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**PLEASE COMPLETE NOTES IN INK AND DO NOT STAPLE.**

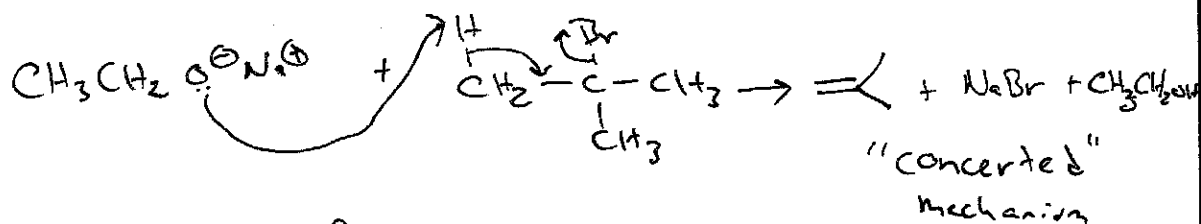
Last Lecture: - SN2 rxns - stereochemistry (backside attack)

- parameters influencing reactivity

(Substrate, nucleophile, solvent, leaving group)

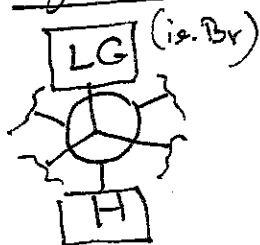
Elimination Reaction

E2 - 2<sup>nd</sup> order reaction



Stereochemistry of E2

Requirement: H and LG (-substituent) must be anti to each other



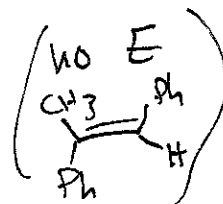
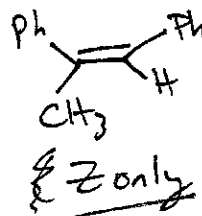
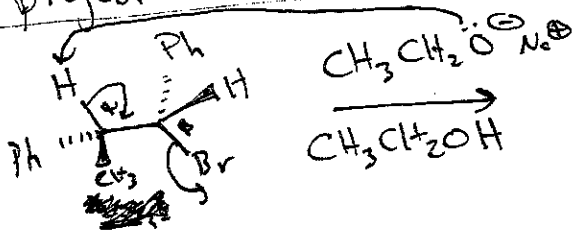
the LG is β from the site of the H abstraction

Newman projection

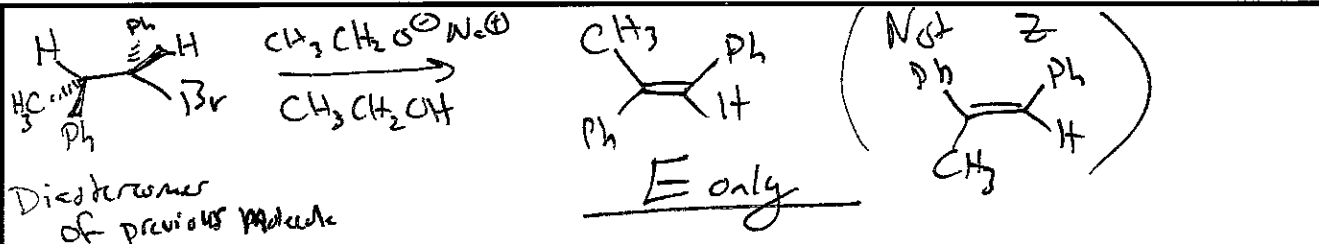
Example:

Ph = phenyl

Ph =

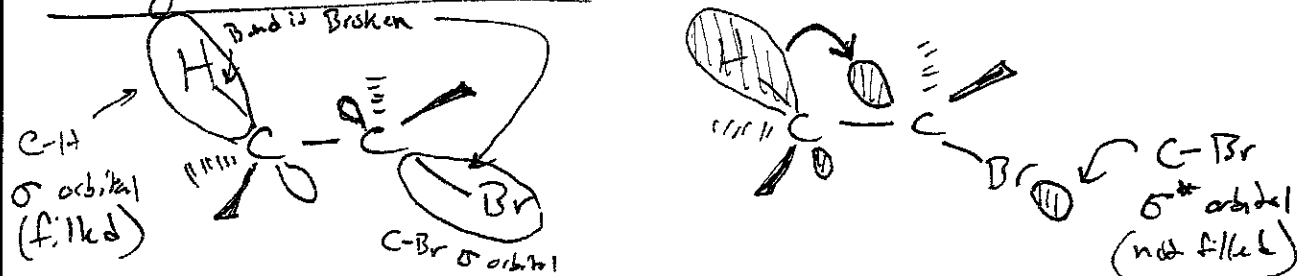


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This stereospecificity implies that H + Br must be anti - coplanar when the E2 occurs.

Looking at the M.O.



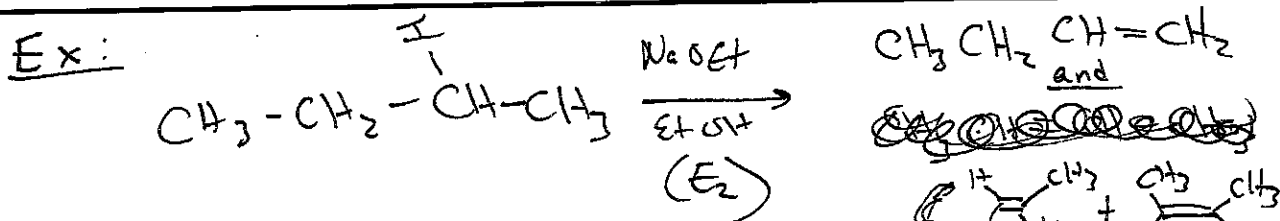
C-H  $\sigma$  bond donates  $e^-$  to  $\sigma^* \text{C-Br}$   
 this breaks the C-Br  $\sigma$  bond

This  $e^-$  flow requires a parallel orientation of the C-H  $\sigma$ -bond and the C-Br  $\sigma^*$ -bond!  
 (as occurs when they are anti-coplanar)

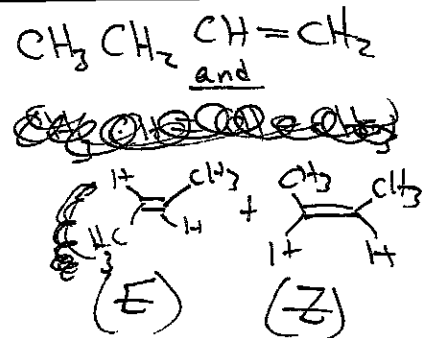
Regioselectivity

Problematic, since multiple products can be formed if multiple elimination modes are possible

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rationalize at home  
 the product formation  
 w/ molecular model



3 products

Some rxn conditions may drive these rxns to selectively favor certain products over others

E<sub>2</sub> vs S<sub>N</sub>2 - often competing pathways, because species that act as nucleophiles can also act as bronsted bases (and vice versa)

3 Probabilities

S<sub>N</sub>2 predominant

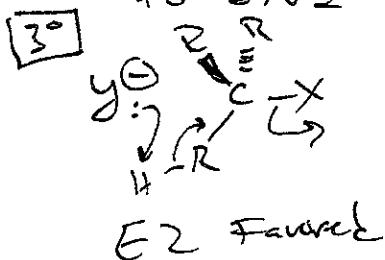
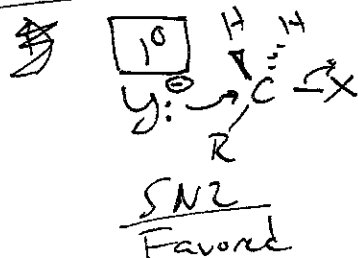
E<sub>2</sub> "

Both pathways occur

Considerations for selectivity

1) Alkyl halide structure

-more alkyl substituents of C bearing the L.G. favors E<sub>2</sub> relative to S<sub>N</sub>2



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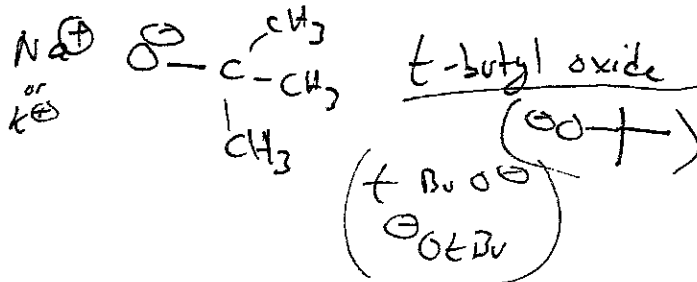
2° halides → often observe mixtures → both pathways

2.) Structure of the nucleophile/base is also important

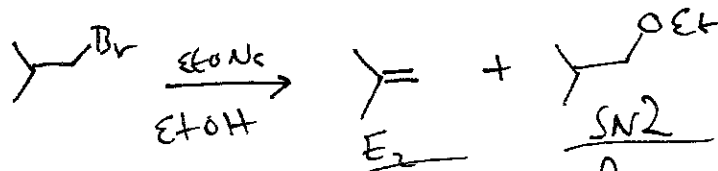
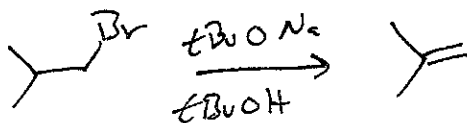
Steric bulk favors E2 over SN2

if you want elimination to occur, use a bulky base

Common example:



Example:



3.) Weak basic nucleophiles will favor SN2  
 (not basic enough to deprotonate for E2 process)



Look in text for more considerations

Course 343

Instructor Hackenberger

Day Friday

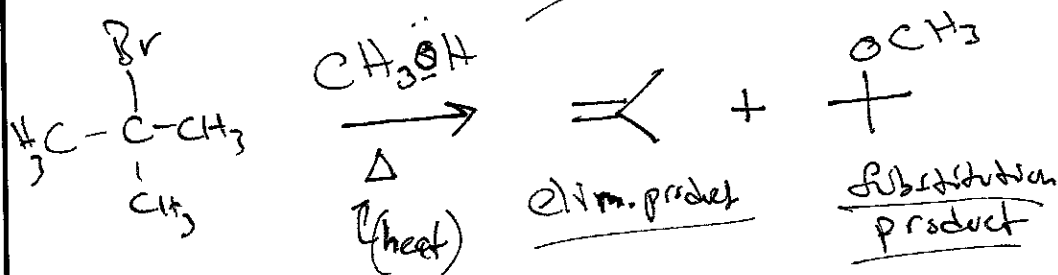
Date 11/9/13

Notes Taken By Guenette

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Alternative pathway for elimination + substitution:  
E1 + S<sub>N</sub>1



Kinetic analysis:



1<sup>st</sup> order reaction

∴ Elimination = E1 order (1<sup>st</sup> order) → elimination

Substitution = S<sub>N</sub>1 order  
↑ nucleophilic substitution

Mechanism will go by a carbocation intermediate.