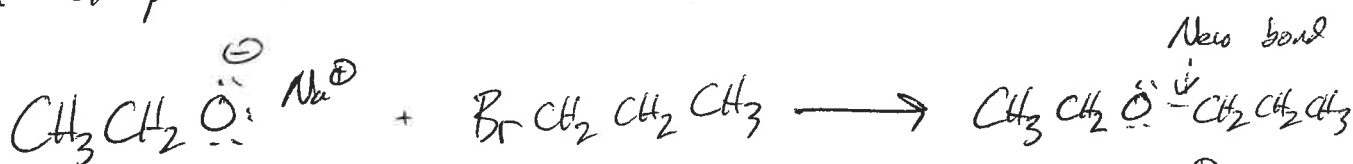


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Chapter 9: Rxns of Alkyl Halides

Major Topic = Substitution/Elimination Rxn Mainfold

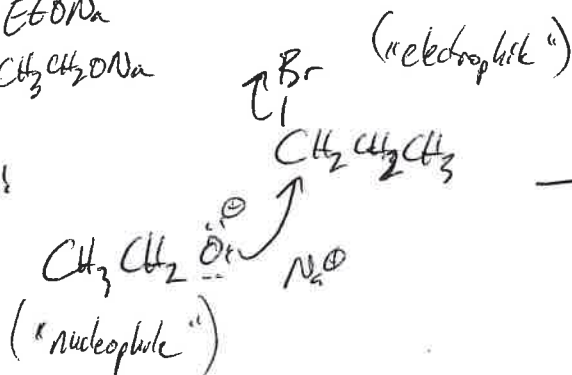
An example of "Substitution" ("Nucleophilic displacement")



"EtONa"
 $\text{CH}_3\text{CH}_2\text{ONa}$

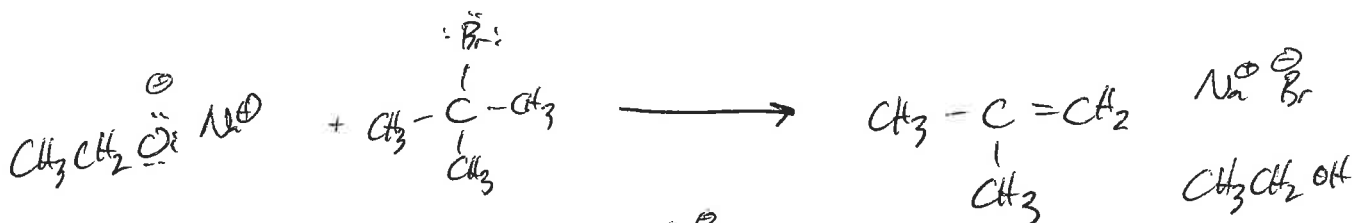
(Leaving group)
 $\text{Br}^- \text{Na}^+$

Mech:

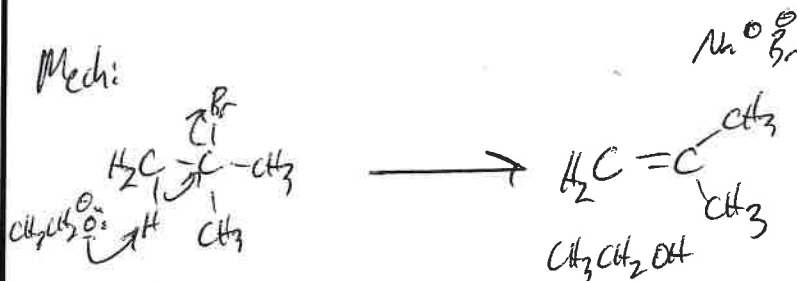


(Note: There is another substitution mech!)

Example of elimination:



Mech:



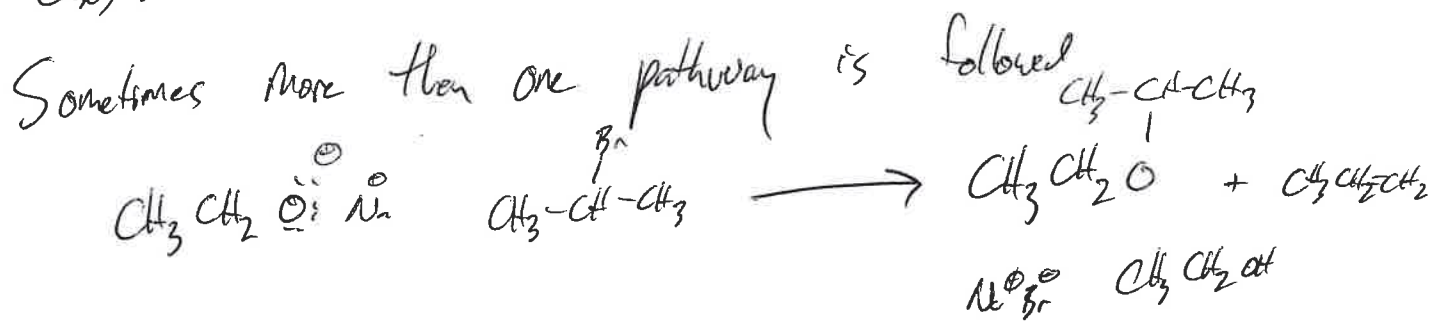
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Terminology: "β-elimination" - $\begin{matrix} & \beta & & \\ & | & & \\ \beta & -C- & C- & \beta \\ & | & & \\ & H & & \alpha \end{matrix}$

Compare these 2 rxns

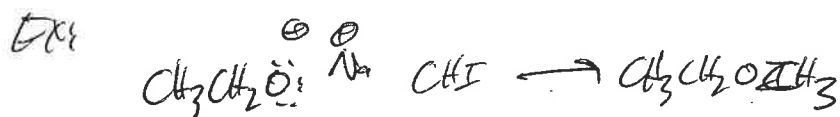
- Both involve CH_3CH_2ONa , but nucleophile vs. Brønsted base
- Both involve alkyl halides, but 1° vs. 3°

Sub/Elim manifold - complex, because multiple possibilities;
 We must learn how to predict outcomes in specific cases!



Closer look @ Substitution

(Substitution + elimination)



Thus, rxn is "second order"

Rate law: (rate constant)

→ depends on two conc. terms

$$Rate = k [CH_3I] [CH_3CH_2ONa]$$

Rxn is 1st order in alkyl halide
 is 1st order in CH_3CH_2ONa

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 Day Friday Date 10/30/15
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Designation: S_N2 Rxn
 \swarrow Substitution \searrow nucleophile
 \rightarrow 2nd order

From Rate Law, conclude that both methyl Iodide (CH_3I) and $NaOCH_2CH_3$ are involved in the rate determining transition state

This Rate Law is strong evidence for mechanism

