

Chapter 12: Alcohols

Today –Finish up Reactions with Alcohols

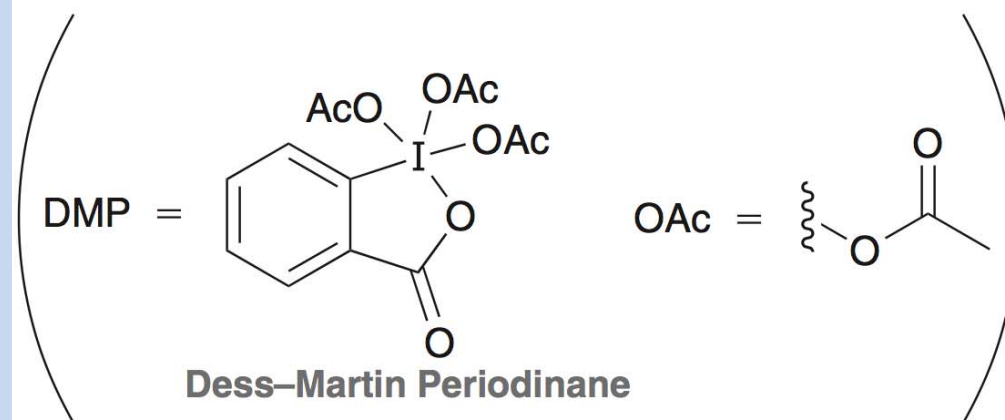
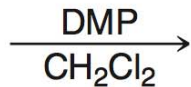
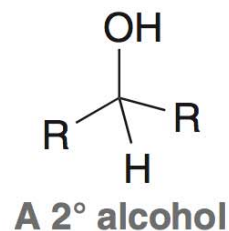
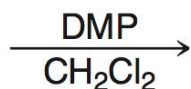
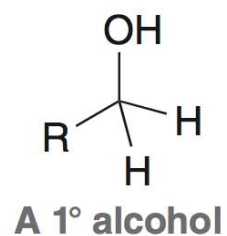
12.6 Preparation of Alcohols with Grignard

12.7 Protection of Alcohols

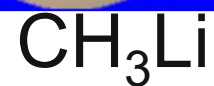
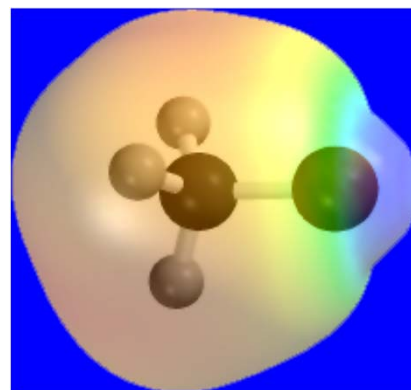
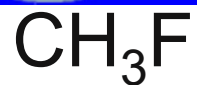
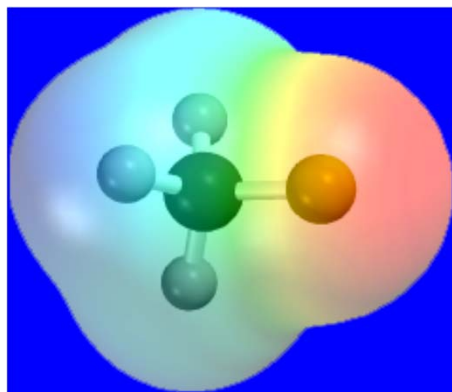
12.9 Alcohols – Substitution and Elimination

Oxidation of Alcohols

2. Dess-Martin periodane oxidation (DMP) – yields analogous results as the Swern oxidation:



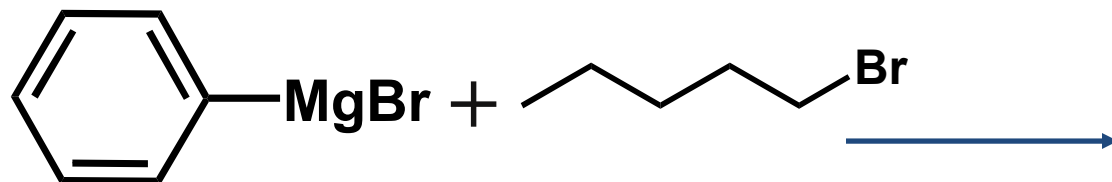
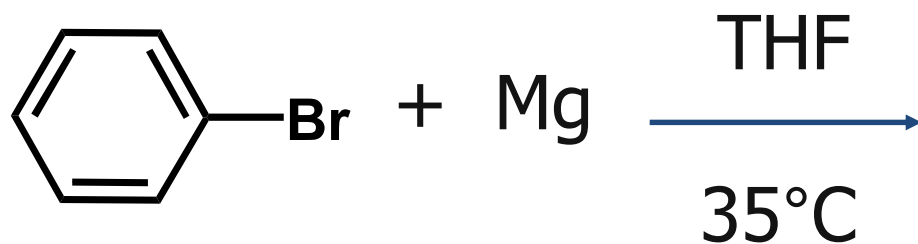
Organometallic Compounds



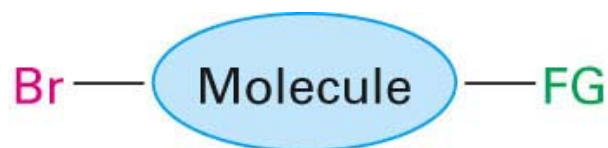
Preparation of Organomagnesium Compounds

Grignard Reagents

prepared by reaction of alkyl halides with magnesium

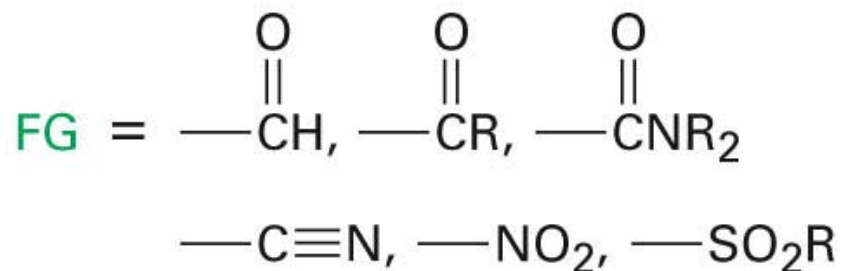


Grignard Reagents and Other Functional Groups in the Same Molecule



where $\text{FG} = \text{—OH}, \text{—NH}, \text{—SH}, \text{—CO}_2\text{H}$

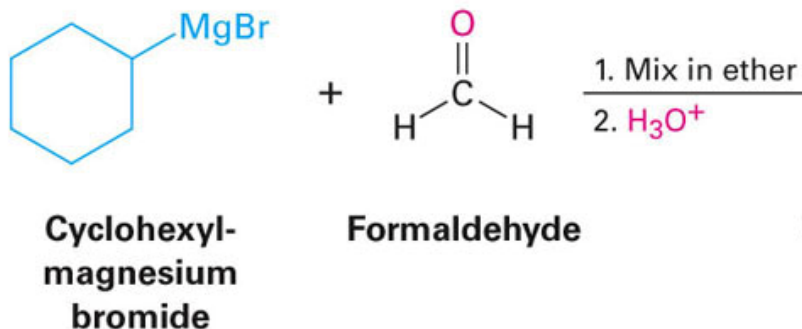
The Grignard reagent is protonated by these groups.



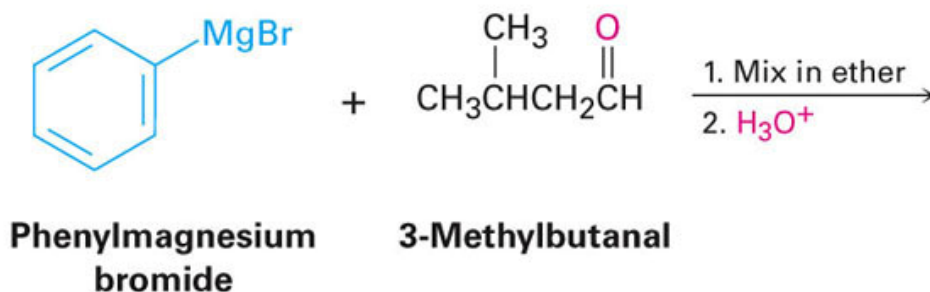
The Grignard reagent adds to these groups.

Reactions of Grignard Reagents with Carbonyl Compounds

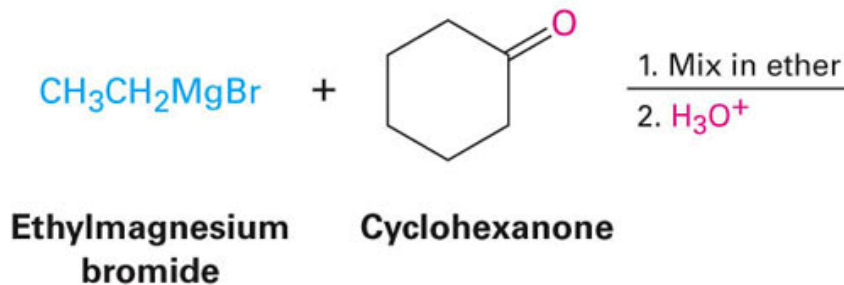
Formaldehyde reaction



Aldehyde reaction

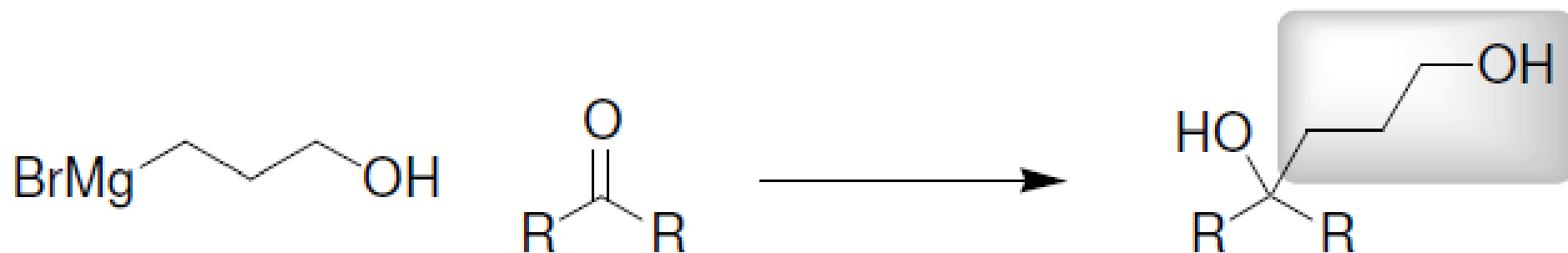


Ketone reaction



Protection of Alcohols

- Consider the reaction below. WHY won't it work?

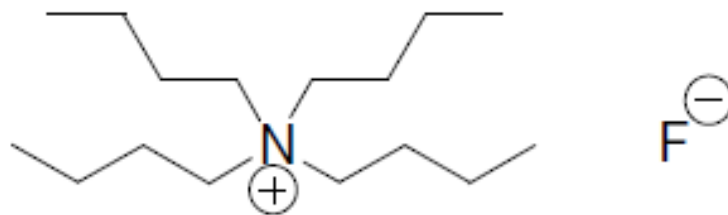


Protection of Alcohols

- A three-step process is required to achieve the desired overall synthesis.

Protection of Alcohols

- One such protecting group is trimethylsilyl (TMS).
- The TMS protection step requires the presence of a base.
- The TMS group can later be removed with H_3O^+ or F^- .
- TBAF is often used to supply fluoride ions.

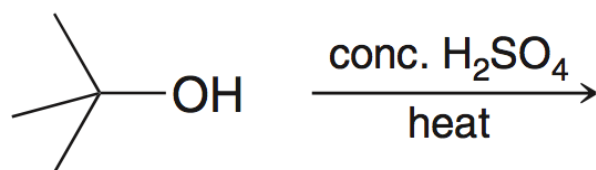


tetrabutylammonium fluoride (TBAF)

Protection of Alcohols

Reactions of Alcohols

- In section 7.12, we saw **alcohols undergo elimination in acidic conditions:**



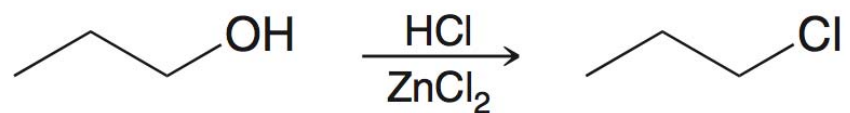
- 3° follow ? **mechanism** under these conditions:

Reactions of Alcohols

- 3° alcohols are converted to alkyl halides with HX (S_N1 rxn)
- For 1° or 2° alcohols, the reaction occurs via S_N2

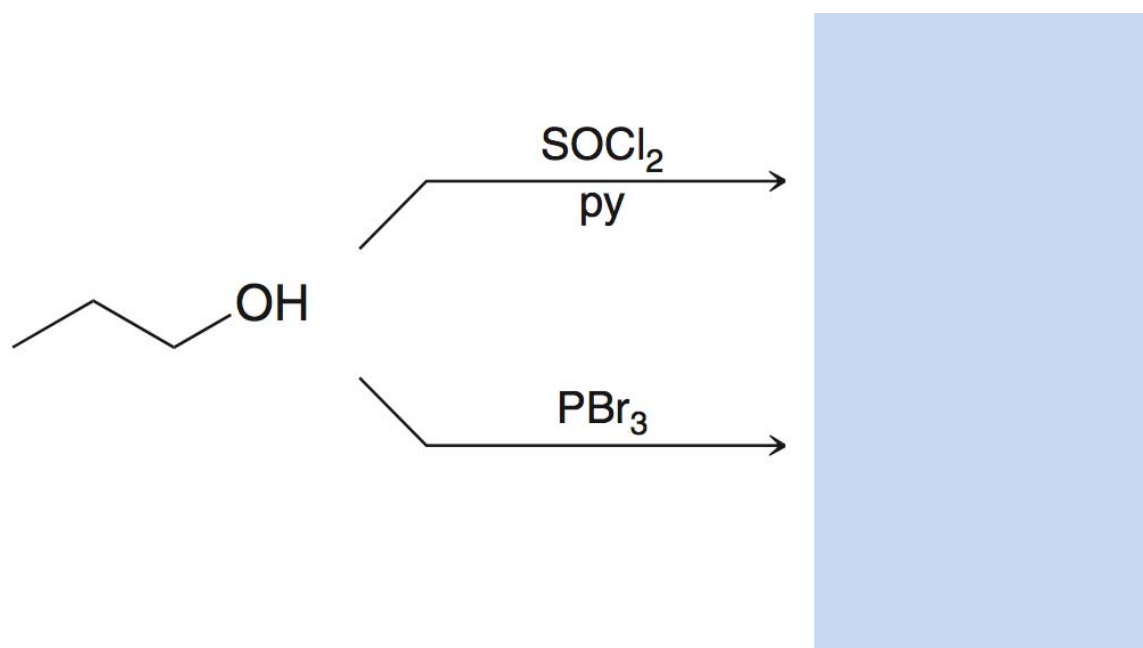
Reactions of Alcohols

- To make an alkyl chloride, ZnCl_2 must be used with HCl



Reactions of Alcohols

- 1° and 2° alcohols can also be converted to alkyl halides using SOCl_2 or PBr_3 :



Reactions of Alcohols

For Next Time....

Suggested Homework Problems Chapter 9

1, 7, 9, 13, 18, 20, 32-37, 41, 44, 52, 57

Suggested Homework Problems Chapter 10

1, 2, 12, 16, 23, 24, 33, 42

Suggested Homework Problems Chapter 12!

1, 4, 5, 7, 13, 17, 27-32, 34, 43-45