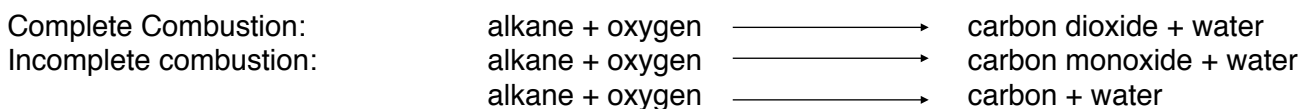


Reactions

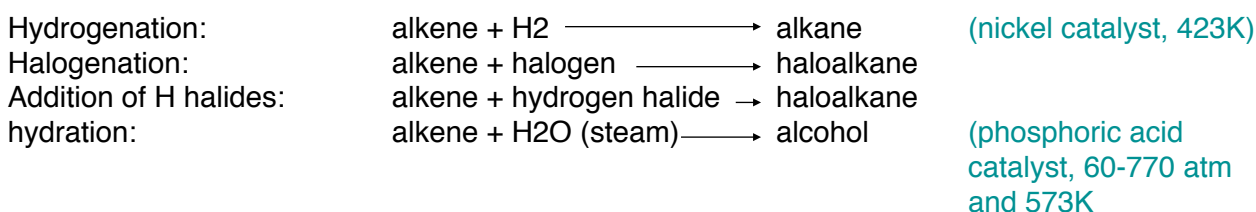
Alkanes



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

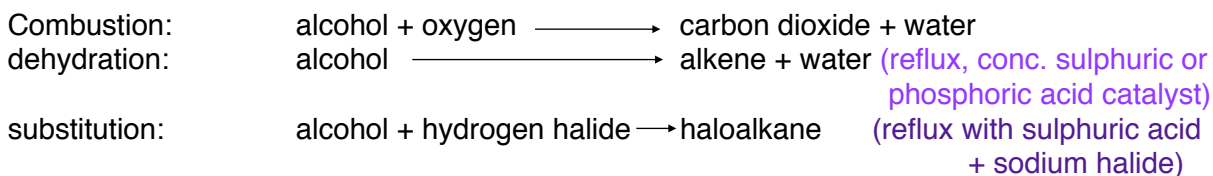
Alkenes



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** + K₂Cr₂O₇ + H₂SO₄ + distillation + gentle heat \longrightarrow aldehyde green
- **Primary** + excess K₂Cr₂O₇ + H₂SO₄ + reflux + strong heat \longrightarrow carboxylic acid green
- **Secondary** + K₂Cr₂O₇ + H₂SO₄ + 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