Hey guys! Hope classes are going well thus far! Exams are this week so let’s review CH. 12 and 13: Alcohols, Ethers, Epoxides, Thiols, and Sulfides and start reviewing CH. 17: Conjugated Pi Systems

In-person group tutoring sessions will take place every Thursday from 5:15 - 6:15 pm in Sid Rich Rm. 74! In these sessions I will provide practice problems and be available for specific questions. To reserve a spot, go to https://baylor.edu/tutoring. I hope to see you there!

**Key Words:** Synthesis, Alcohols, Reduction, Oxidation, Epoxides, Pericyclic Reactions

**TOPIC OF THE WEEK:** Common Reactions of Alcohols, Ethers, Epoxides, Thiols and Sulfides; Conjugated Pi Systems

These key topics are covered in CH. 12, 13 and 17, but first let’s review some important reactions involving alcohols for your upcoming test!

**HIGHLIGHT #1: REVIEW OF OXIDATION AND REDUCTION REACTIONS WITH ALCOHOLS**

Common Reduction Reagents:
- NaBH₄ = mild, only reduces ketones/ aldehydes
- LAH = strong, reduces all carboxylic acid derivatives but not alkenes
- Rainey Ni/ H₂ = very strong, reduces all carboxylic acid derivates and alkenes

Common Oxidation Reagents:
- Strong Agents oxidize a primary alcohol all the way into a carboxylic acid; this includes Na₂Cr₂O₇/ H₂SO₄, KMnO₄, and HNO₃
- Mild Agents only oxidize primary alcohols into aldehydes; this includes PCC/ CH₂Cl₂
- Both types of agents are used to oxidize secondary alcohols
Reactions of Ethers:

1. Williamson Ether Synthesis

2. Alkoxymercuration - Demercuration

3. Alcohol Dehydration - only works for symmetrical ethers

4. Acidic Cleavage
Reactions of Sulfides:

Preparing Epoxides:

2. Base Promoted cyclization of halohydrin:
Ring-Opening Reactions of Epoxides: KNOW THIS CHART!

**Conjugated pi systems:**
- Overlapping p-orbitals (dumbbell shaped)
- Conjugated pi bonds increase stability (through resonance)

Electrophilic Additions: how products are added to a carbon conjugated system-- temperature dependent!
- 1, 2- addition favored at low temperature
- 1,4- addition favored at high temperature

<table>
<thead>
<tr>
<th>Pericyclic Reactions:</th>
<th>Change in the number of sigma bonds</th>
<th>Change in the number of pi bonds</th>
<th>Illustration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cycloaddition</td>
<td>+2</td>
<td>-2</td>
<td></td>
</tr>
<tr>
<td>Electrocyclic reaction</td>
<td>+1</td>
<td>-1</td>
<td></td>
</tr>
<tr>
<td>Sigmatropic rearrangement</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
TEST YOURSELF: SYNTHESIS

1. Predicting the product when given a synthesis problem is challenging. Try to write out
what you have and what you want, and then analyze the roadmap that you need to solve.
For some, this is helpful through retrosynthesis. I found it easier to do both forward
synthesis and reverse synthesis and meet somewhere in the middle. DON’T GET
DISCOURAGED! Synthesis takes LOTS AND LOTS OF PRACTICE!

2. Doing practice problems is the only way you will be able to be comfortable with what each
reagent does, so when you’re struggling to remember what are reducing and oxidizing agents,
I would recommend reviewing that section for the respective chapter and practice, practice, practice!
ANSWERS TO SYNTHESIS PROBLEMS:

1) $\text{Na}_4 \cdot \text{O} \cdot \text{H}$

2) Propose a synthesis

3) $\text{S}_2 \text{N}_2$ flips stereochemistry!
4) 

5) 

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