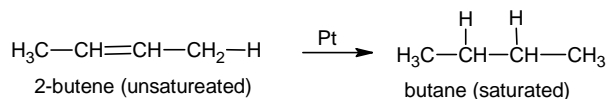


AP Chemistry  
Organic Chemistry – Reactions

Reactions of Alkenes

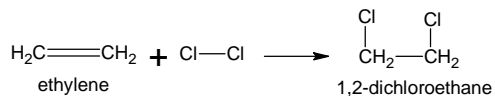
1) Hydrogenation (adding H<sub>2</sub>) or reduction

Reduction of alkenes produces the corresponding alkanes



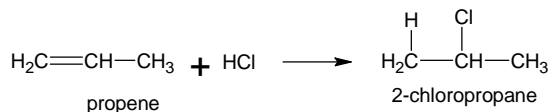
2) Halogenation (adding Cl<sub>2</sub> or Br<sub>2</sub>)

Halogens add across the double bond to produce the dihaloalkane



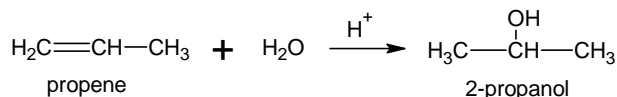
3) Hydrohalogenation (adding HCl, HBr)

Addition of hydrogen halides follows “Markovnikov’s rule” that says that the hydrogen atom adds to that carbon of the double bond which has the maximum number of hydrogens attached to it.

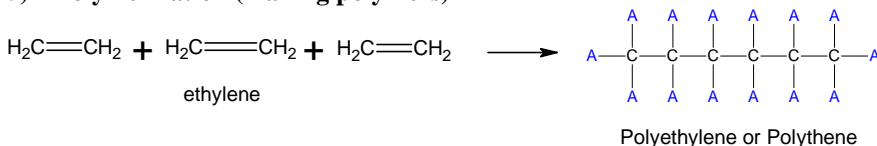


4) Hydration (adding H<sub>2</sub>O)

Follow Markovnikov’s rule, the result is an alcohol



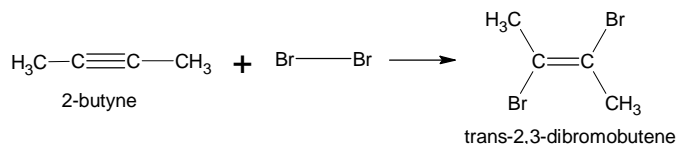
5) Polymerization (making polymers)



Reaction of Alkynes

6) Addition of halogens or hydrogen halides

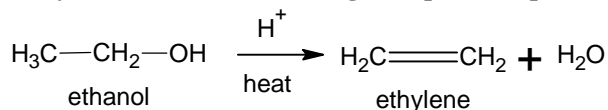
Again, Markovnikov’s rule is followed, and “trans” alkenes are formed



Reactions of Alcohols

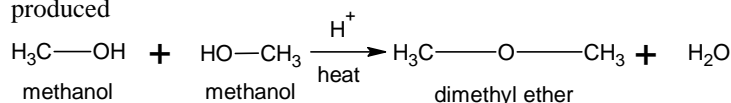
7) Dehydration of Alcohols

Dehydration of alcohols, at high temperature produces the corresponding alkenes



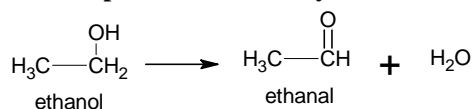
8) Formation of ethers

Ethers form when the dehydration of alcohols occurs at lower temperatures in the presence of an acid catalyst. Then the components of water are removed from two separate molecules: an H from one alcohol and the OH from the other. When the remaining portions of the two alcohols join, and ether is produced



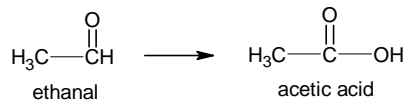
### 9) Oxidation of primary alcohols

Oxidation of primary alcohols produce aldehydes. Conversely, reduction of aldehydes produces primary alcohols. Oxidation of secondary alcohols produces ketones. Conversely, reduction of ketones produces secondary alcohols.



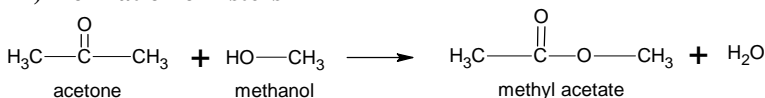
### 10) Oxidation of aldehydes

Aldehydes are oxidized to form carboxylic acids.

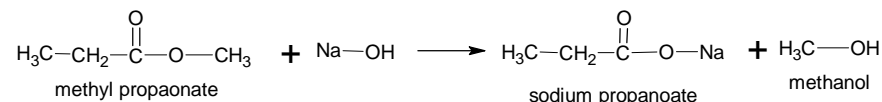
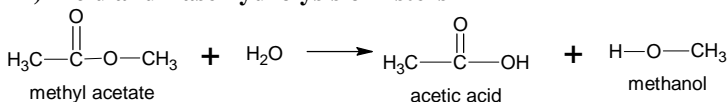


### Reactions of carboxylic acids

#### 11) Formation of Esters

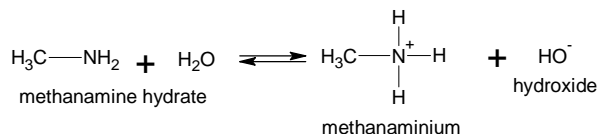


#### 12) Acid and Base hydrolysis of Esters

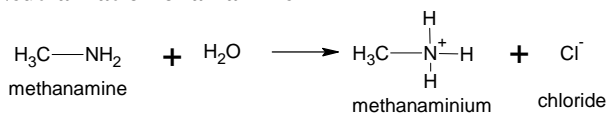


### 13) Reactions of amines

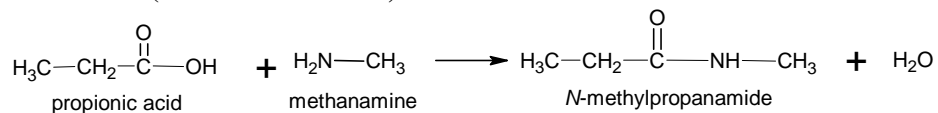
#### a) Ionization of an amine in water



#### b) Neutralization of an amine

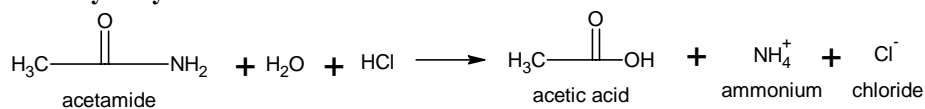


#### c) Amidation (formation of amides)



### 14) Reactions of amides

#### Acid Hydrolysis



#### Base hydrolysis

