

### 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 O<sub>2</sub> 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

Br<sub>2</sub> or Cl<sub>2</sub>

### 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 H<sub>2</sub> (to break 2 out of 3 bonds)

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

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

+H<sub>2</sub> & Catalyst (Pt,Pd,Ni)

Alkene + H<sub>2</sub> → Alkane

Alkyne + 2 (H<sub>2</sub>) → Alkane

Aldehyde + H<sub>2</sub> → Primary Alcohol

Ketone + H<sub>2</sub> → 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 (H<sub>2</sub>O)

+H<sub>2</sub>O & Acid Catalyst (H<sub>2</sub>SO<sub>4</sub>)

*Markovnikov's Rule:* the rich get richer

Alkene + H<sub>2</sub>O → Alcohol

Alkyne + H<sub>2</sub>O → 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**

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