

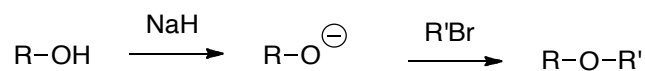
**These are all reactions for Organic I that you are responsible for. You are also responsible for Acid/Base and Substitution and Elimination Reactions (Chapter 9).**

**Reactions of Alcohols**

a. Acidity and Basicity of Alcohols (Intro, Chapter 10.3)

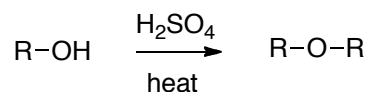
i. Reactions of alcohols promoted by bases

- Deprotonation of alcohols (**Chapter 10.4**)
- Williamson Ether Synthesis (**Chapter 11.4A**)

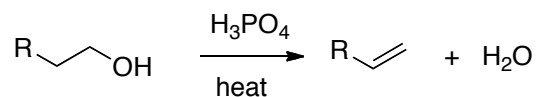


ii. Reactions of Alcohols promoted by acids

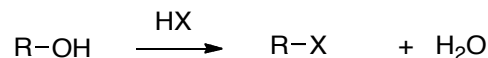
- dehydration to make ethers (**Chapter 11.4B**)



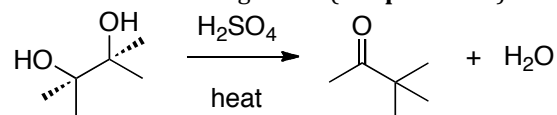
- dehydration to make alkenes (**Chapter 10.6**)



- Conversion to halides with H-X (**Chapter 10.5A**)

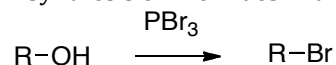


- Pinacol Rearrangement (**Chapter 10.7**)

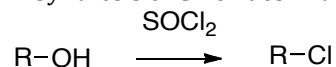


b. Conversion of Alcohols into Leaving Groups

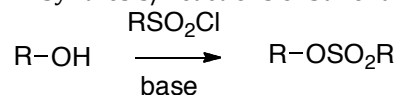
i. Synthesis of Bromides with PBr<sub>3</sub> (**Chapter 10.5B**)



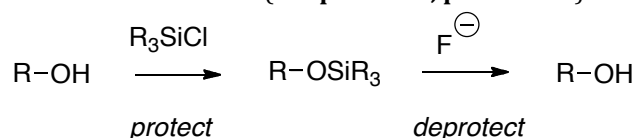
ii. Synthesis of Chlorides with SOCl<sub>2</sub> (**Chapter 10.5C**)



iii. Synthesis/Reactions of Sulfonates (**Chapter 10.5D**)



c. Protection of Alcohols (**Chapter 11.6, p. 428-430**)



## Reactions of Alkenes

### i. Alkenes as Bronsted Bases (Chapter 4.2C)

- Addition of Hydrogen Halides, Aqueous acids (Chapter 6.3A-C, p. 208-218)



### ii. Alkenes as Lewis Bases

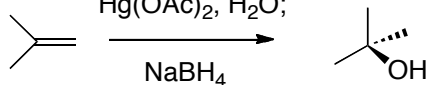
- Addition of X<sub>2</sub> across alkenes (Chapter 6.2D)

- Addition of RO and X across alkenes (Chapter 6.2E)

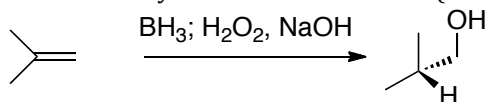


- Oxymercuration-Reduction (Chapter 6.2F)

Hg(OAc)<sub>2</sub>, H<sub>2</sub>O;

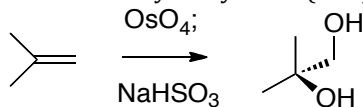


### iii. Hydroboration-Oxidation (Chapter 6.4)

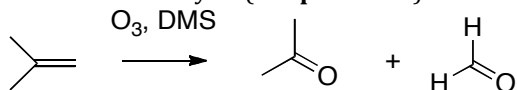


### iv. Oxidation Reactions (Chapter 6.5 Intro)

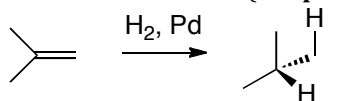
- Dihydroxylation (Chapter 6.5A)



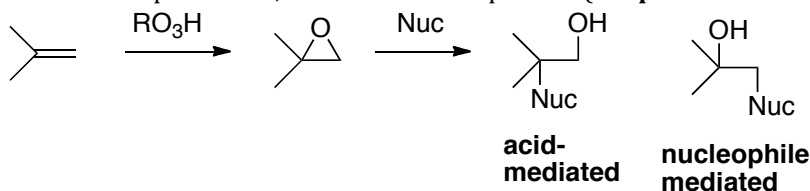
- Ozonolysis (Chapter 6.5B)



### v. Reduction (Chapter 6.6)



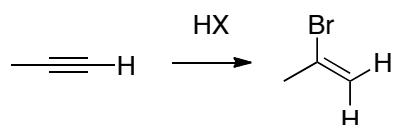
### vi. Epoxidation, and reactions of epoxides (Chapter 11.7-11.9)



## Reactions of Alkynes

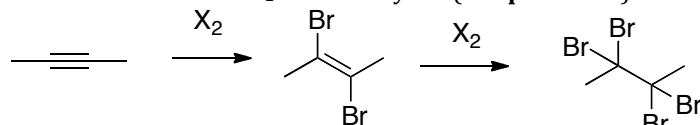
### i. Alkynes as Bronsted Base

- Addition of Hydrogen Halides (Chapter 7.6B)

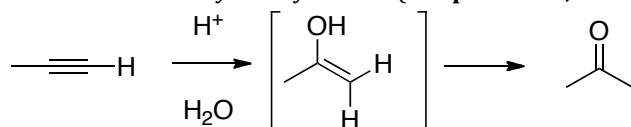


ii. Alkynes as Lewis Bases

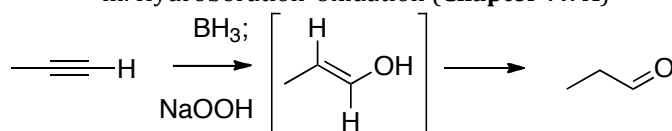
- Addition of  $\text{X}_2$  across alkynes (**Chapter 7.6A**)



Acid-catalyzed Hydration (**Chapter 7.7B, see also Chapter 16.9**)

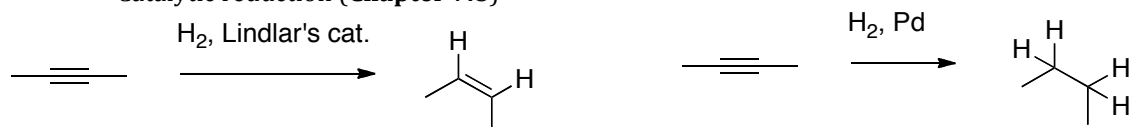


iii. Hydroboration-Oxidation (**Chapter 7.7A**)

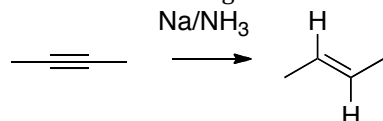


iv. Reductions

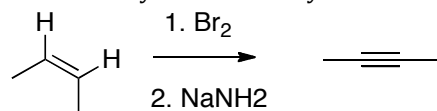
- Catalytic reduction (**Chapter 7.8**)



- Dissolving Metal Reduction (**Chapter 7.8C**)

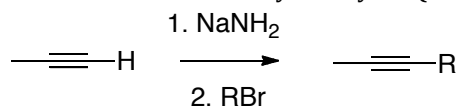


v. Synthesis of Alkynes from Alkenes (**Chapter 7.4B**)



vi. Alkylation with Alkyne Nucleophiles

- acidity of alkynes (**Chapter 7.4**)



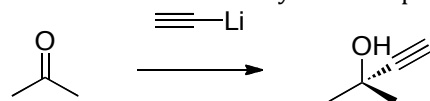
- usage of deprotonated alkynes (**Chapter 7.5A**)

## Reactions of Carbonyls

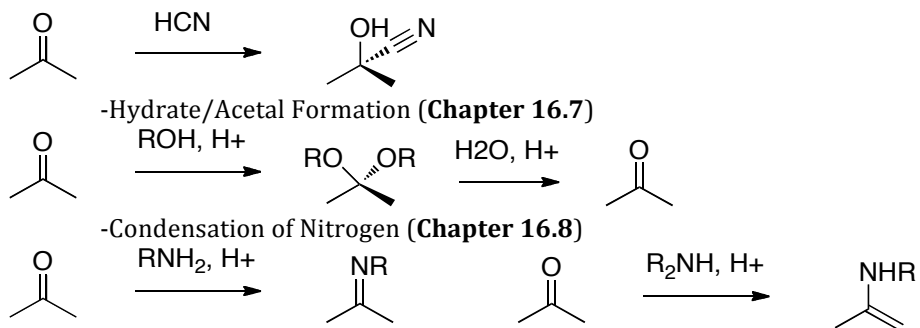
i. Physical properties of carbonyls (**Chapter 16.3**)

ii. Reactivity of Carbonyls (**Chapter 16.4**)

- Addition of alkyne nucleophiles (**Chapter 16.5C**)

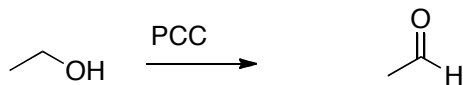
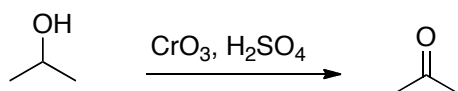
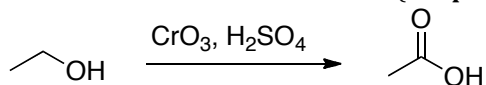


- Addition of Hydrogen Cyanide (**Chapter 16.5D**)

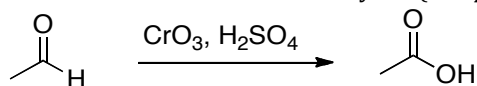


ii. Oxidation/Reduction Chemistry

- Oxidation of Alcohols (**Chapter 10.8A-B**)



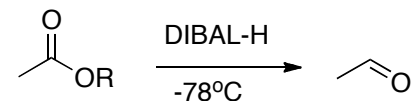
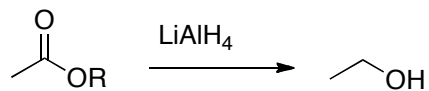
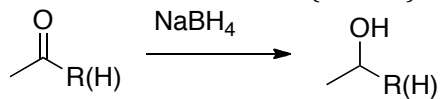
- Oxidation of Aldehydes (**Chapter 16.10A**)



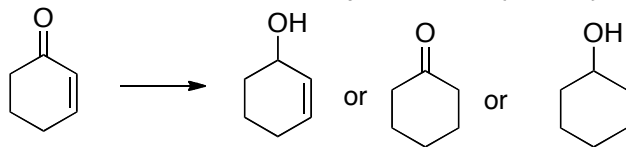
- Reduction of Carbonyls

o Ketone/Aldehyde (**16.11A-B**)

o Ester (**18.10A**)



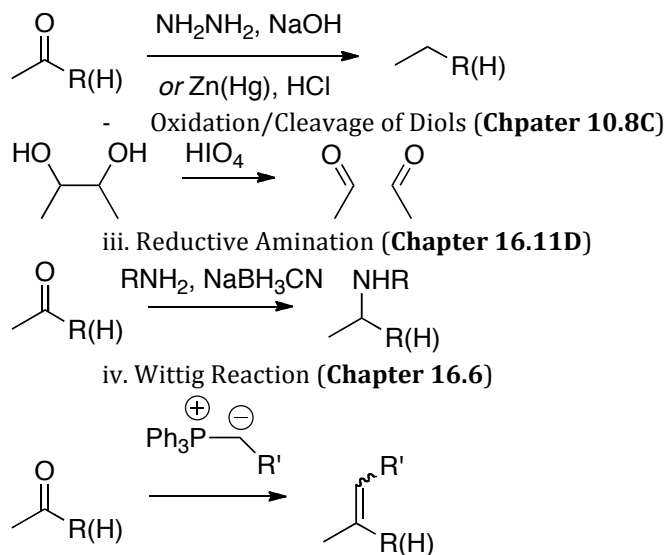
o Selectivity vs. alkenes (**16.11C**)



w/ LiAlH<sub>4</sub>      w/ Rh, H<sub>2</sub>      w/ Pt, H<sub>2</sub>

o Exhaustive Reduction (**Chapter 16.11E**)

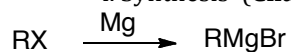
▪ Clemmensen and Wolff-Kishner



### Organometallic Reactions

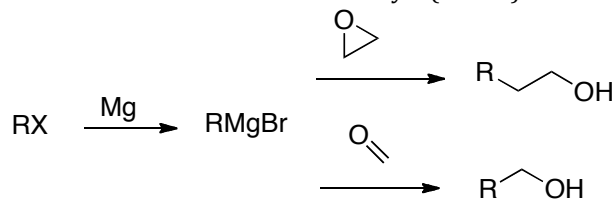
#### a. Grignards

##### i. Synthesis (**Chapter 15.1A**)



##### iii. Reactions with Oxiranes (**Chapter 15.1C**)

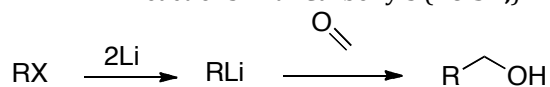
##### iv. Reactions with Carbonyls (**16.5A**)



#### b. Alkyn Lithium

##### i. Synthesis (**Chapter 15.1A**)

##### ii. Reactions with Carbonyls (**16.5B**)



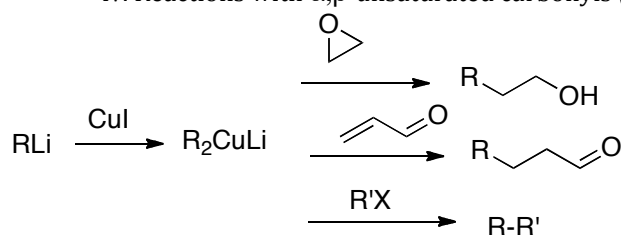
#### c. Alkyl Cuprates

##### i. Synthesis from Alkyl Lithium (**Chapter 15.2A**)

##### ii. Coupling Reactions (**Chapter 15.2B**)

##### iii. Reactions with oxiranes (**Chapter 15.2C**)

##### iv. Reactions with $\alpha,\beta$ -unsaturated carbonyls (**Chapter 19.8E**)



### Radicals

#### d. Halogenation of alkanes

##### i. Saturated alkanes (**Chapter 8.4**)

##### ii. allylic halogenation (**Chapter 8.6**)

iii. HBr to alkenes (**Chapter 8.8**)

