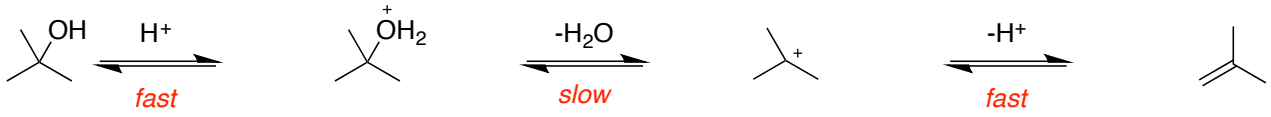
Elimination Reactions To Form Alkenes

from chapter(s) _____ in the recommended text

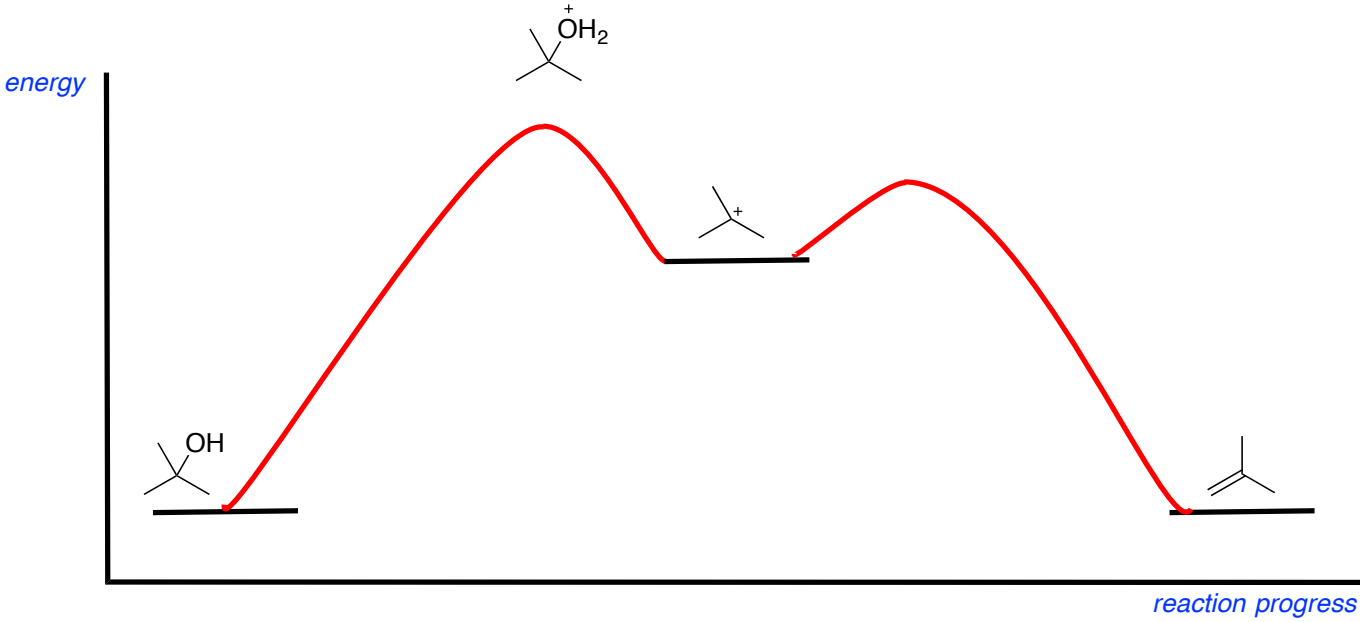
A. Introduction

.

B. E1 Mechanisms



protonated intermediate *carbocation intermediate* *alkene product*



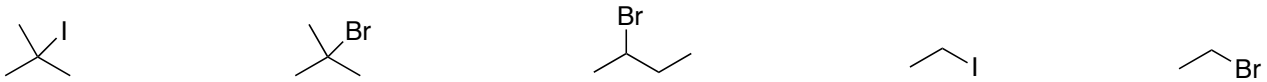
Kinetics

rate is proportional to [^{t}BuOH] rate = k [^{t}BuOH]

Carbocation Stability

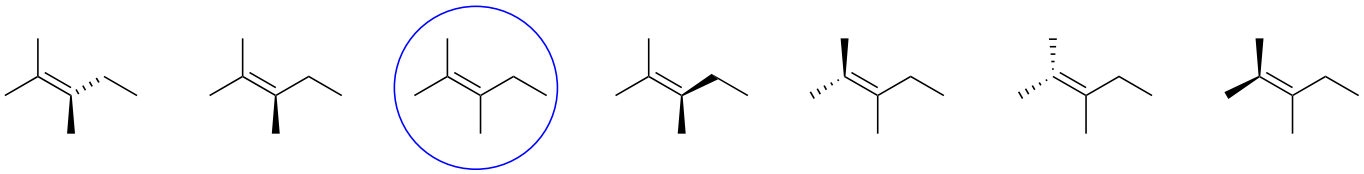
Rates of E1 reactions tend to *increase*

most stable *least stable*



fastest *slowest*

Bredt's Rule



sp^3 so it has ideal dihedral angles of about *109*

the same

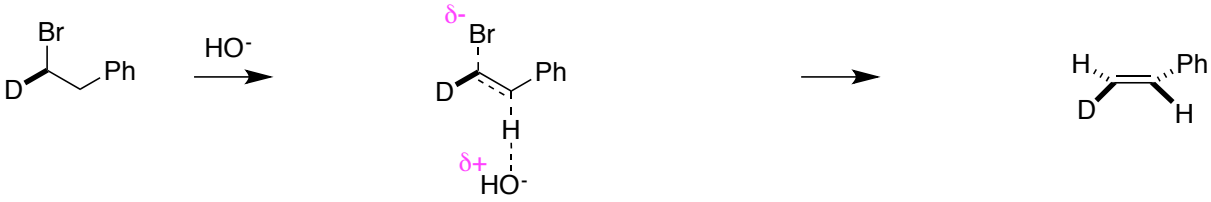
more

is not

adamantane *adamantane cation* *adamantene*

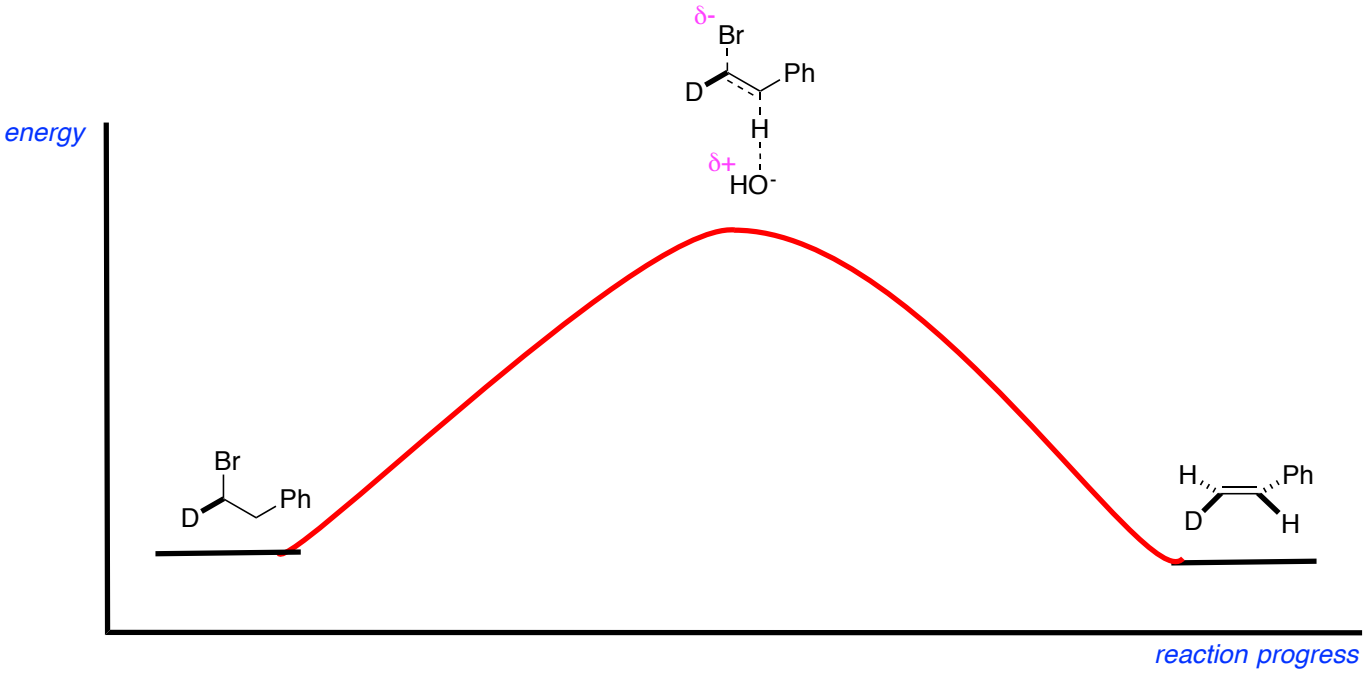
are not favorable.

C. E2 Mechanisms



transition state

product
(show stereochemistry)



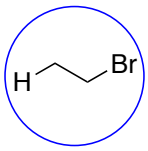
Kinetics

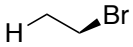
rate is proportional to [$DCHBrCH_2Ph$] [OH^-]

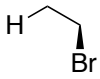
rate = k [$DCHBrCH_2Ph$] [OH^-]

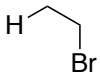
doubles

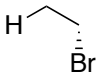
Stereoselectivity
different
perpendicular.

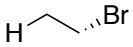




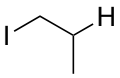




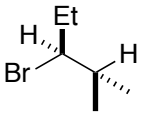




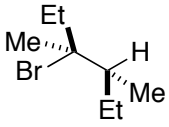
syn-periplanar EtCl



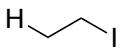
anti-periplanar 1-iodopropane



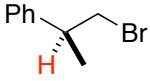
anti-periplanar $EtBrHCCHMe_2$



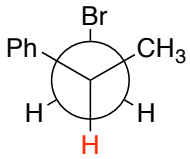
anti-periplanar EtMeHCCBrMeEt



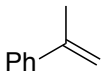
anti-periplanar ethyl iodide



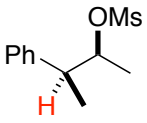
..... can be represented as



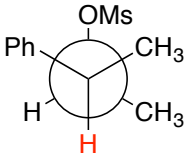
complete Newman projection

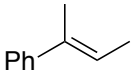


show alkene product



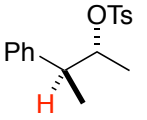
..... can be represented as



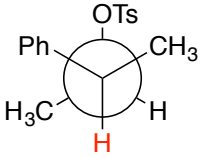


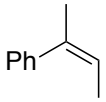
complete Newman projection

show alkene product



..... can be represented as

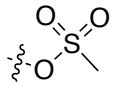




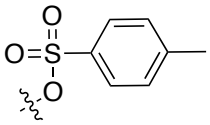
complete Newman projection

show alkene product

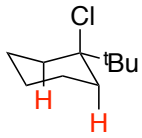
Show structures for:

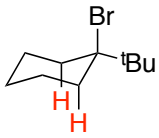


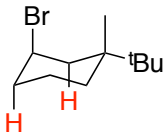
mesyl group, -OMs

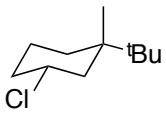


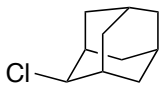
tosyl group, -OTs

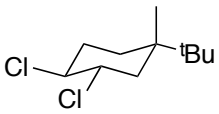


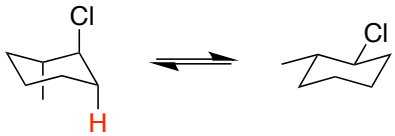


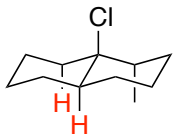


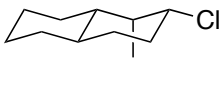


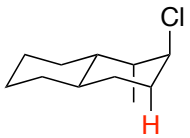


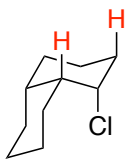


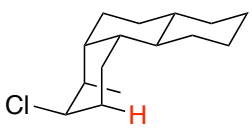


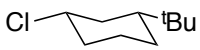


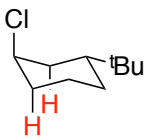


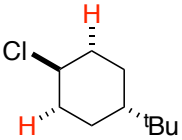




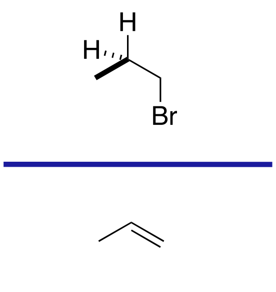


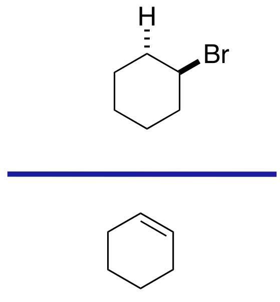


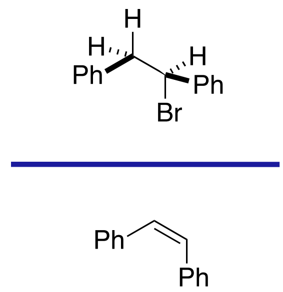


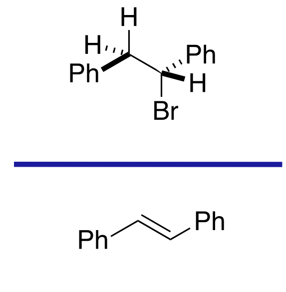


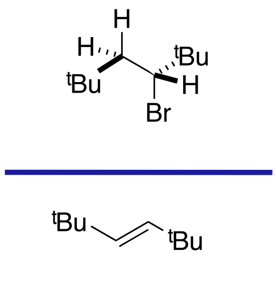
anti-periplanar.

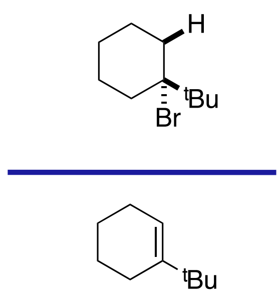


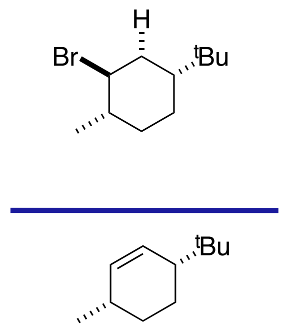


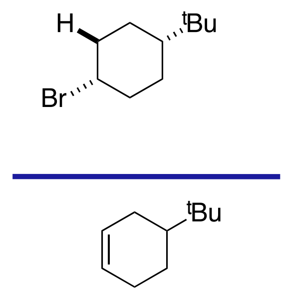


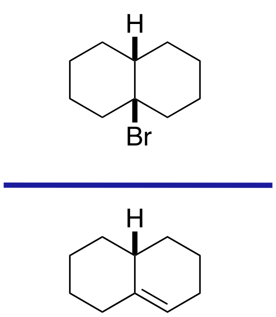


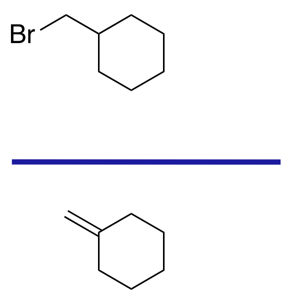


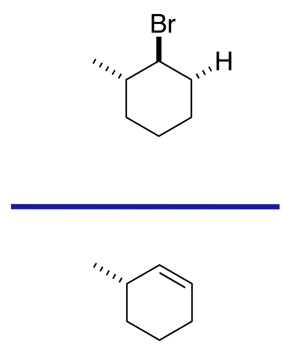


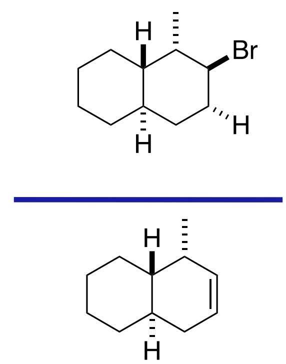


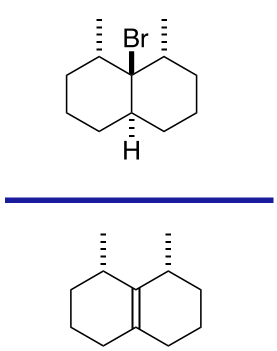


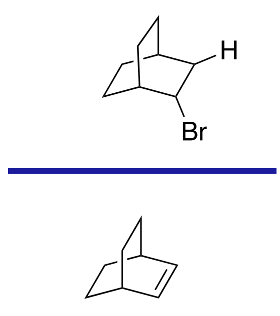


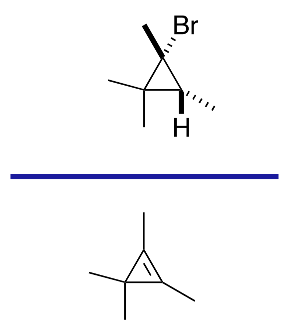


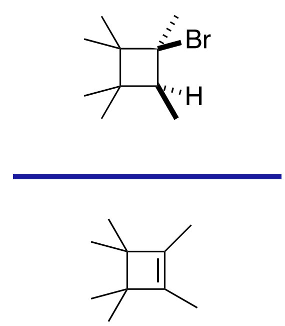












D. Factors That Favor E1, E2, S_N1, or S_N2

Basicity *vs* Nucleophilicity

(i) *E2 relative to E1* reactions and it will tend to favor *E2*
(ii) *E2 relative to E1* *favor E1*
(iii) *will not* *will not*
(iv) *S_N2 relative to S_N1* *S_N2*

increases

Nucleophilicity

(i) *S_N1* relative to *S_N2* reactions; and,
(ii) *E1* over *E2*

(i) *S_N2* relative to *S_N1* reactions;
(ii) *E2* over *E1* reactions.

CN^-	N_3^-	I^-	Cl^-	MeO^-	NH_3	H_2O
most nucleophilc						*least nucleophilic*

OH^-	Cl^-	PhO^-	NH_2^-	NH_3	H_2O
most basic					*least basic*

Temperature (and Entropy)

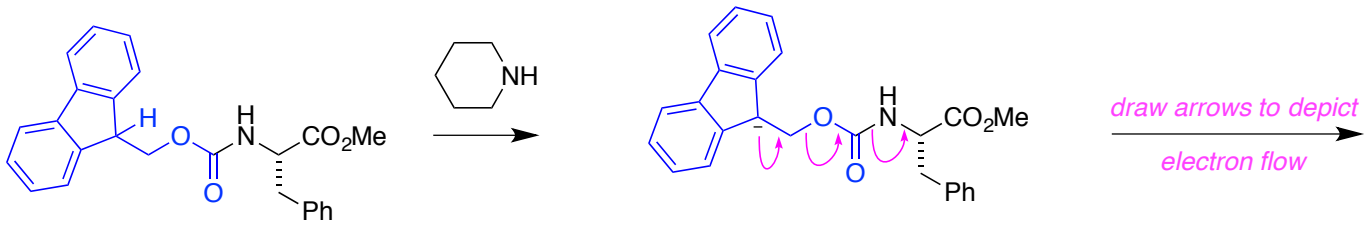
E2 and *S_N2* over *E1* and *S_N1*.

$$\Delta G^{\#} = \Delta H^{\#} - T\Delta S^{\#}$$

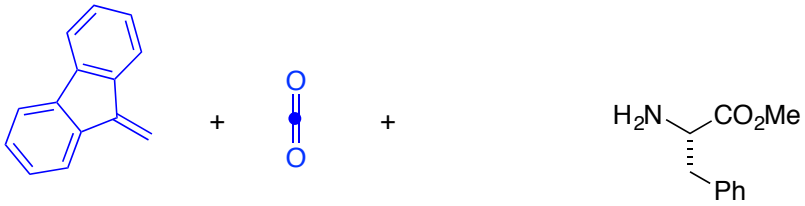
E2 and *S_N2* over *E1* and *S_N1* reactions.
E1 and *S_N1* over *E2* and *S_N2* reactions.

E. E1cB

FMOC
carbamates.



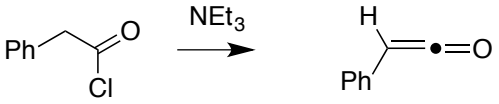
anionic intermediate



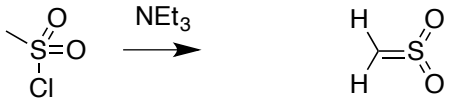
product (methyl phenylalanine)

14 πe,
aromatic.

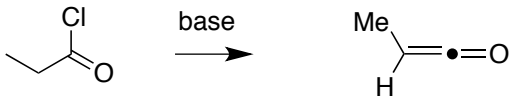
F. Eliminations To Give Allenes, Alkynes, Ketenes And Sulfenes



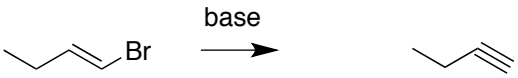
ketene



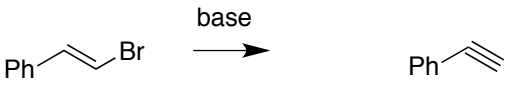
sulfene



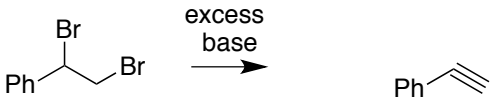
ketene



alkyne



alkyne



alkyne