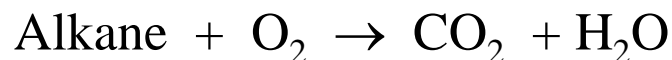


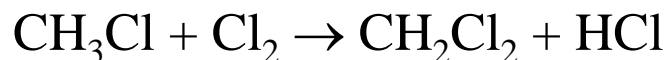
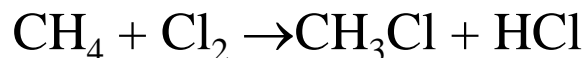
# REACTIONS OF HYDROCARBONS

# ALKANES

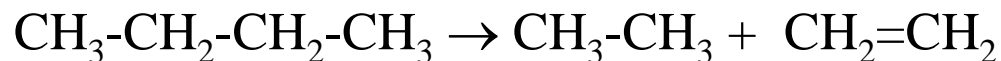
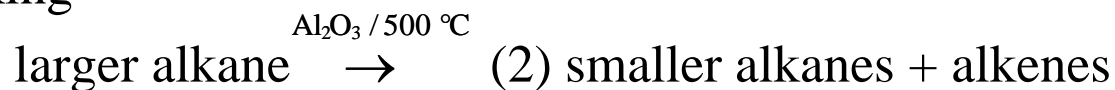
## 1. Combustion (Extreme Oxidation)



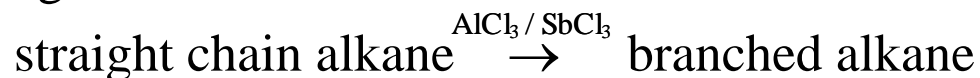
## 2. Substitution (with halides)



## 3. Cracking



## 4. Reforming



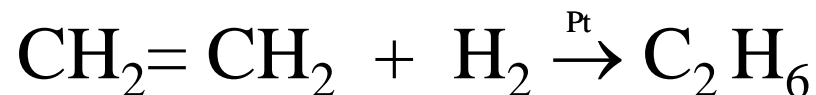
# Preparation of Alkanes

## 1. Inorganic

Calcium acetate + calcium hydroxide  $\rightarrow$  2 calcium carbonate  
+ 2 methane

## 2. Organic (Hydrogenation of Alkenes)

Alkene + hydrogen  $\rightarrow$  alkane

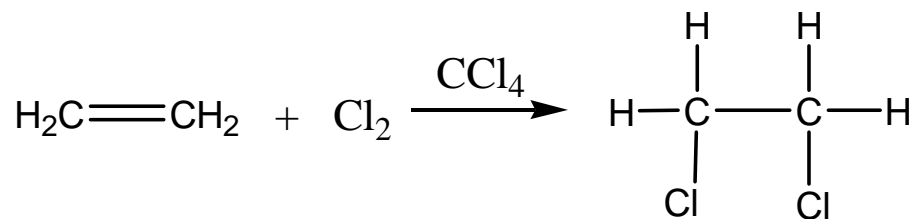


# ALKENES

## 1. Addition Reactions (breaking of the $\pi$ bond)

### A) Halogenation (adding halides)

alkene + halogen  $\xrightarrow{\text{CCl}_4}$  haloalkane

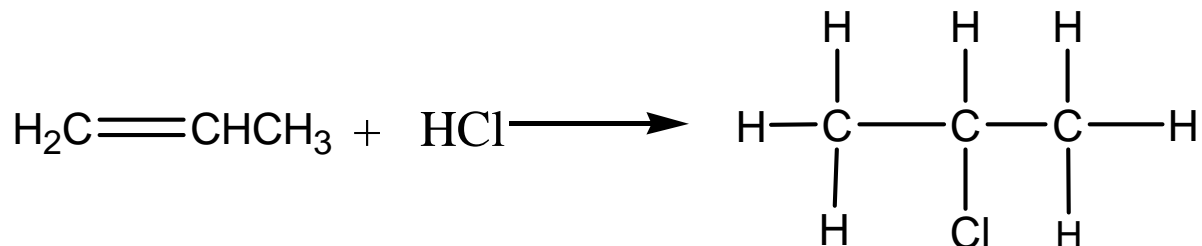


### B) Hydrogenation (adding hydrogen)

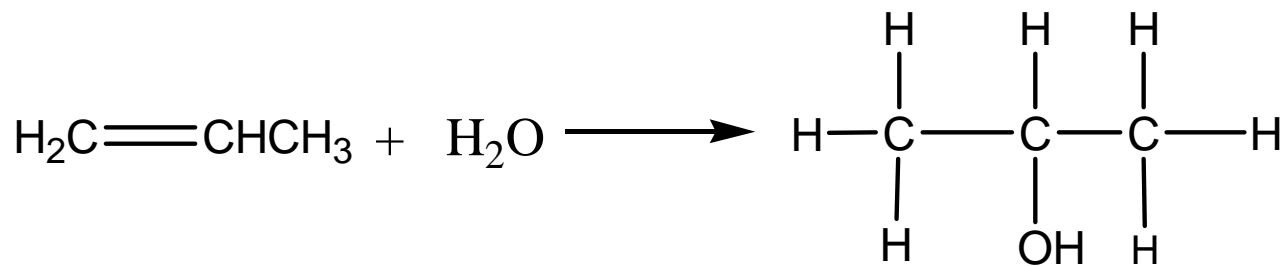
alkene + hydrogen  $\xrightarrow{\text{Pt}}$  alkane



C) Hydrohalogenation (adding hydrogen halides)  
alkene + hydrogen halide  $\star$  haloalkane

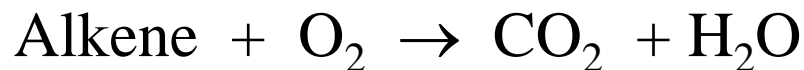


D) Hydration (adding water)  
alkene + water  $\xrightarrow{\text{H}_2\text{SO}_4 / 100^\circ\text{C}}$   $\star$  alcohol

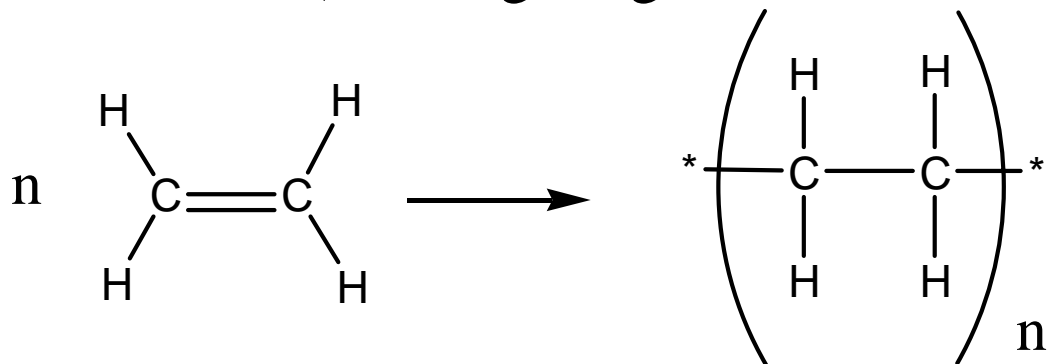


Hydrohalogenation and hydration follow Markovnikov's Rule which states that the hydrogen is added to the carbon with the most hydrogen atoms originally bonded to it.

2. Combustion (extreme oxidation)

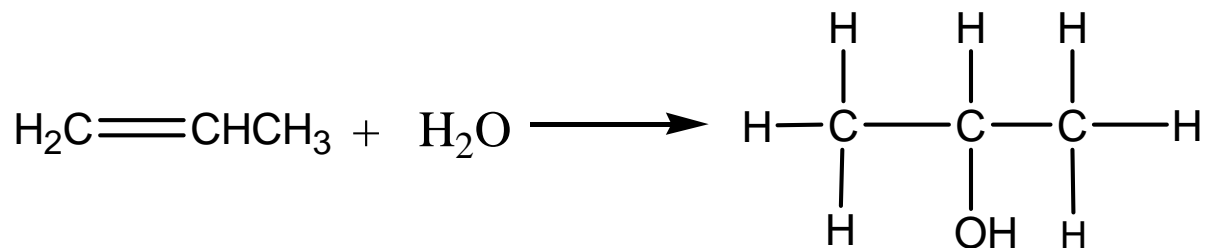
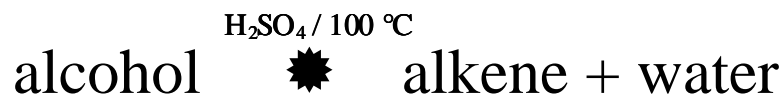


3. Polymerization (forming long chains from small subunits)



## Preparation of Alkenes

1. The Dehydration of Alcohols (reverse of 1 D)

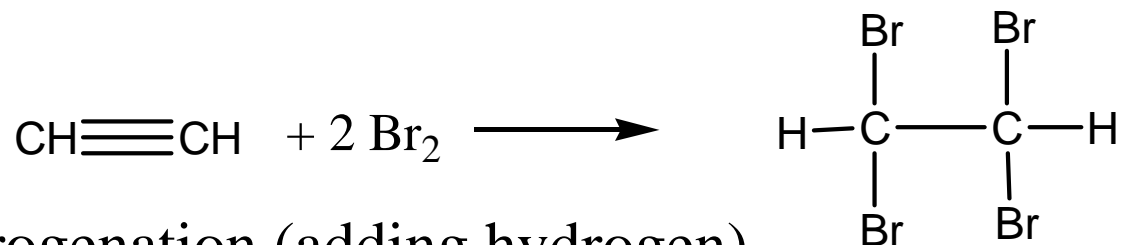


# ALKYNES

## 1. Addition Reactions (breaking of the $\pi$ bond)

### A) Halogenation (adding halides)

alkyne + 2 halogens  $\star$  haloalkane



### B) Hydrogenation (adding hydrogen)

alkyne + 2 hydrogen  $\star$  alkane



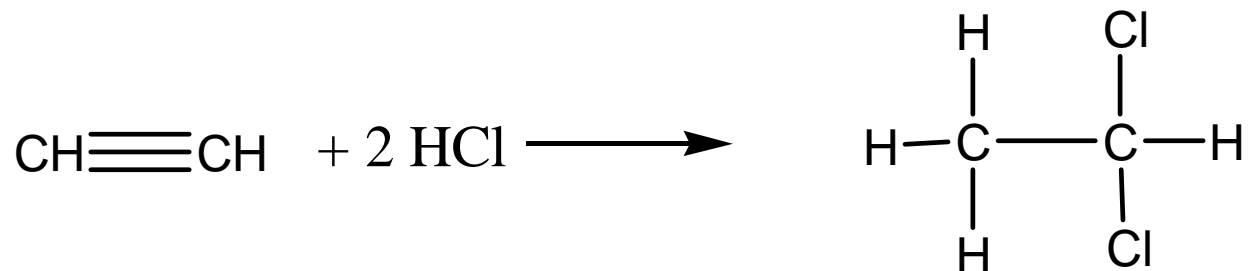
### C) Hydrohalogenation (adding hydrogen halides)

alkyne + 2 hydrogen halides  $\star$  haloalkane

\* Remember Markovnikov's Rule \*

### C) Hydrohalogenation (adding hydrogen halides)

alkyne + 2 hydrogen halides ✱ haloalkane



## 2. Reaction as an Acid

ethyne + sodium ✱ sodium ethanide + hydrogen



\* heavy metal ethanides can be explosive



# Preparation of Ethyne

Inorganic (limestone + coal)



# Homework

- Page 27 # 1-3
- Page 31 # 1-4, 6