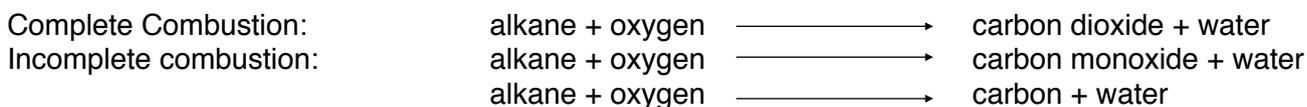


# Reactions

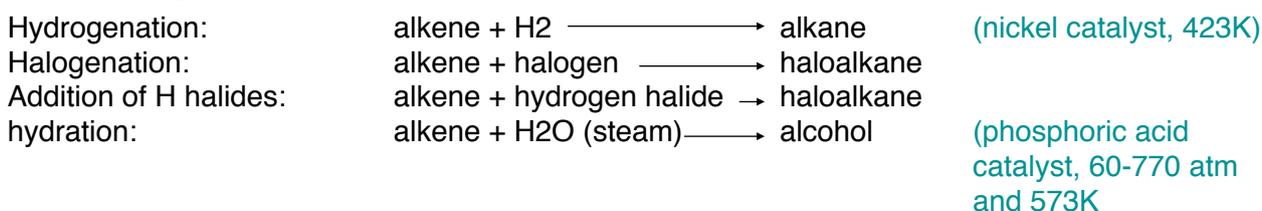
## Alkanes



### Free radical substitution

- initiated by high energy UV light
- **homolytic fission** - covalent bond breaks, one electron from the bond pair goes on each of the previously bonded carbon atoms, producing two radicals
- **free radical** - very reactive particle with unpaired electrons
- further substitutions can occur - di/tri/tetra - limit with excess
- long chains = substitution at different positions

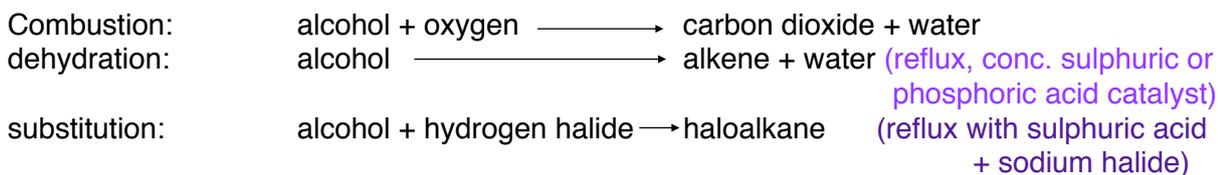
## Alkenes



### Electrophilic Addition

- double bond = region of high electron density, attract electrophiles
- **heterolytic fission** - covalent bond breaks, both electrons in the bond go to one atom, ions are formed
- **electrophile** - electron pair acceptors, attracted to electron rich regions, carry a full or slight positive charge
- **Markownikoff's Rule**: hydrogen halide added to unsymmetrical alkene = H attach to C with most H atoms and less C atoms attached to form the major product - most stable
- 3° Carbocations most stable - alkyl groups donate electrons towards +charge on carbocation - more alkyl groups is more stable

## Alcohols



### Oxidation

- **Primary** + K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> + H<sub>2</sub>SO<sub>4</sub> + distillation + gentle heat  $\longrightarrow$  aldehyde green
- **Primary** + excess K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> + H<sub>2</sub>SO<sub>4</sub> + reflux + strong heat  $\longrightarrow$  carboxylic acid green
- **Secondary** + K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> + H<sub>2</sub>SO<sub>4</sub> + reflux + heat  $\longrightarrow$  ketone green
- **Tertiary**: not oxidised - no C-H bonds to break and C-C bonds too strong - remains orange

primary — — **DISTILL** — — aldehyde — — **REFLUX** — — carboxylic acids  
secondary — — — — **REFLUX** — — — — ketone