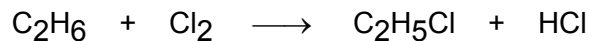


# Summary of Organic Reactions

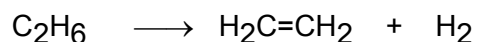
## Hydrocarbons

### A. Alkanes (generally unreactive)

1. free radical substitution (not selective!)

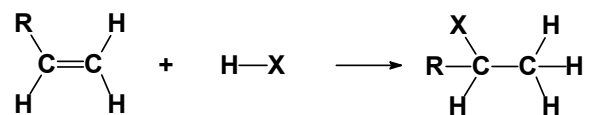


2. dehydrogenation (reverse reaction is more common!)



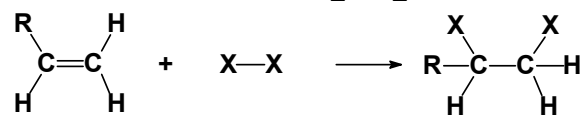
### B. Alkenes

*addition to double bond*



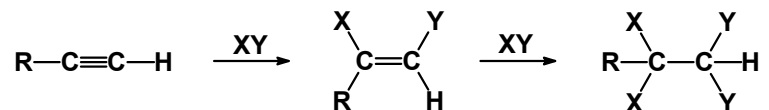
HX where X = Cl, Br, I, or OH (i.e., H<sub>2</sub>O)

- *Markovnikov's rule*: "them that has, gets"  
(H goes on the C that already has the most H's)
- addition of *non-polar* reagents (H<sub>2</sub>, Br<sub>2</sub>, etc.) also occurs



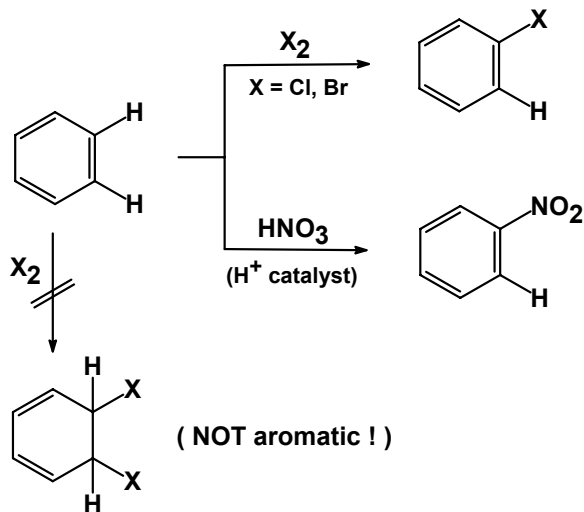
### C. Alkynes

- similar addition reactions as alkenes (stepwise addition can occur)



## D. Aromatic Hydrocarbons (Benzene and its derivatives)

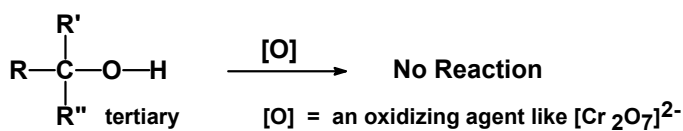
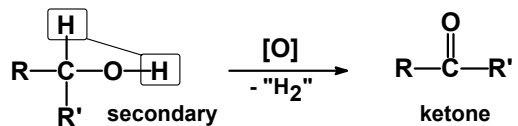
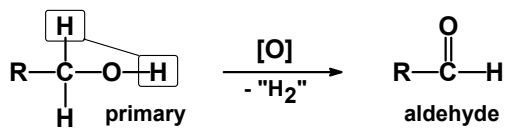
- *Substitution* Reactions (never addition!)



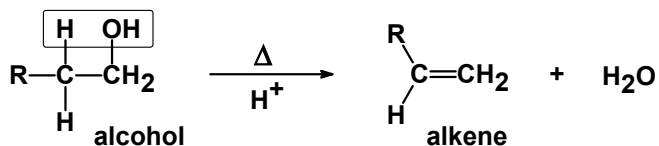
## Reactions of the Other Functional Groups

## A. Alcohols R-O-H

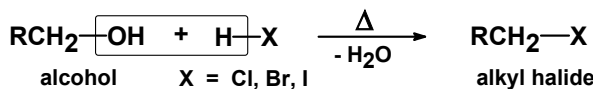
1. *Oxidation* of alcohols:



2. *Elimination* Reactions of alcohols:

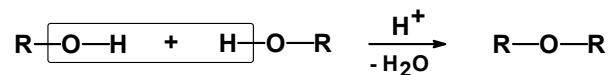


3. *Substitution* Reactions of alcohols:

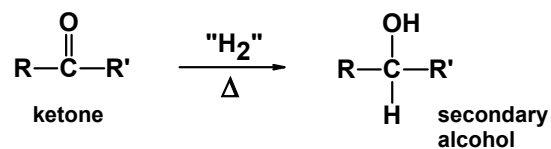
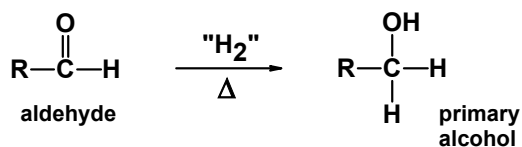
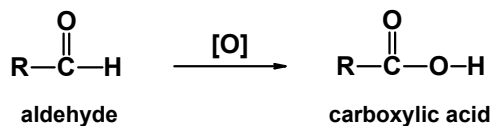


B. *Ethers*, R-O-R'

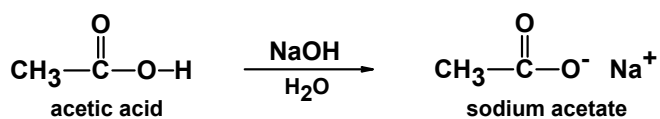
Ether Synthesis:



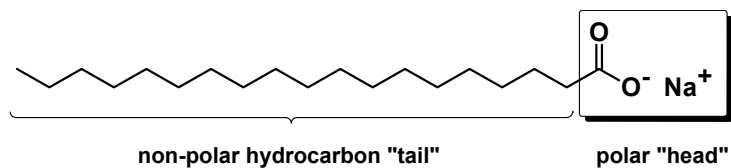
## C. Aldehydes and Ketones

1. *Hydrogenation (reduction)* of aldehydes and ketones2. *Oxidation* of aldehydes (very easy!)

## D. Carboxylic Acids

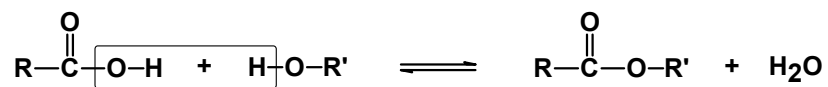
1. Acid + Base  $\longrightarrow$  Salt of Acids:

e.g. Soap is a salt of long chain carboxylic acid

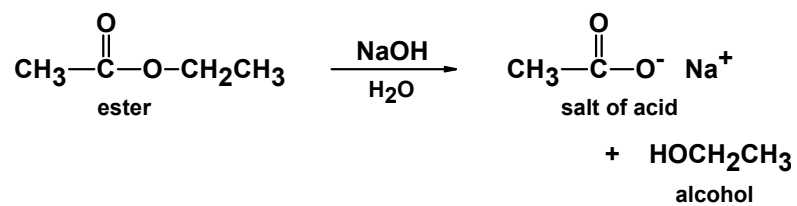


## E. Esters

1. *Formation of Esters* (from acid + alcohol)

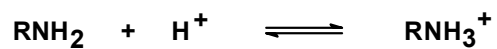


2. Saponification of Esters (hydrolysis)



F. Amines

amines are *weak bases*, so base + acid  $\longrightarrow$  salt



G. Amides

Formed from acid and amine:

