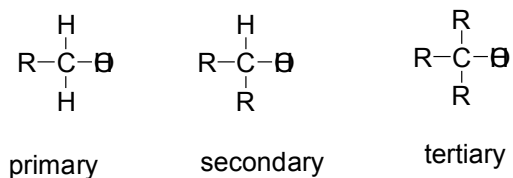


Chap 10

Alcohols



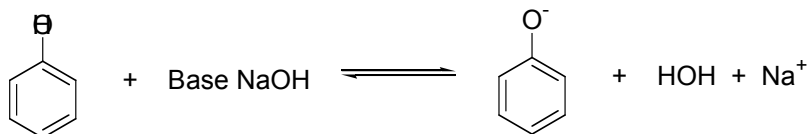
*Indy cars use methanol - less flammable water dilutes the fire but need good seals.

1. Formation of oxy anions.



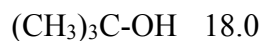
used for tertiary alcohols to slow.

b) Phenols-slightly acidic.



c) Alcohols-

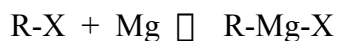
pKa



alkyl groups inhibit solvation

2. Grignard reagent

Et-O-Et



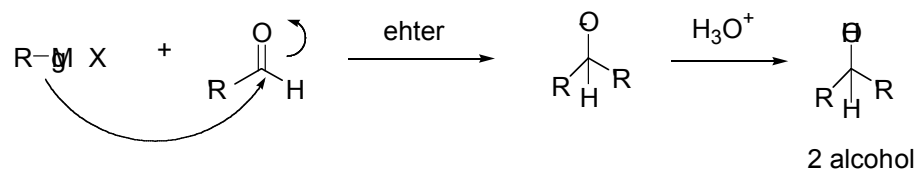
electronegativity Mg 1.3, C 2.5, Al 1.6

Reactivity $R-I > R-Br > R-Cl \gg R-F$

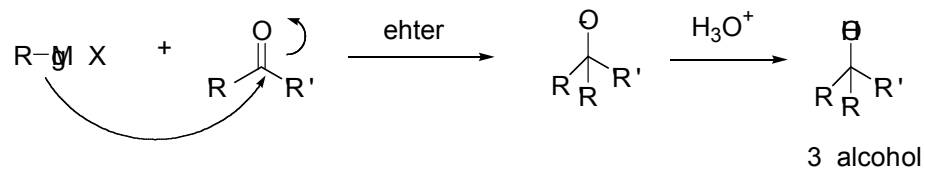
make grignard $CH_3CH_2Br + Mg \rightarrow CH_3CH_2MgBr$

A. Grignard rxn to carbonyl.

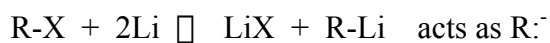
aldehyde



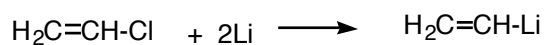
ketone



B) organo lithium reagent



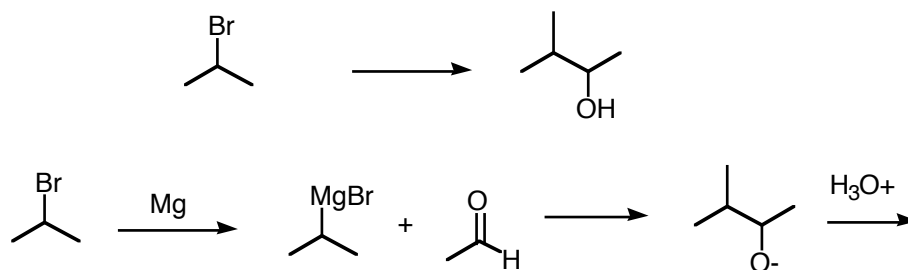
$X = Cl, Br, I$



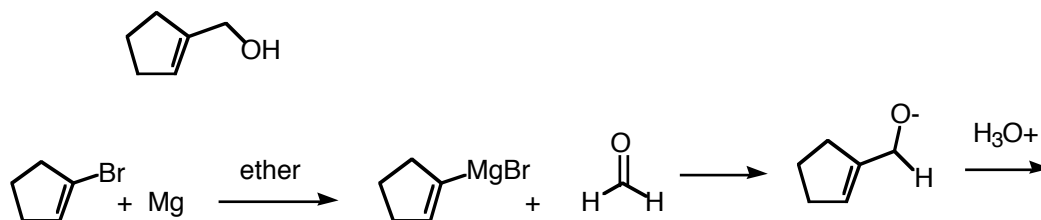
Practice Ex.

Synthesize the following.

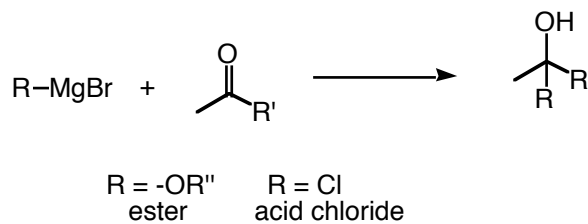
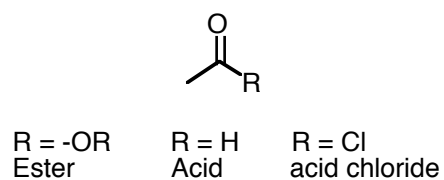
a)

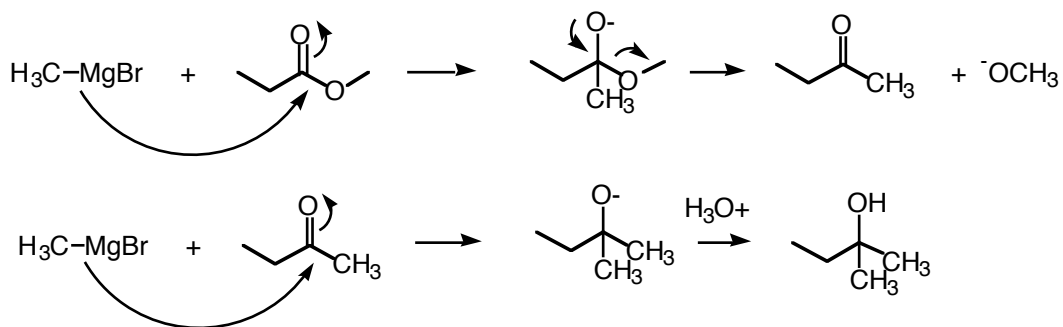


b) Use a Grignard reagent to make

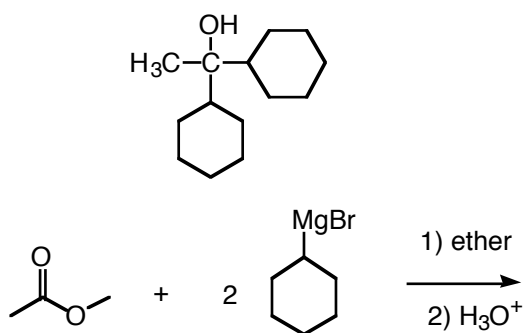


3. Grignard to Acid Chlorides, esters.

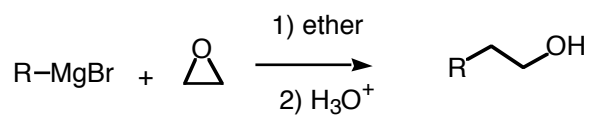




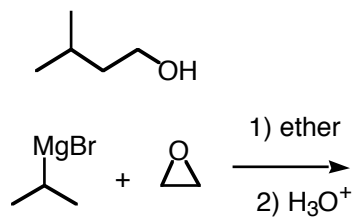
Make the following using a Grignard reagent and an ester.



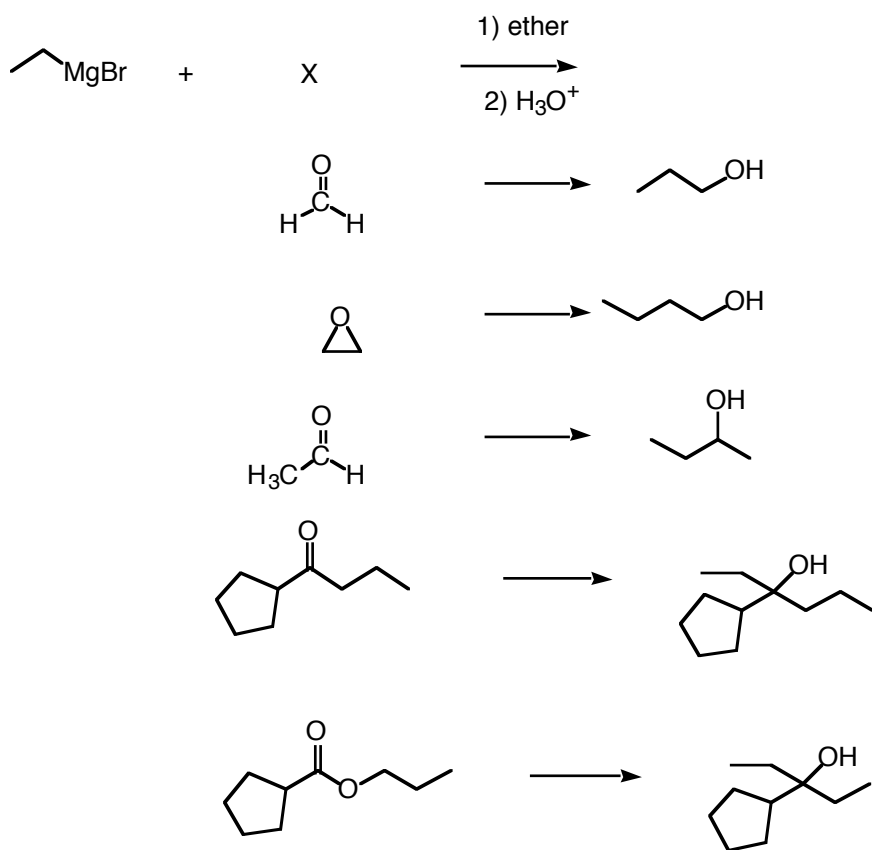
4. Grignard to ethylene oxide.



Make the following using a Grignard reagent.

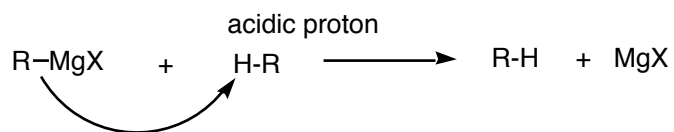


Review of synthesis of alcohols using Grignard.

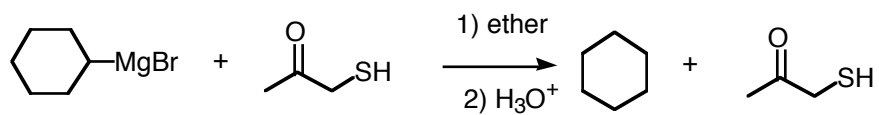


Limitations of Grignard:

1) Acidic protons O-H, N-H, S-H, alkyne C≡C-H

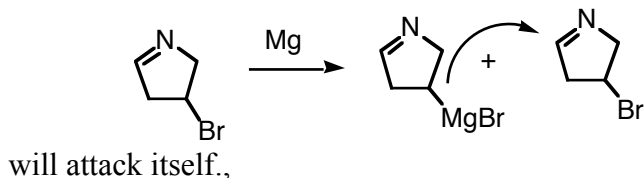


water kills the Grignard.



Does not work with carboxylic acids.

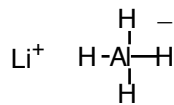
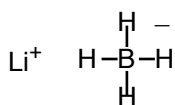
2) Electrophilic multiple bonds, C=O, S=O, C=N, N=O



Reduction Reactions of carbonyls:

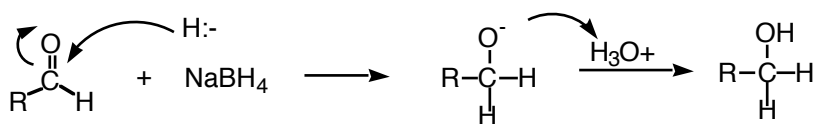
Addition of hydride H⁻:

Two main sources:

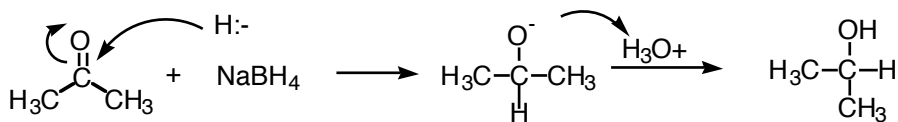


1. NaBH₄ milder

a) aldehydes



b) ketones



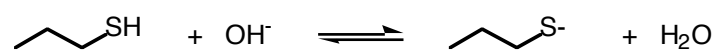
c) Does not reduce esters or carboxylic acids.

2. LiAlH₄

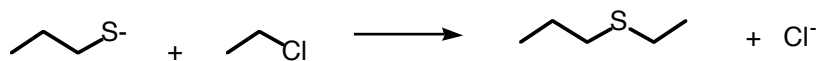
a) Reduces aldehydes and ketones in the same way.

Thiols- more acidic than alcohols and are good nucleophiles.

a) acidity-



b) used as a nucleophile. Good nucleophile



Formation of skunk oil.

