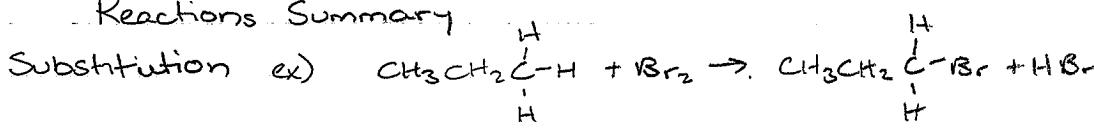


### Reactions Summary

#### 1. Alkanes

##### Substitution ex)



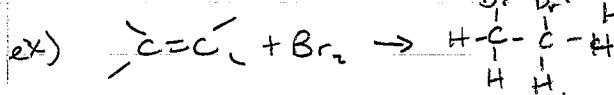
#### 2. Aromatics

##### Substitution, ex)



#### 3. Alkenes / Alkynes

##### Addition



Hydration -  $\text{H}_2\text{O}$  "the rich get richer"

Hydrogenation -  $\text{H}_2$ , markovnikov's rule.

Halogenation -  $\text{F}_2 \text{Cl}_2 \text{Br}_2 \text{I}_2$

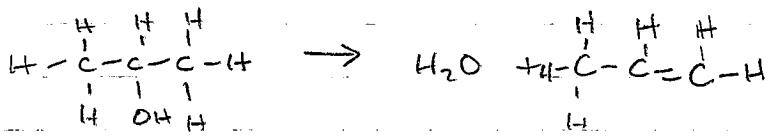
Hydrohalogenation -  $\text{HCl}$

$\text{HBr}$

$\text{HF}$

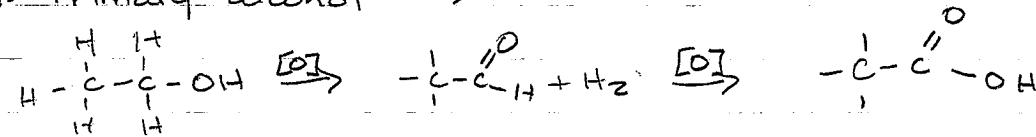
##### Elimination

#### 4. Dehydration $\xrightarrow{\text{H}_2\text{O}}$ Remove $\text{H}_2\text{O}$ from an alcohol to produce Alkene.



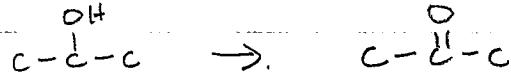
#### 5. Oxidation - Make another bond to oxygen, reduce bonds to it.

##### 1. Primary alcohol $\xrightarrow{\text{[O]}}$



ethan-1-ol  $\rightarrow$  ethanal  $\rightarrow$  ethanoic acid.

##### 2. Secondary Alcohol $\rightarrow$ Ketone.



#### 6. Hydrogenation $\rightarrow$ add $\text{H}_2$ to turn an aldehyde into alcohol.

#### 7. Condensation or Esterification

alcohol + carboxylic acid  $\rightarrow$  ester + water.

#### 8. Hydrolysis $\rightarrow$ ester turns back into alcohol and acid.

Ester +  $\text{H}_2\text{O} \rightarrow$  alcohol + carboxylic acid.