Organic Reactions Overview

1. Chlorination of Alkanes: $C_2H_6 + Cl_2 \rightarrow C_2H_5Cl + HCl$ + other chlorinated products

2. Dehydrogenation of Alkanes: $C\text{-}C\text{-}C\text{-}C \xrightarrow{\text{Heat}} C\text{-}C\text{-}C{=}C + C\text{-}C{=}C\text{-}C + H_2$

3. Cracking of Alkanes: $C\text{-}C\text{-}C\text{-}C \xrightarrow{\text{Heat /cat}} C\text{-}C\text{-}C + CH_4 + C{=}C$

4. Combustion of Alkanes: $C\text{-}C\text{-}C\text{-}C + O_2 \rightarrow CO_2 + H_2O$ + Heat

5. Hydrogenation of Alkenes: $C\text{-}C\text{-}C{=}C + H_2 \xrightarrow{\text{Pt cat}} C\text{-}C\text{-}C\text{-}C$

6. Halogenation of Alkenes: $C\text{-}C\text{-}C{=}C + Cl_2 \rightarrow$

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                Cl
                |
C-C-C=C + Cl2 → C-C-C-C
                      |
                      Cl
```

7. Hydration of Alkenes: $C\text{-}C\text{-}C{=}C + H_2O \xrightarrow{H_2SO_4}$

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                OH
                |
C-C-C=C + H2O → C-C-C-C
                      |
                      H
```

more substituted alcohol ($2^o > 1^o$)

8. Hydrohalogenation of Alkenes: $C\text{-}C\text{-}C{=}C + HCl \rightarrow$

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                Cl
                |
C-C-C=C + HCl → C-C-C-C
                      |
                      H
```

9. Halogenation of Aromatic Compounds: + Br_2 → -Br + HBr

10. Addition of NO_2 to a benzene ring: + HNO_3 $\xrightarrow{H_2SO_4\ Cat}$ - NO_2 + H_2O

11. Synthesis of Alcohols: $\underset{\underset{Cl}{|}}{C\text{-}C\text{-}C\text{-}C}$ + H_2O $\xrightarrow{NaOH}$ $\underset{\underset{OH}{|}}{C\text{-}C\text{-}C\text{-}C}$ + HCl

12. Synthesis of Ethers: R-OH + R'-OH $\xrightarrow{H_2SO_4 + heat}$ R-O-R' + H_2O

13. Synthesis of Aldehydes: $CH_3\text{-}CH_2\text{-}OH$ + ½ O_2 $\xrightarrow{KMnO_4}$ $CH_3\text{–}\underset{\underset{H}{|}}{C} = O$ + H_2O
(1° alcohol)

14. Synthesis of Ketones: $R\text{-}\overset{\overset{OH}{|}}{C}\text{-}R'$ + ½ O_2 $\rightarrow$ $R\text{-}\overset{\overset{O}{||}}{C}\text{-}R'$ + H_2O
(2° alcohol)

15. Synthesis of Amines: R-Cl + NH_3 $\rightarrow$ $R\text{-}NH_3^+$ + Cl^- $\xrightarrow{NaOH}$ $R\text{-}NH_2$ + H_2O

16. Synthesis of Organic Acids: $R\text{–}\underset{\underset{H}{|}}{C}\text{=}O$ + ½ O_2 $\xrightarrow{KMnO_4}$ R- COOH
(aldehyde)

$R\text{-}CH_2\text{-}OH$ + O_2 $\xrightarrow{KMnO_4}$ R COOH + H_2O

17. Synthesis of Esters: R-COOH + R'-OH $\xrightarrow{H_2SO_4}$ $R\text{-}\overset{\overset{O}{||}}{C}\text{-}O\text{-}R'$ + H_2O