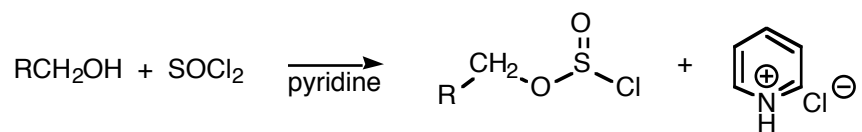


WORKSHOP, Chapter 15

Alcohol Reactions and Syntheses

1. When ethanol is added to chromic acid, $\text{CrO}_3/\text{H}_2\text{SO}_4/\text{H}_2\text{O}$, the solution changes from orange to blue-green. This reaction forms the basis of the "Breathalyzer" test used to catch drunk drivers. Write a balanced equation for the reaction.
2. When an alcohol reacts with $\text{SOCl}_2/\text{pyridine}$, the derivative shown below is formed. If the reactant alcohol is (S)-1-deuterioethanol, the product is (R)-1-deuterioethyl chloride. Clearly explain how the formation of this intermediate facilitates the conversion of the alcohol to the corresponding alkyl chloride. Explain the stereochemical change.



3. Show how to prepare each of the two compounds below using Grignard coupling reactions for the C-C bond-forming steps. All the carbons in the products must originate from benzene or alcohols having three or fewer carbon atoms. You may use any needed reagents or solvents.

