Organic Chemistry ACS Study Guide Cheat Sheet

by rebeconn via cheatography.com/77777/cs/19039/

Combustion

Complete	__ + O2 --> CO2 + H2O
Incomplete	__ + O2 --> CO +H2O
	__ + O2 --> C +H2O

Alkane/Ether

Balance Carbon> Hydrogen> Oxygen

Halogenation

Alkene	H2C=CH2 + Br2 --> H2C(Br)CH2(Br)
Alkyne	same as alkene, but double addition reagent

+Cl2 or Br2

Addition of Simple Acids

Alkene	CH2=CH2+HCl --> CH3-CH2(Cl)
Alkyne	Same as Alkene, but twice addition reagent

+HBr or HCl

Markovnikov's Rule: Hydrogen goes to Carbon with more Hydrogen; the rich get richer

Hydration

Alkene	H2C=CH2 + H-OH --> CH3-CH2(OH)
Alkyne	Same as Alkene, but twice the addition reagent

+H2O & Acid Catalyst (Pt, Pd, Ni)

Markovnikov's Rule: the rich get richer

Hydrogenation

Alkene	H2C=CH2 + H2 --> CH3-CH3
Alkyne	Same as Alkene, but twice the addition reagent
Aldehyde	CH2(O) + H2 --> CH3(OH)
Ketone	H3CC(O)CH3 + H2 --> H3C-CH(OH)-CH3

Alkene/Alkyne --> Alkane
Aldehyde --> Primary Alcohol
Ketone --> Secondary Alcohol

Polymerization

Addition	CH2=CH+CH=CH2-->CH2-CH2-CH2-CH2
Condensation	(OH)C(O)-(O)C(OH) + HO-CH2-OH -->
Polyamides	(Cl)C(O)-(O)C(Cl) + H2N-NH2 -->

Addition Polymerization: linking together many Alkene molecules through addition reactions

Carboxylic Acid: Condensation

Amide: Polyamide

Substitution

Aromatic	Switch **1** Hydrogen with one of the addition reagents

Aromatics= stable/chemically inert

Dehydration

180*C	H3C-CH2(OH) --> H2C=CH2 + H2O
140*C	H3C-OH + H3C-OH --> H3C-O-CH3 + H2O

@180*C Alcohol --> Alkene
@140*C Alcohol + Alcohol --> Ether

Requires Acid Catalyst (H2SO4)

Oxidation

Primary Alcohol --> Aldehyde
Secondary Alcohol --> Ketone
Tertiary Alcohol -- NR
Aldehyde --> Carboxylic Acid
Ketone --> NR
Thiols --> Disulfide

Oxidizing Agents: K2Cr2O7; KMnO4

Tollens Reagent: $2Ag(NH3)2^{+}$ --> 2 Ag

Benedicts Reagent: $2Cu^{2+}$ --> Cu2O (blue) --> (red precipitate)

Dissociation

Acid: Carboxylic Acid, Phenol
Donate H from -OH to H2O --> O^{-} +$H3O^{+}$

Base: Amine
Steal H from H2O --> $NH\_^{+}$ + OH^{-}

Acid + H2O -->

Base + H2O -->

Neutralization

Acid + Base --> Salt + H2O

Salt Ex) $O^{-}K^{+}$

Base: KOH, NaOH
Acid: Phenol, Carboxylic Acid

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