

Combustion

Complete $\text{---} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$

Incomplete $\text{---} + \text{O}_2 \rightarrow \text{CO} + \text{H}_2\text{O}$

$\text{---} + \text{O}_2 \rightarrow \text{C} + \text{H}_2\text{O}$

Balance Carbon > Hydrogen > (Multiply everything except O₂ by 2) and then balance Oxygen

Alkane & Ether

Halogenation

Alkene $\text{H}_2\text{C}=\text{CH}_2 + \text{Br}_2 \rightarrow \text{CH}_2(\text{Br})\text{CH}_2(\text{Br})$

Alkyne same as Alkene, but requires twice as many moles to break 2 out of the 3 bonds

Br₂ or Cl₂

Addition of Simple Acids

Alkene $\text{CH}_2=\text{CH}_2 + \text{HCl} \rightarrow \text{CH}_3-\text{CH}_2(\text{Cl})$

Alkyne Same as Alkene, but requires twice as many moles to break 2 out of the 3 bonds

HBr or HCl

Markovnikov's Rule: the rich gets richer (Hydrogen goes to Carbon with more Hydrogens already)

Hydrogenation

Alkene $\text{CH}_2=\text{CH}_2 + \text{H}_2 \rightarrow \text{CH}_3-\text{CH}_3$

Alkyne Same as Alkene, but double H₂ (to break 2 out of 3 bonds)

Aldehyde $\text{CH}_2(\text{O}) + \text{H}_2 \rightarrow \text{CH}_3(\text{OH})$

Ketone $\text{CH}_3\text{C}(\text{O})\text{CH}_3 + \text{H}_2 \rightarrow \text{CH}_3\text{CH}(\text{OH})\text{CH}_3$

+H₂ & Catalyst (Pt, Pd, Ni)

Alkene + H₂ → Alkane

Alkyne + 2 (H₂) → Alkane

Aldehyde + H₂ → Primary Alcohol

Ketone + H₂ → Secondary Alcohol

Break double bond and add Hydrogen

Hydration

Alkene $\text{CH}_2=\text{CH}_2 + \text{H}-\text{OH} \rightarrow \text{CH}_3-\text{CH}_2(\text{OH})$

Alkyne same as Alkene, but 2 times the reagent (H₂O)

+H₂O & Acid Catalyst (H₂SO₄)

Markovnikov's Rule: the rich get richer

Alkene + H₂O → Alcohol

Alkyne + H₂O → Alcohol

Polymerization

Addition $\text{CH}_2=\text{CH} + \text{CH}=\text{CH}_2 \rightarrow \text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2$

Addition: linking together many **ALKENE** molecules through addition reactions

Addition Polymer formed by the reaction of 2 *different* monomers- **Copolymer**

C

By **rebeconn**
cheatography.com/rebeconn/

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