



# Chem 342 • Organic Chemistry II

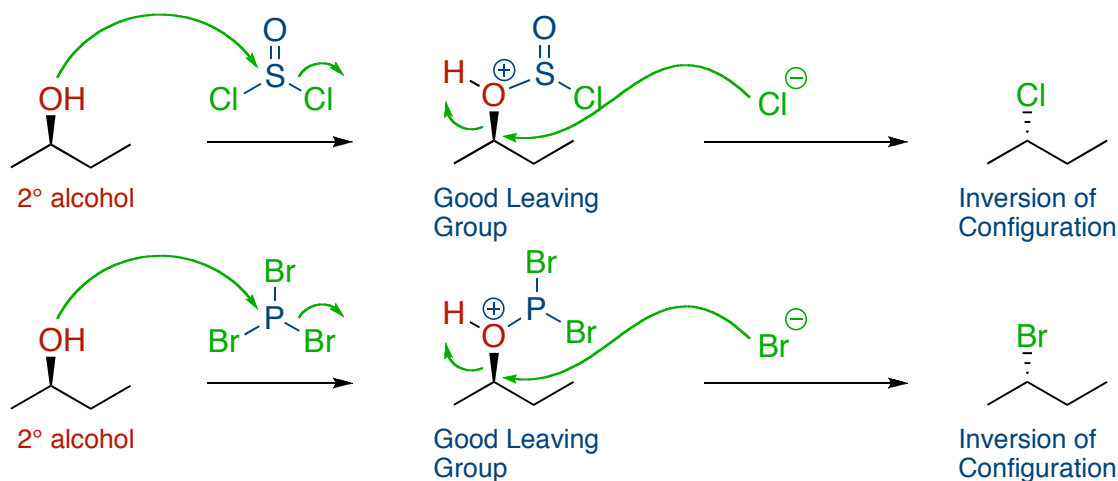
Lecture Summary 16 - 25 Feb 2009

## Chapter 17 - Alcohols and Phenols

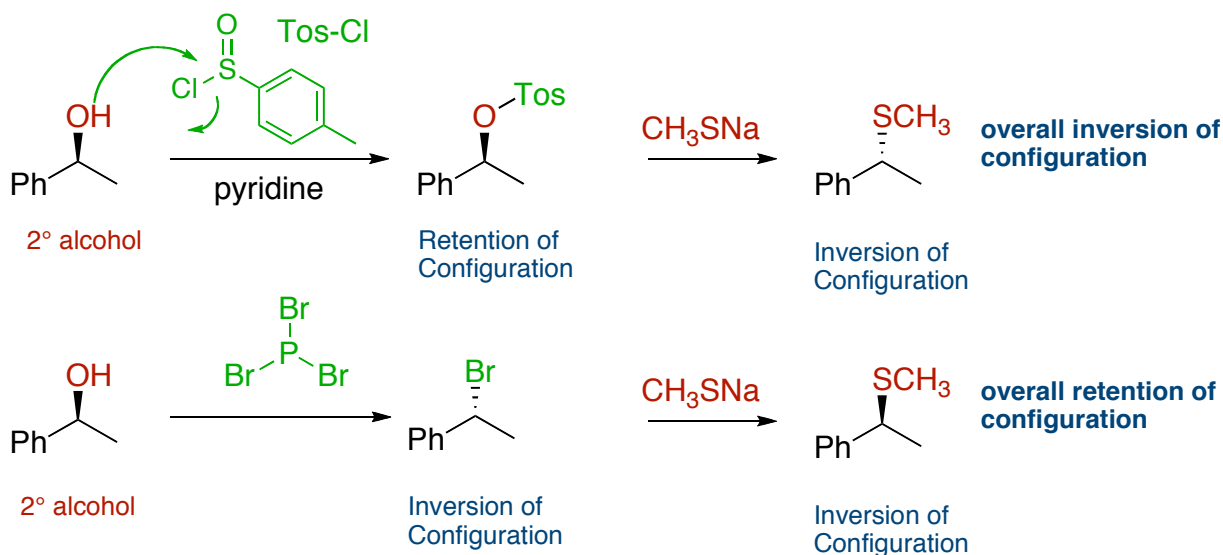
### Reactions of Alcohols

Secondary, and particularly, primary alcohols require E2 or S<sub>N</sub>2 reactions and there are several reagents that have been developed to convert alcohols into alkenes or alkyl halides.

#### Electrophile Promoted Substitution - S<sub>N</sub>2 - 1° and 2° Alcohols

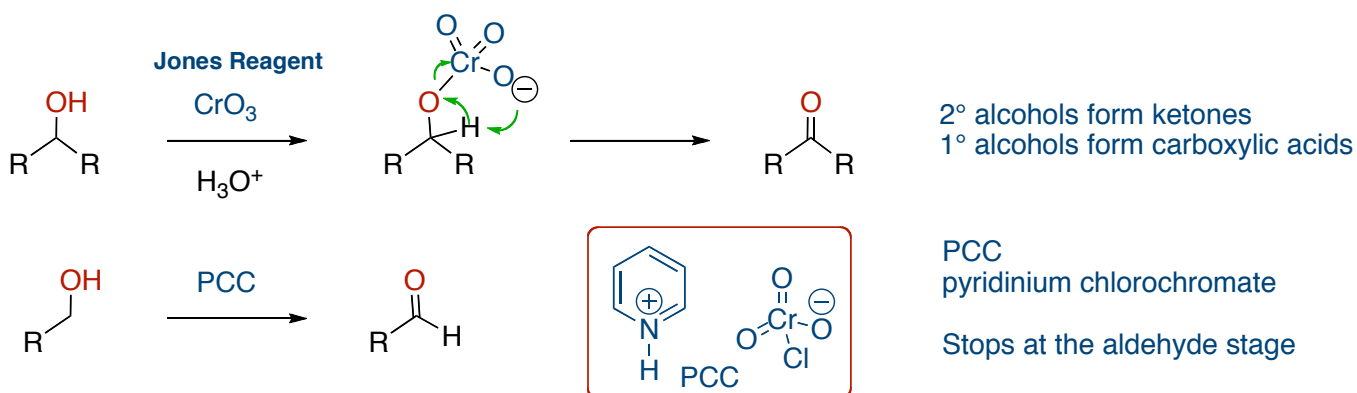
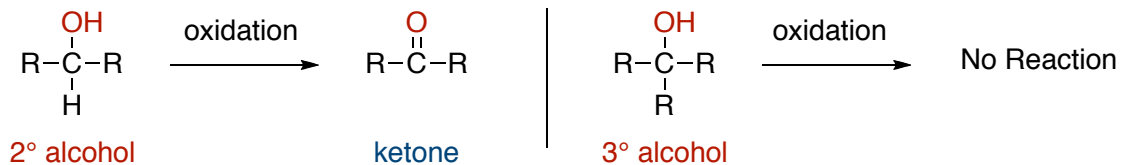
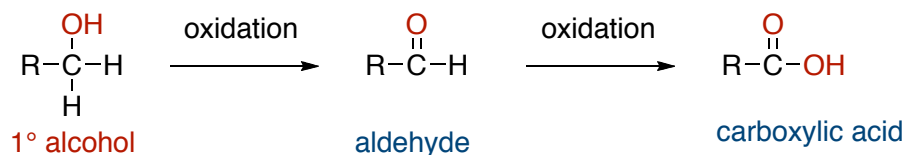


Making alkyl halides by these methods results in inversion of the configuration - thus if you do subsequent S<sub>N</sub>2 chemistry on it, the stereochemistry is inverted back to the original alcohol stereochemistry. If the other stereoisomer is desired, a tosylate derivative can be prepared from the alcohol. Making a tosylate does not change the original C-O bond so there is no change in stereochemistry in the first step.



## Reactions of Alcohols - Oxidation

Primary and Secondary alcohols can be oxidized to carbonyl compounds. Tertiary alcohols are inert to oxidation. Depending on the oxidizing agent, one can oxidize a primary alcohol to the aldehyde stage, or oxidize fully to the carboxylic acid.



## Daily Quiz

Q: Which of the following reaction conditions will carry out the following transformation?

The reaction shows the reduction of 4-acetylbenzoic acid methyl ester to 4-(1-hydroxyethyl)benzoic acid methyl ester. The starting material is a benzene ring with a methyl ketone group (-C(=O)CH<sub>3</sub>) at the para position and a methyl ester group (-COOCH<sub>3</sub>) at the other para position. The product is the same benzene ring, but the methyl ketone group has been reduced to a secondary alcohol (-CH(OH)CH<sub>3</sub>).

Options:

- 1: 1) LiAlH<sub>4</sub>  
2) H<sub>3</sub>O<sup>+</sup>
- 2: 1) CH<sub>3</sub>MgBr  
2) H<sub>3</sub>O<sup>+</sup>
- 3: 1) NaBH<sub>4</sub>  
2) H<sub>3</sub>O<sup>+</sup>
- 4: 1) NaH  
2) H<sub>3</sub>O<sup>+</sup>