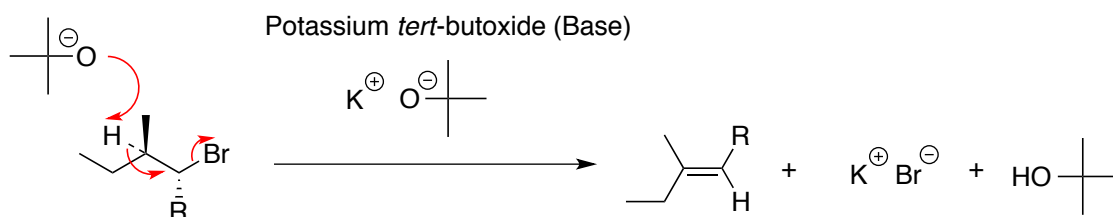
Example 6:**Example 7:**

(too unstable – will not form according to Bredt's rule)

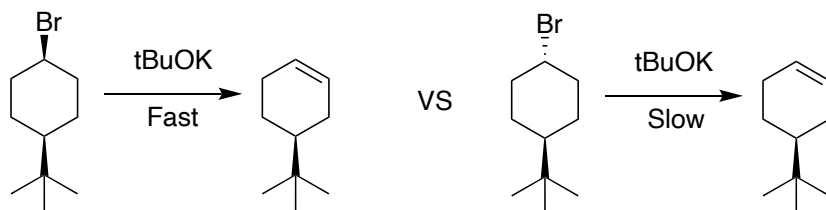
Example 8: more substituted alkene formed – works OK if a bridge is "0"**Example 9:**

Example 10 A:

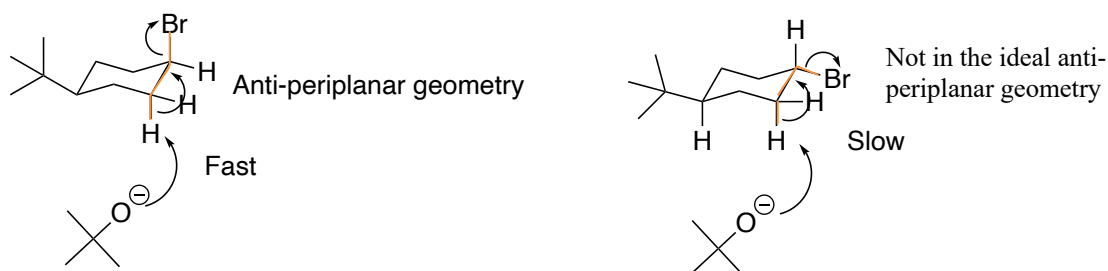
H and Br need to be in "Anti" configuration (anti-periplanar)

Example 10 B: Start with different stereochemistry get different product stereochemistry (a diastereomer)

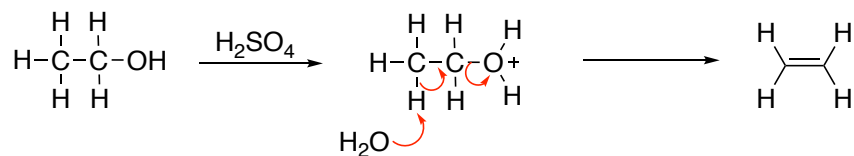
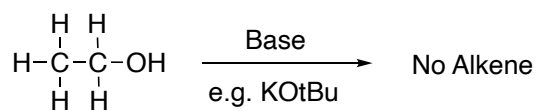
H and Br need to be in "Anti" configuration (anti-periplanar)

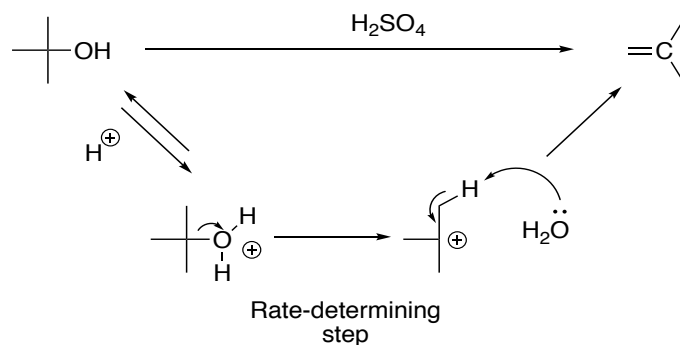
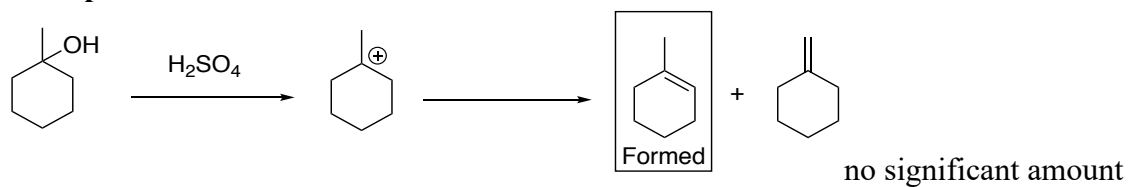
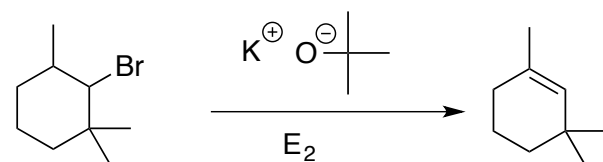
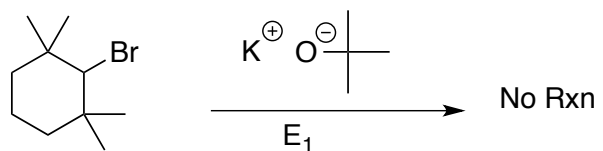
Example 11:

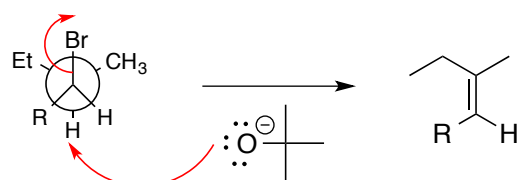
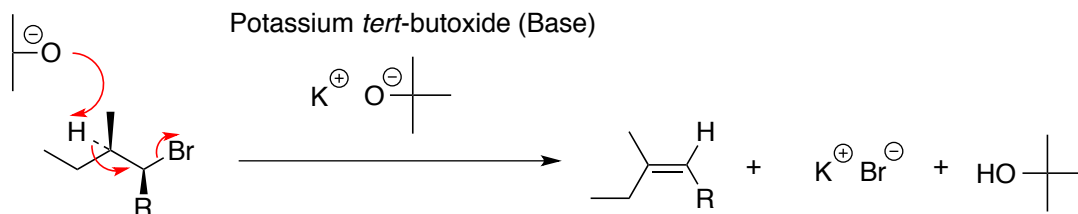
The *tert*-butyl group must be placed in the equatorial position

**Dehydration**

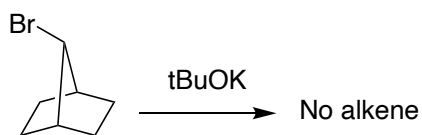
-OH and -OR are not leaving groups, but H-OH and H-OR are okay (they can leave favoured by heat or strong acid)

Example 1:

Example 2:**Example 3:****Example 4:**

Example 5:

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

Example 6:

(too unstable – will not form according to Bredt's rule)

Elimination vs Substitution**Substitution**

- Low Temp
- Weaker Base
- Dilute H^+
- Leaving group on 1° carbon
- Small Nucleophile

vs.

Elimination

- High Temp (Heat)
- Stronger Base
- Conc. H^+
- $2^\circ, 3^\circ$
- Large Nucleophile

Note: HO-H, HOR are leaving groups but requires strong acid (H^+) such as H_2SO_4