Lecture 16-OCSP 2020

Today’s Agenda

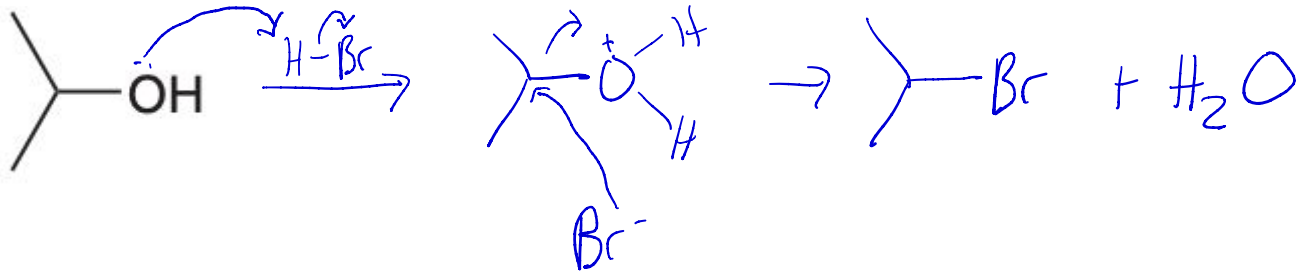
- SN2 and E1 reactions with alcohols
  - Making alcohols good LGs
    - Protonate alcohol, then attack (2 methods)
    - Tosylation / Mesylation
  - E1 reaction with H_2SO_4

The problem with alcohols

- In 3570, alcohols are not considered good leaving groups → $\bar{O}H$ is unstable
- Ways to convert alcohol into a good LG
  - Method 1: protonate the -OH
  - Method 2: tosylation / mesylation

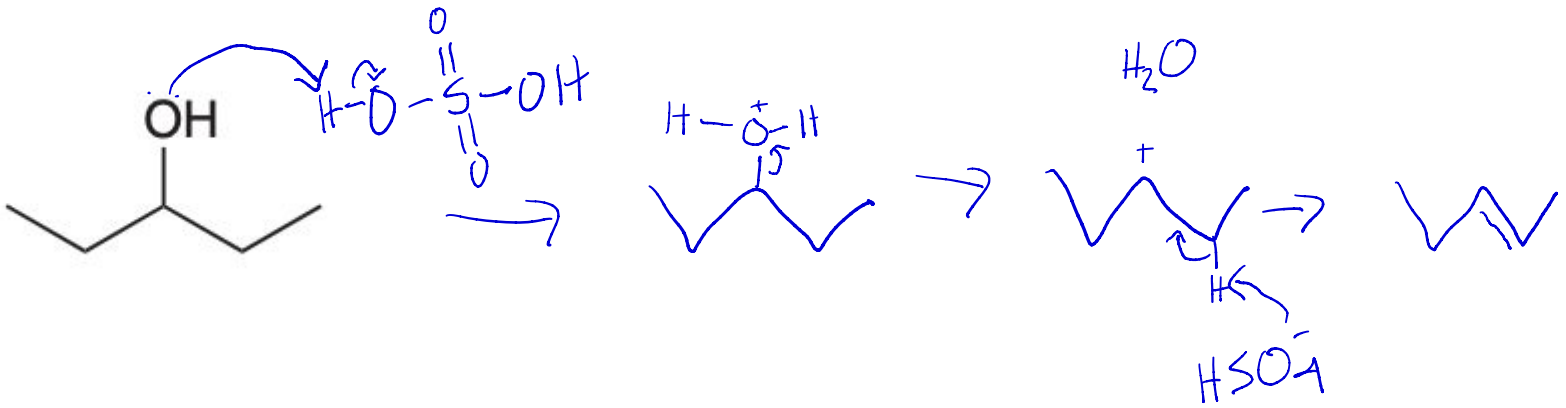
Example Rxn 1:

- SN2 reaction with an alcohol and H-X (acid) HCl, HBr

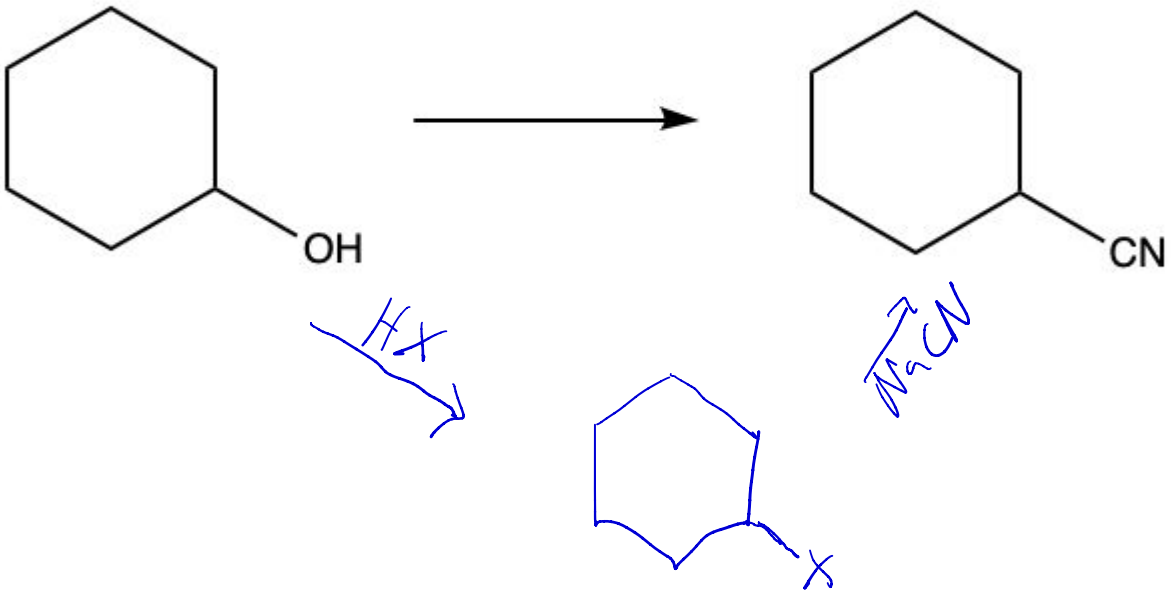


Example Rxn 2:

- E1 reaction using H_2SO_4
- Similar idea as before: protonate -OH
- Attached $+OH_2$ can leave on its own in E1 reaction



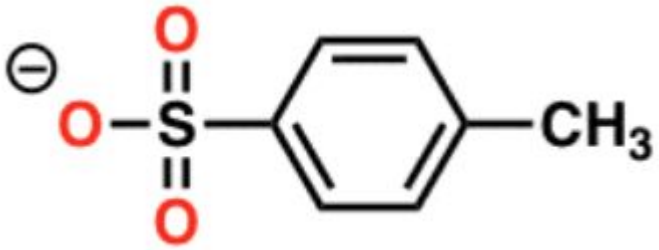
Practice Synthesis Problem:



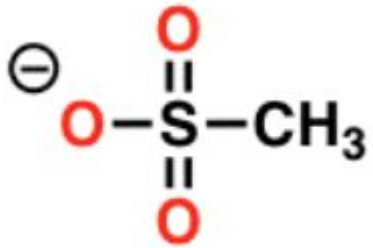
Tosylates and Mesylates

~ types of sulfonate ions :)

Tosylate (OTs)

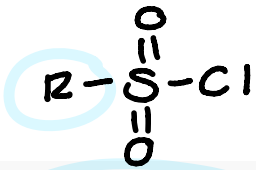


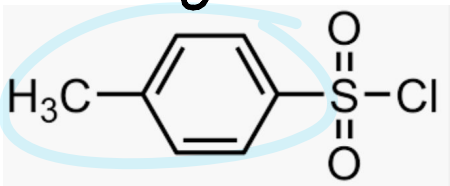
Mesylate (OMs)



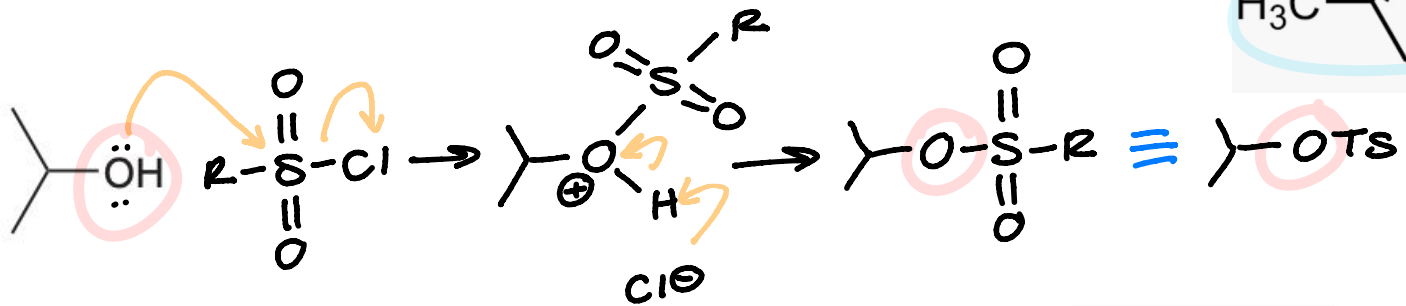
Tosylation and Mesylation

make OH into a good LG

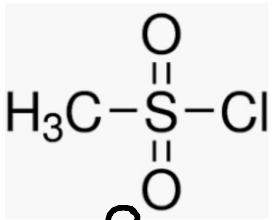


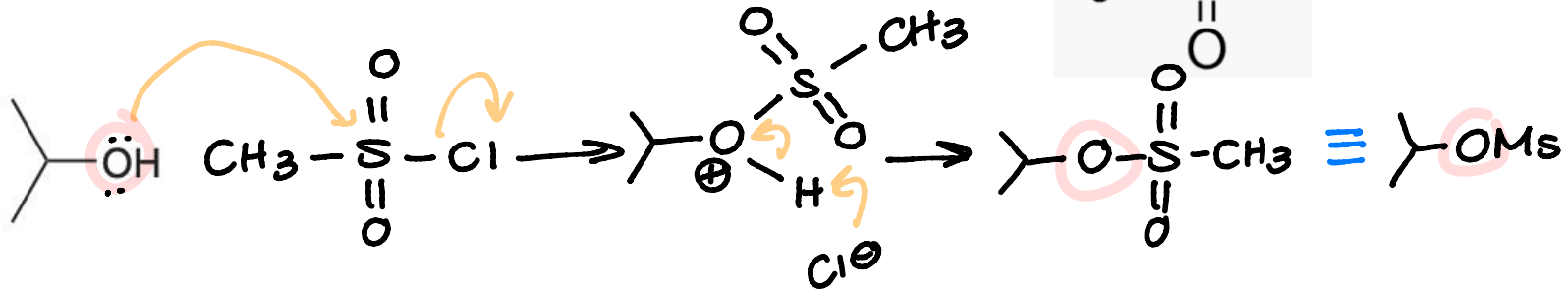


- Tosylation with tosyl chloride (TsCl) :



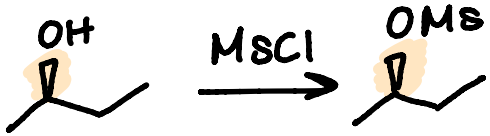
- Mesylation with mesyl chloride (MsCl):



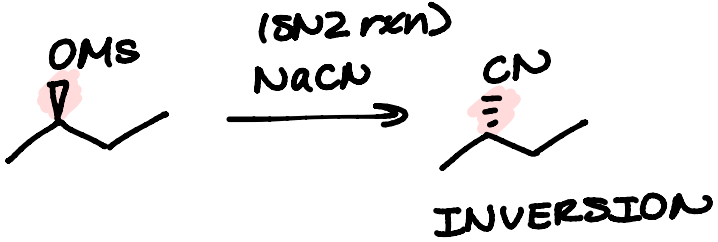


Characteristics of Tosylation and Mesylation

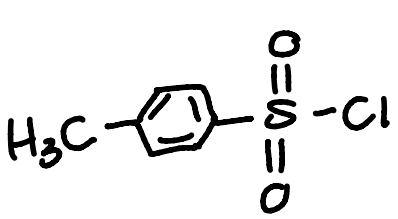
- Formation step *does not* change stereochem



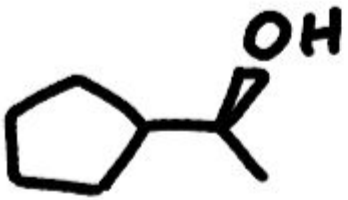
- Stereochem can *inverted* if **SN2** reaction occurs



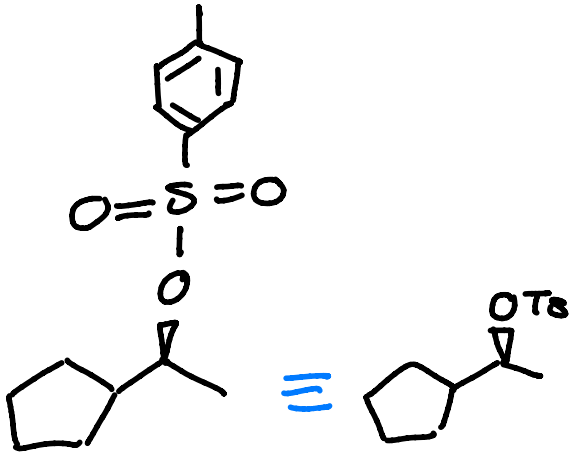
Practice #1



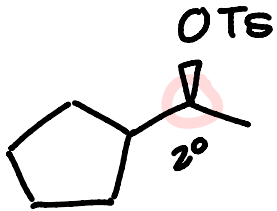
(1)



TsCl



(2)



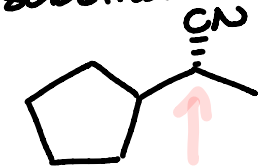
good NU ⇒ SN2

NaCN

DMF

polar aprotic

substrate: methyl, 1°, 2° ✓

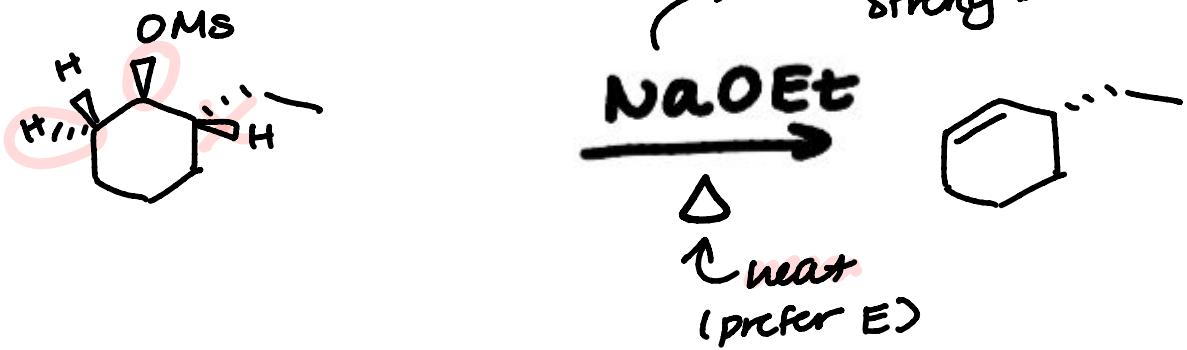


inversion!

Practice #2

(1)

(2)



Practice #3

(1)

(2)