Reactions of Organic Compounds

PART ONE: HYDROCARBONS

- COMBUSTION
- SUBSTITUTION
- ADDITION

COMBUSTION REACTIONS

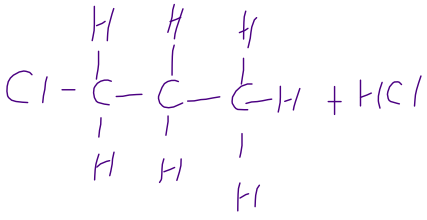
- All hydrocarbons burn (combust)
- This involves a reaction with oxygen gas, O_2
- The products are always:
  CO_2 and H_2O

Eg. $C_5H_{12} + 8\ O_2 \rightarrow 5\ CO_2 + 6H_2O$

Substitution Reactions

- Alkanes and Aromatics generally undergo substitution reactions, where 1 hydrogen will substituted for something else

- Eg.
- propane + chlorine -->

$CH_3CH_2CH_3 + Cl_2 \rightarrow$ 

Which is….

1-chloropropane

Addition Reactions

- Alkenes and Alkynes undergo addition reactions.
- Elements are added to the organic compound at the functional group
- Result is the loss of the multiple bond

Summary of Addition Reactions:

Hydrogenation
- Addition of H_2 to a double bond

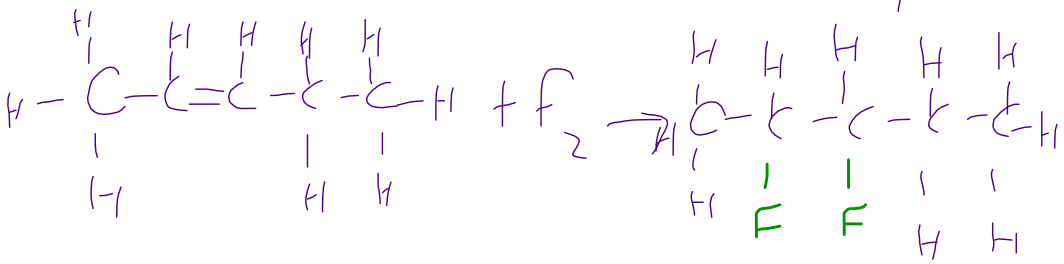
Halogenation
- Addition of Cl_2, Br_2, F_2, I_2 to a double bond

Hydrohalogenation
- Addition of HCl, HBr, HF, HI to a double bond

Hydration
- Addition of water to a double bond (to make an alcohol)

eg

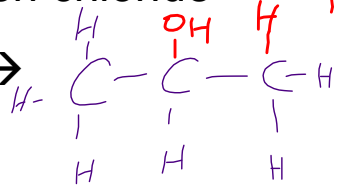
2-pentene + fluorine --> 2,3-difluoropentane



Markovnikov's Rule

"THE RICH GET RICHER"

- When adding a hydrogen compound to an alkene, the hydrogen goes to the carbon with the most hydrogens.
  - Eg.
  - propene + hydrogen chloride --> propan-2-ol

$CH_3CH=CH_2 + HCl \rightarrow$ 

Addition of Water to make an alcohol

propene + water -->

$CH_3CH=CH_2 + H_2O \rightarrow$

- Aromatic Compounds, although they have double bonds, also undergo substitution reactions, rather than addition reactions.

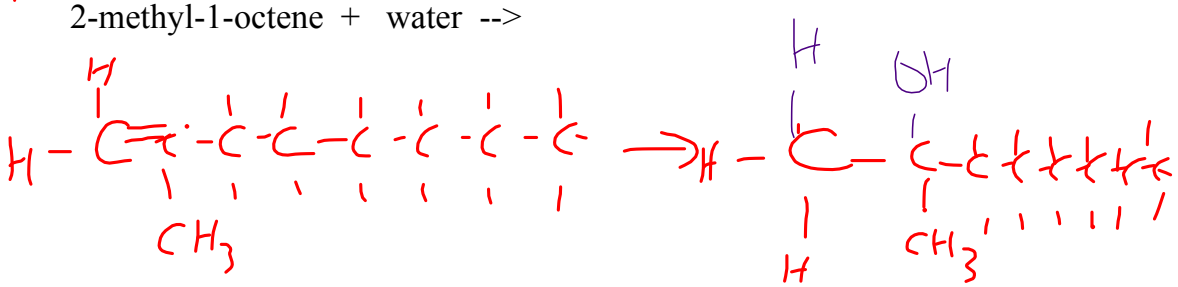
Bromine Substitution on Benzene

WWU -- Chemistry

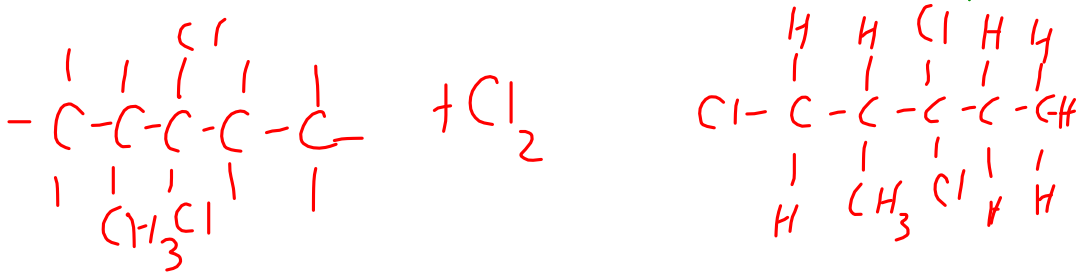
Hydration

2-methyloctan-2-ol

2-methyl-1-octene + water -->



3,3-dichloro-2-methylpentane + chlorine --> 1,3,3-trichloro-2-methyl pentane



MODEL KIT ACTIVITY

Attachments

alken2.mov

rxn alkene1.mov

ethyl propanate.mov

alcohol dehyd.mov