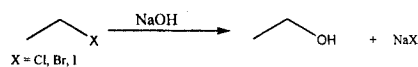
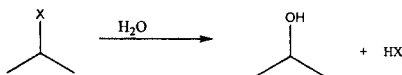
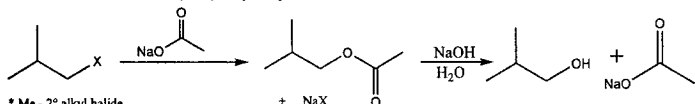
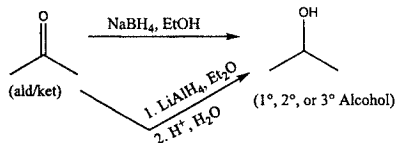
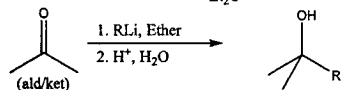
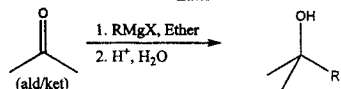
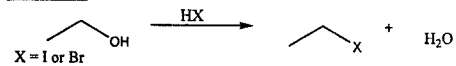


ALCOHOL SYNTHESIS: Nucleophilic SubstitutionChemistry Specialist: Alicia Hart
UC Davis - SASC**a) Me/1° unbranched alkyl halide (SN2)**

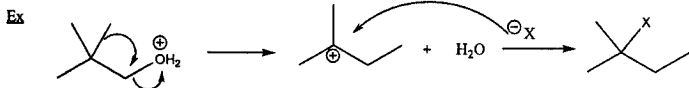
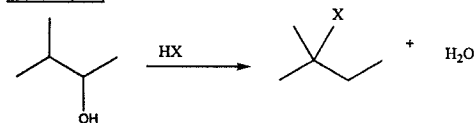
*1° branched alkyl halide would go E2 (see table)

b) 2°/3° alkyl halide (SN1)**c) Acetate Substitution (SN2) - Hydrolysis**

* Me - 2° alkyl halide

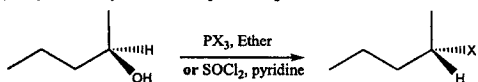
d) Reduction**e) Organometallic Reagents (add C's while making OH's)****i) Alkyl Lithium Reagent** $(\text{RX} \xrightarrow[\text{Et}_2\text{O}]{2 \text{Li}} \text{RLi} + \text{LiX})$ **ii) Grignard Reagent** $(\text{RX} \xrightarrow[\text{Ether}]{\text{Mg}} \text{RMgX})$ **RXNS OF ALCOHOLS: Part II**Chemistry Specialist: Alicia Hart
UC Davis - SASC**a) Alkyl Halide Synthesis w/ Nuc Acid**Alcohol \rightarrow Alkyl Halide**1° OH (SN2)**

*If 1° OH is highly substituted next door, do a concerted hydride shift alkyl shift.

**2°/3° OH (SN1)**

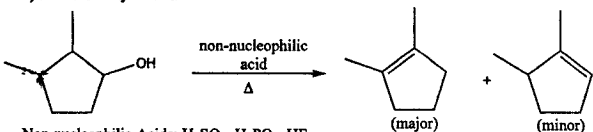
X = Cl, Br, I

*Be on the lookout for hydride/alkyl shifts.

b) Alkyl Halide Synthesis w/PX₃ or SOCl₂PX₃ = PBr₃ or PCl₃ or P, I₂, Δ

1°OH / 2° OH (SN2 - Backside Attack!)

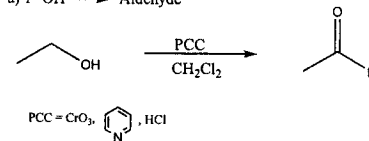
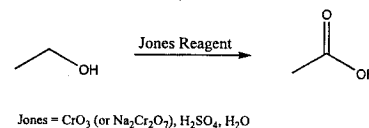
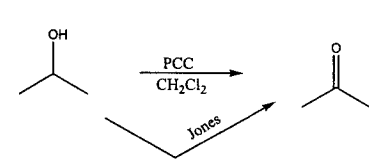
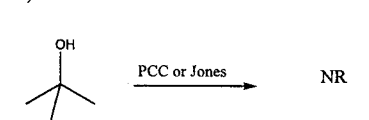
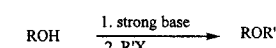
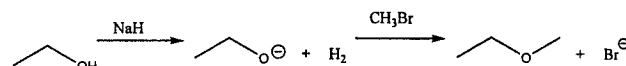
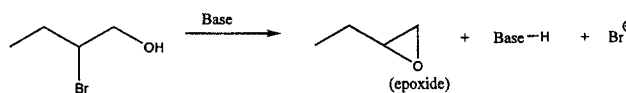
3°OH (SN1 - racemic)

c) Alcohol DehydrationNon-nucleophilic Acids: H₂SO₄, H₃PO₄, HF

1°OH (E2)

2°/3°OH (E1 - hydride/alkyl shift with carbocation formation)

More sub double bond is major.

RXNS OF ALCOHOLS - OxidationChemistry Specialist: Alicia Hart
UC Davis - SASC**a) 1° OH \rightarrow Aldehyde****b) 1° OH \rightarrow Carboxylic Acid****c) 2° OH \rightarrow Ketone****d) 3° OH \rightarrow ?****RXNS OF ALCOHOLS: Part III**Chemistry Specialist: Alicia Hart
UC Davis - SASC**RXNS OF ALCOHOLS - Part III**Chemistry Specialist: Alicia Hart
UC Davis - SASC**a) Williamson Ether Synthesis (WES)**Alcohol \rightarrow Ether**EX: Intermolecular WES***If non-bulky base, RX = Me or 1° unbranched (2°/3° goes E2)
If bulky base, RX = Me only, otherwise E2**EX: Intramolecular WES**

*Intramolecular will still work with 2° or 3° RX and ROH (won't do E2 like intermolecular).

b) Alcohol Dehydration (revisited in detail)

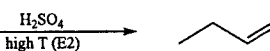
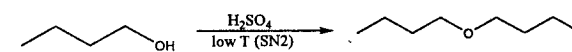
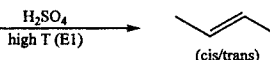
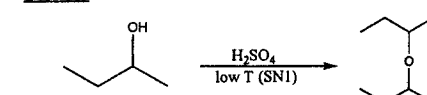
Alcohol Sub (*low T) Elim (*high T)

1° OH ↓ 130°C ↑ 180°C

* Note: exact temp is Prof dependent!

2° OH ↓ 40°C ↑ 130 - 140°C

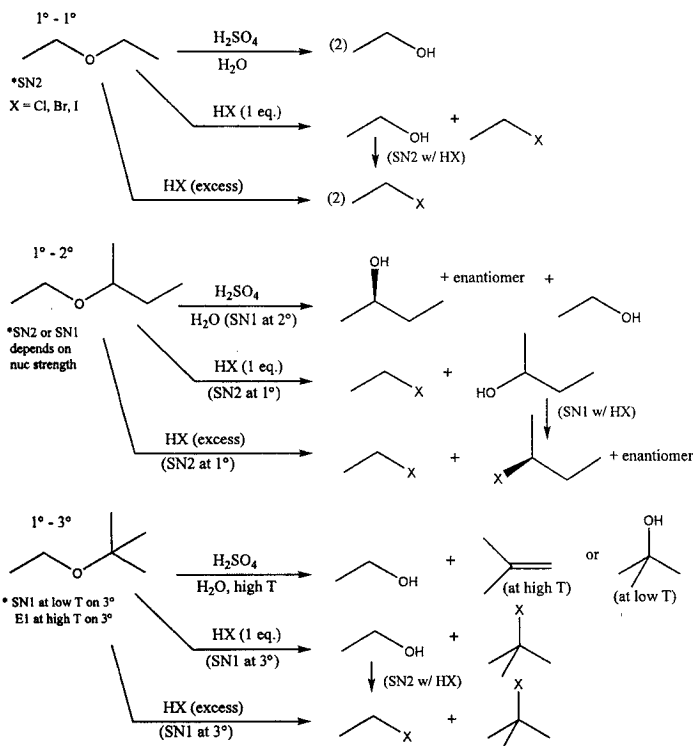
3° OH ↓ 0°C ↑ 20 - 25°C

1° OH**2°/3° OH**

RXNS OF ETHERS

Chemistry Specialist: Alicia Hart
UC Davis - SASC

Ether Cleavage

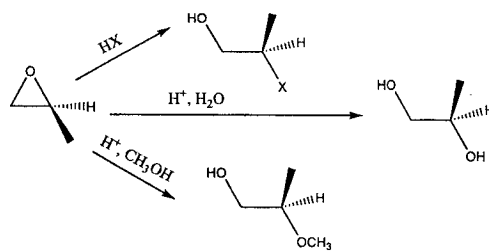


RXNS OF ETHERS

Chemistry Specialist: Alicia Hart
UC Davis - SASC

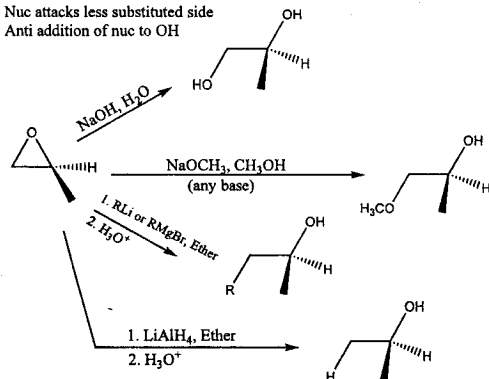
Epoxide Ring Opening - In Acid

- * Nuc attacks more substituted side (markovnikov)
- * Anti addition of nuc to OH



Epoxide Ring Opening - In Base

- * Nuc attacks less substituted side
- Anti addition of nuc to OH



* Other nucs are possible, these are just a few of the most common ring openings.