

## Chapter 6

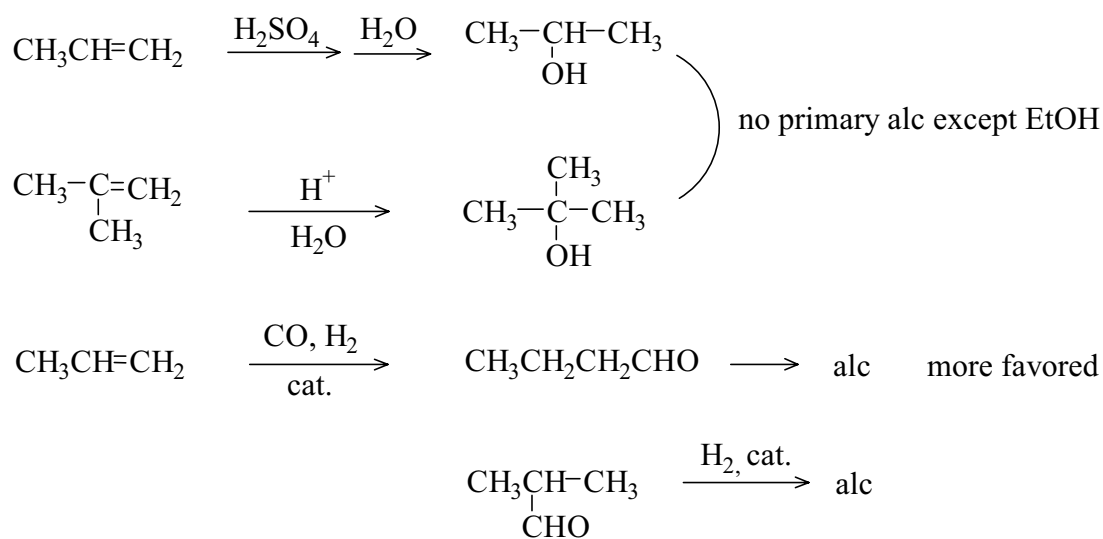
6.5 (p215)

alcohol ;  $\text{R-OH} \Rightarrow$  miscible with  $\text{H}_2\text{O}$  when R is small  
 $\uparrow$  lipophilic  $\downarrow$  hydrophilic  
 hydrogen bonding  $\Rightarrow$  abnormal high b.p.

$\text{EtO-H}$   
 $\downarrow$   
 stretching band  
 dilute soln in  $\text{CCl}_4$  ;  $3640 \text{ cm}^{-1}$   
 concn soln in  $\text{CCl}_4$  ;  $3350 \text{ cm}^{-1}$

6.6 (p218)

industrial methods for ROH

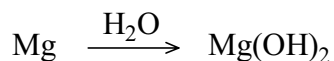


6.9 (p221)

sugar  $\xrightarrow{\text{fermentation}}$  EtOH

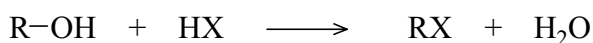
95% EtOH ; 95% EtOH + 5% $\text{H}_2\text{O}$  binary azeotrope ( $78.15^\circ$ )

100%EtOH ; 7.5% $\text{H}_2\text{O}$  + 18.5%EtOH + 74%PhH ternary azeotrope ( $64.9^\circ$ )  
 ( $78.3^\circ$ )





## 6.13 (p229)

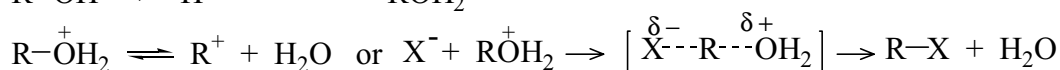


catalyzed by acid ( may require  $\text{ZnCl}_2$  or stronger acid )

rearrangement (except with  $1^\circ\text{-OH}$  )

reactivity :  $3^\circ\text{-ROH} > 2^\circ\text{-ROH} > 1^\circ\text{-ROH} < \text{MeOH}$

↓



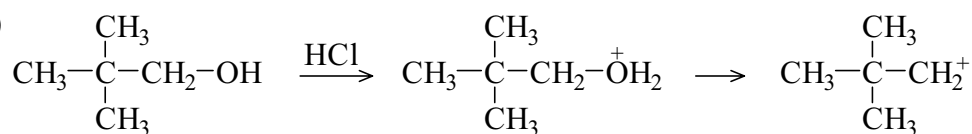
( for  $3^\circ\text{-R-OH}$  &  $2^\circ\text{-R-OH}$  )

↓

a poor leaving group ( $-\text{OH}$ ) is converted into a good leaving group ( $-\text{OH}_2^+$ ) by acid.  
nucleophilic substitution reaction ( $\text{S}_{\text{N}}1$  &  $\text{S}_{\text{N}}2$ )

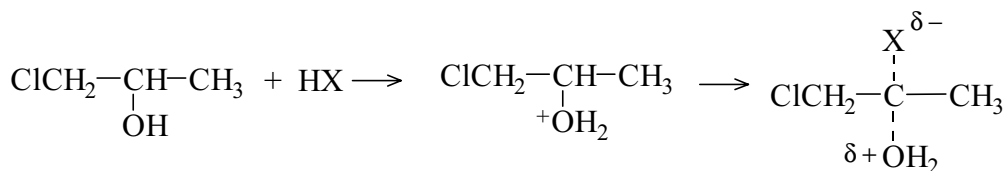
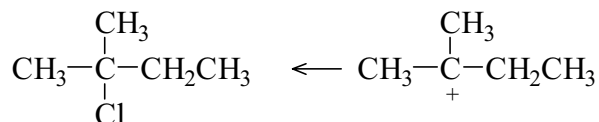
the mechanism is determined by two factors of steric hindrance and charge dispersal.

ex)



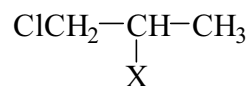
( steric hindrance does not favor  $\text{S}_{\text{N}}2$  )

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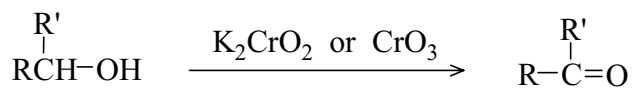
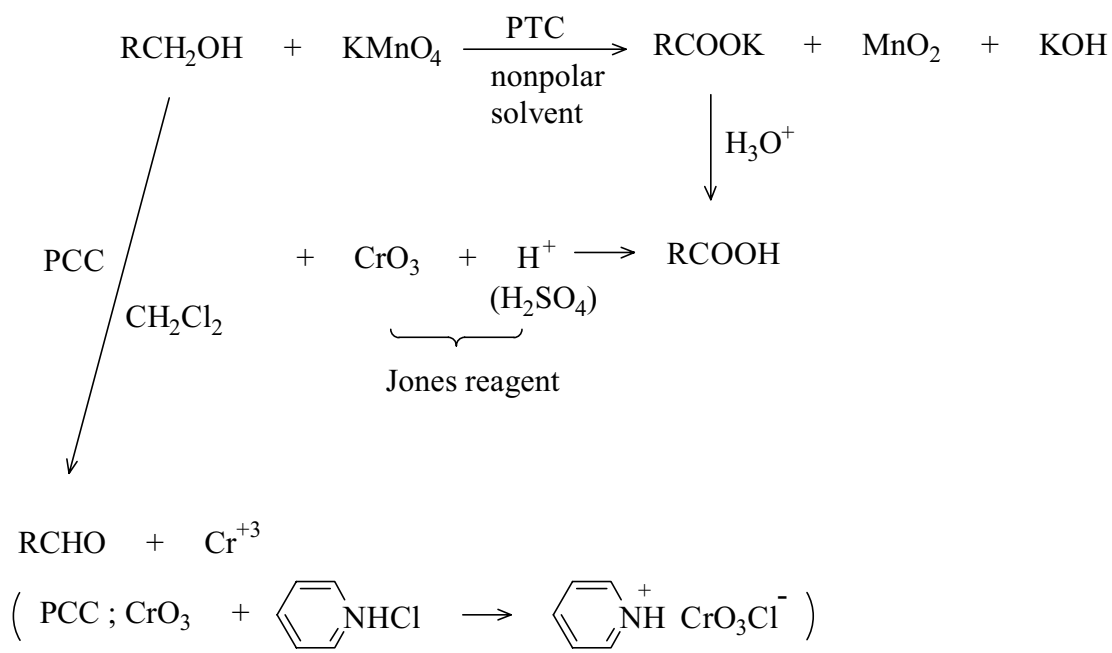


( electronic effect does not favor  $\text{S}_{\text{N}}1$  )

↓







ether ; R-O-R' , Ar-O-Ar' , R-O-Ar

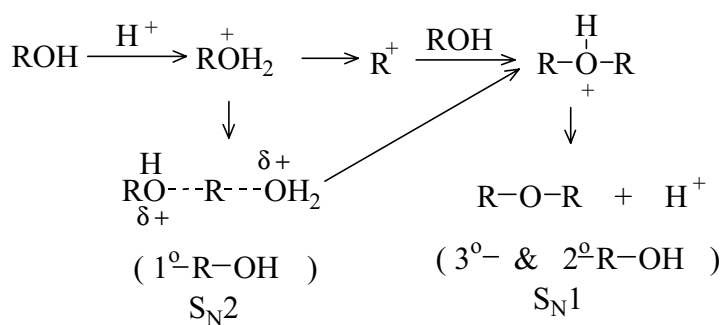
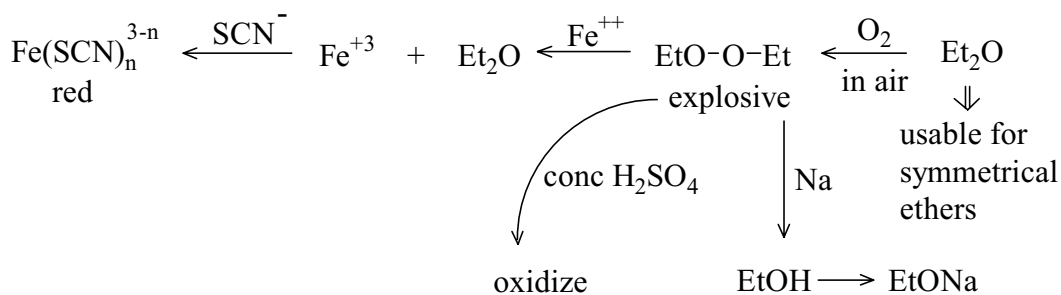
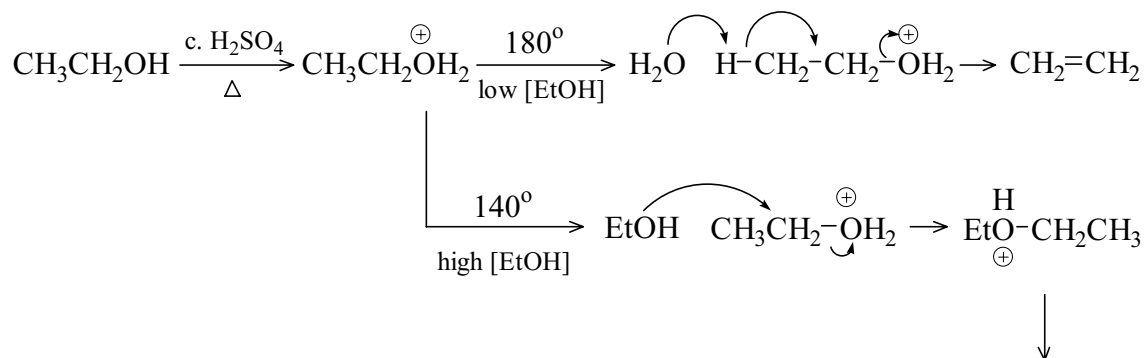
< symmetrical  
 < unsymmetrical

EtOEt      Et-O-Bu<sup>t</sup>      Me-O-Ph  
 diethyl ether    ethyl t-butyl ether    methyl phenyl ether (anisole)

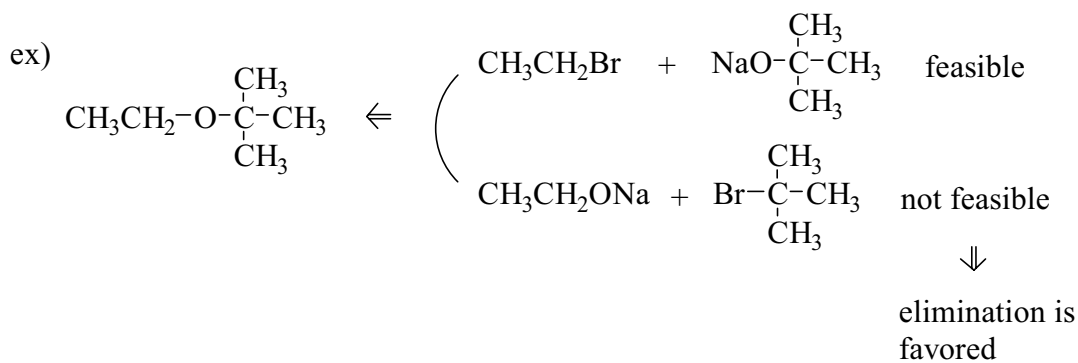
HOCH<sub>2</sub>CH<sub>2</sub>OCH<sub>2</sub>CH<sub>3</sub>  
 2-ethoxyethanol

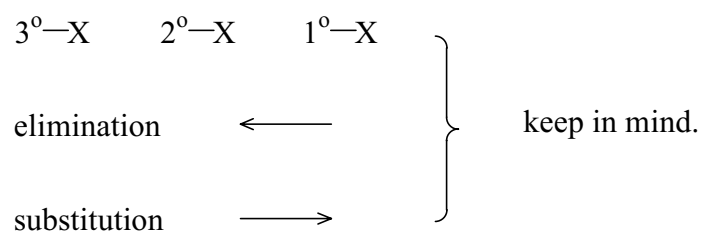
$\begin{array}{c} \text{R} \\ \diagdown \\ \text{O} \\ \diagup \\ \text{R}' \end{array}$ 
 $\longrightarrow$ 
 small  $\mu \Rightarrow$  low b.p.

$\Downarrow$   
 somewhat soluble in H<sub>2</sub>O by hydrogen bonding



$\text{R-X} + \text{NaOR}' \longrightarrow \text{R-O-R}'$  (S<sub>N</sub>2) ; Wiliamson synthesis





ether ; unreactive  $\Rightarrow$  can be cleaved by acids.

