

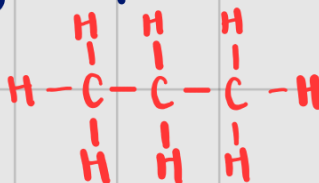
Org. Chem

Alkanes: ends with -ane

→ saturated

→ General formula: C_nH_{2n+2}

Eg. C_3H_8
Propane

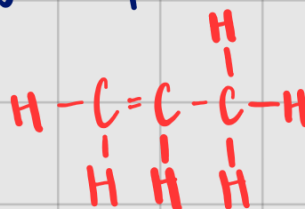


Alkenes: ends with -ene

→ unsaturated

→ General formula: C_nH_{2n}

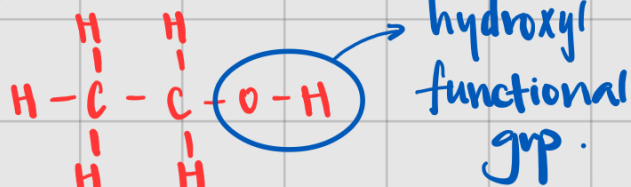
Eg. C_3H_6
Propene



Alcohols: ends with -ol

→ General formula: $C_nH_{2n+1}OH$

Eg. C_2H_5OH
ethanol

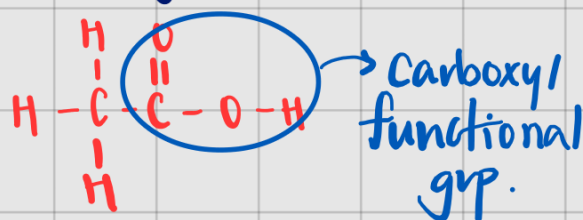


Carboxylic acid: ends with -oic acid

→ General formula: $C_nH_{2n+1}COOH$

→ are weak acids (ionises partially)

CH_3COOH
Eg. ethanoic acid



Naming:

no. of C :	1	2	3	4	5
=	meth-	eth-	prop-	but-	pent-

Rxns with alkanes

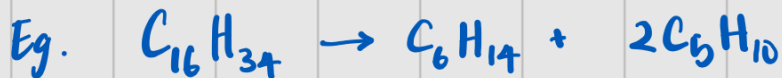
- Combustion: can be incomplete / complete.



- Substitution: UV light



- Catalytic cracking: SiO_2 or Al_2O_3 catalyst, $500^\circ\text{C} - 700^\circ\text{C}$, 1 atm.



Rxns with alkenes

- Combustion

- Hydrogenation (addition of H_2): Nickel catalyst, 200°C



Eg. Conversion of unsaturated vegetable oil into saturated margarine.

- Addition of bromine:



} can be used to test for alkenes.
alkenes decolourises
reddish-brown aq. bromine.

- Catalytic addition of steam: 300°C , 60 atm, phosphoric (v) acid



usage: production of ethanol

- Addition polymerisation

Production of ethanol :

(a) Catalytic add. of steam to ethene.

prevents oxidation of ethanol

(b) fermentation : 37°C , absence of O_2 , yeast.

→ slow process

→ low yield ($\approx 15\%$)

high conc. of ethanol kills yeast

Rxns with alcohols :

- Combustion
- Esterification
- Condensation rxns (with $-\text{COOH}$)

Rxns with carboxylic acids :

- your basic acid rxns (acid-metal, acid-base, acid-carbonate)
- Esterification
- Condensation rxns (with $-\text{OH}$ and $-\text{NH}_2$)

Esterification: conc. Sulfuric acid, heat under reflux

• alcohol + carboxylic acid $\rightleftharpoons$ ester + water

• Polymerisation :

(a) Addition polymerisation . requires unsaturated monomers

(alkene)

Eg.

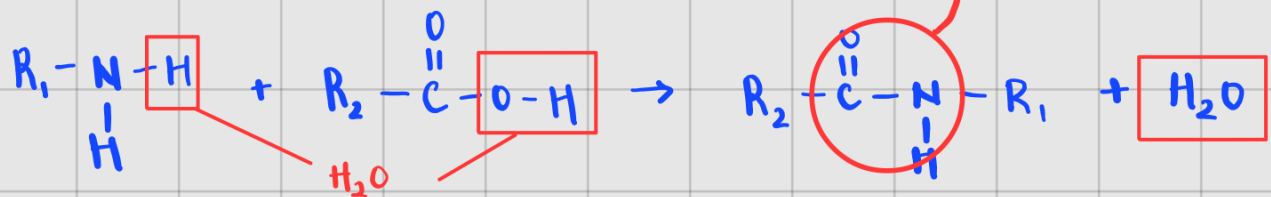


* no by-products *

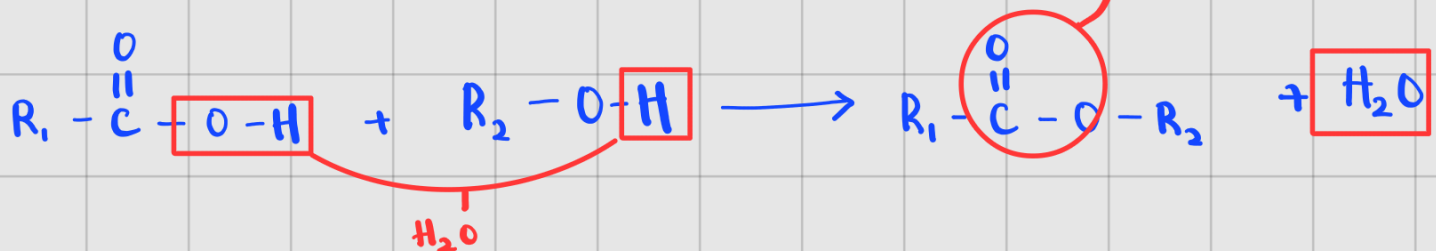
(b)(i) condensation rxns :

PS: R_1, R_2 is just the rest of the molecule.

Eg. Carboxyl grp and amine grp forms amide linkage.

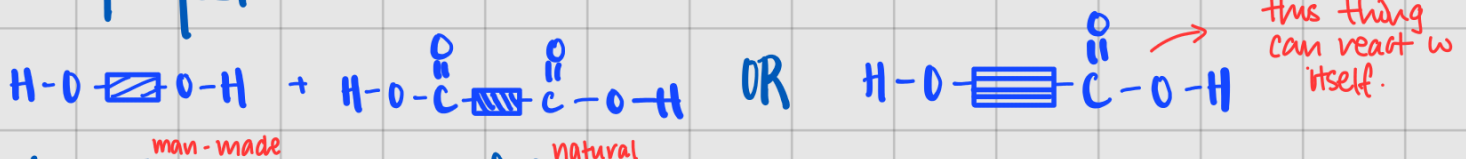


Eg. carboxyl grp and hydroxyl grp forms ester linkage.



(b)(ii) Condensation polymerisation : forms polyester or polyamide.

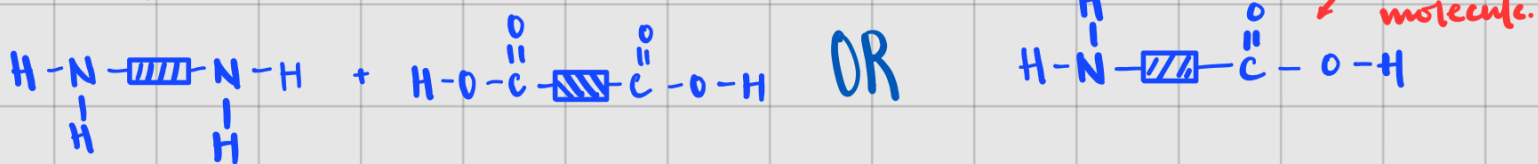
- polyester :



this thing can react w itself.

Eg. ^{man-made} Terylene and ^{natural} fats

- polyamide :



reacts w the same molecule.

Eg. ^{man-made} Nylon and ^{natural} proteins