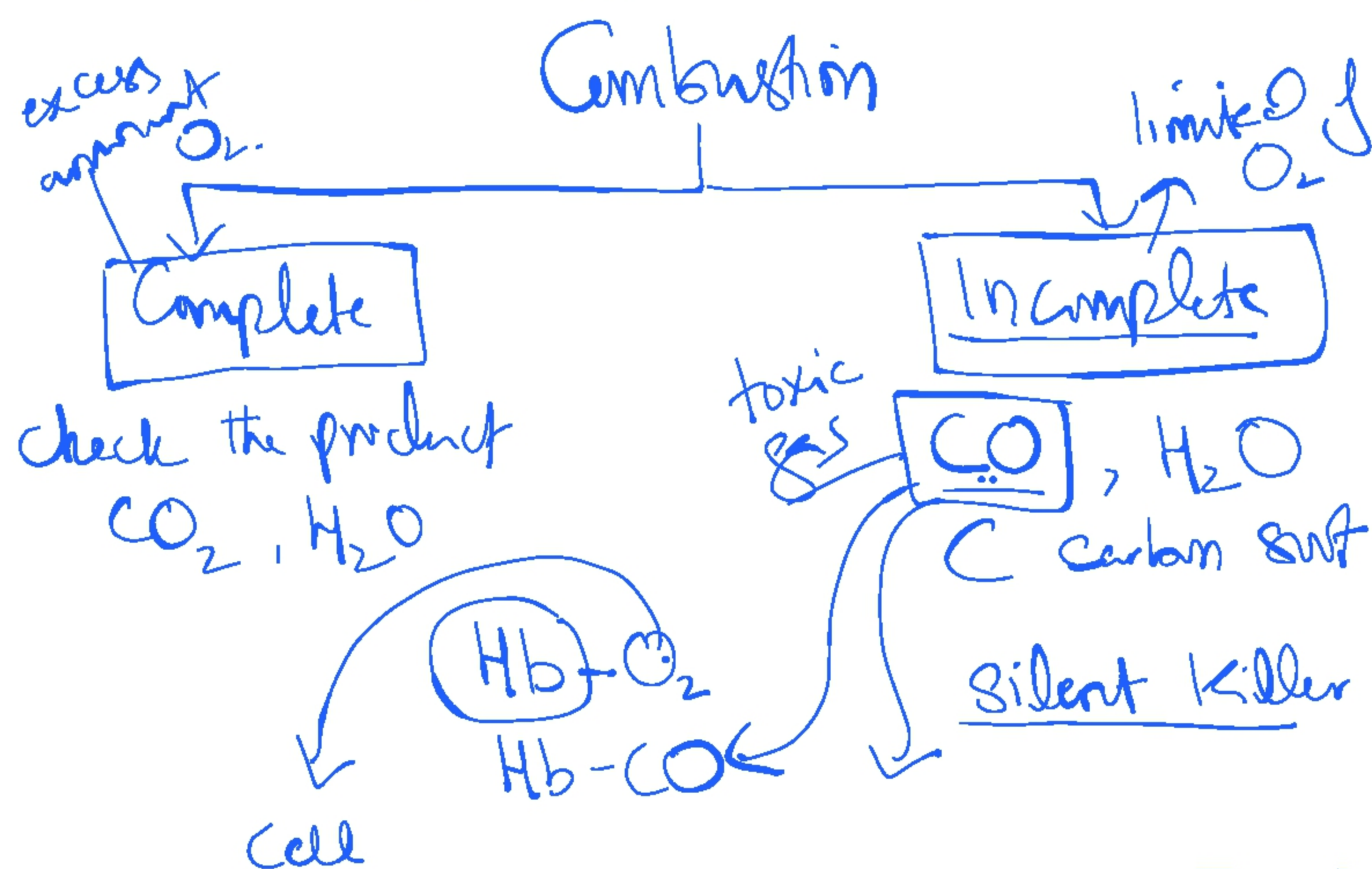
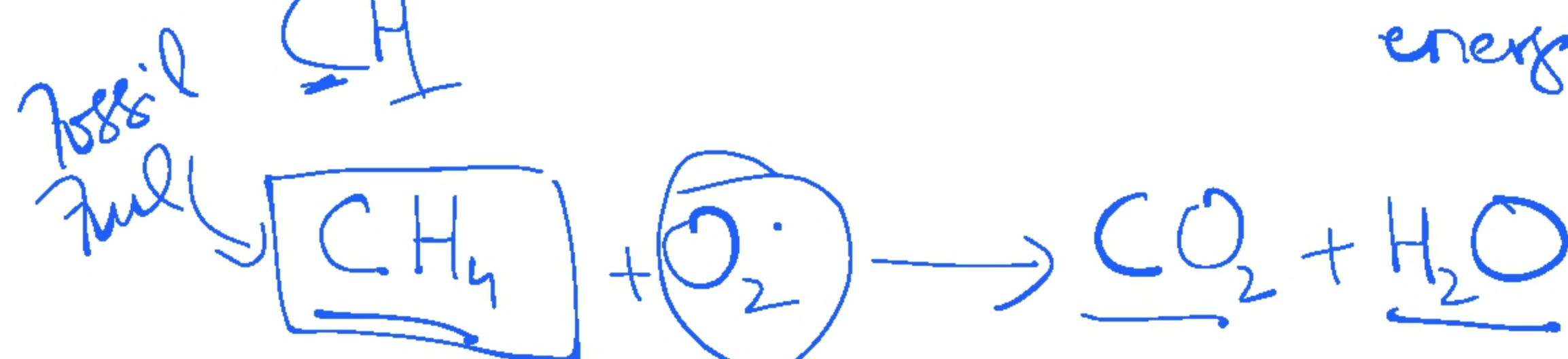
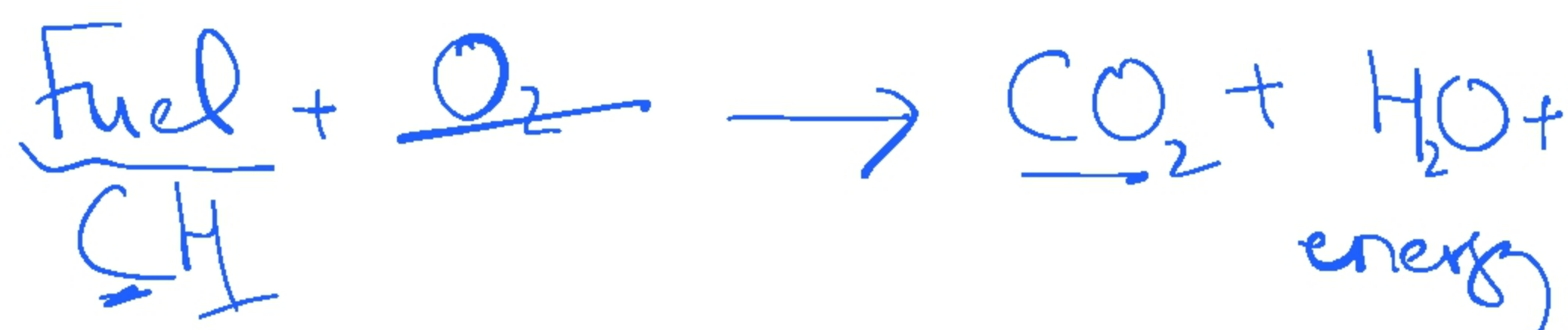




Mixture

Refining gas.

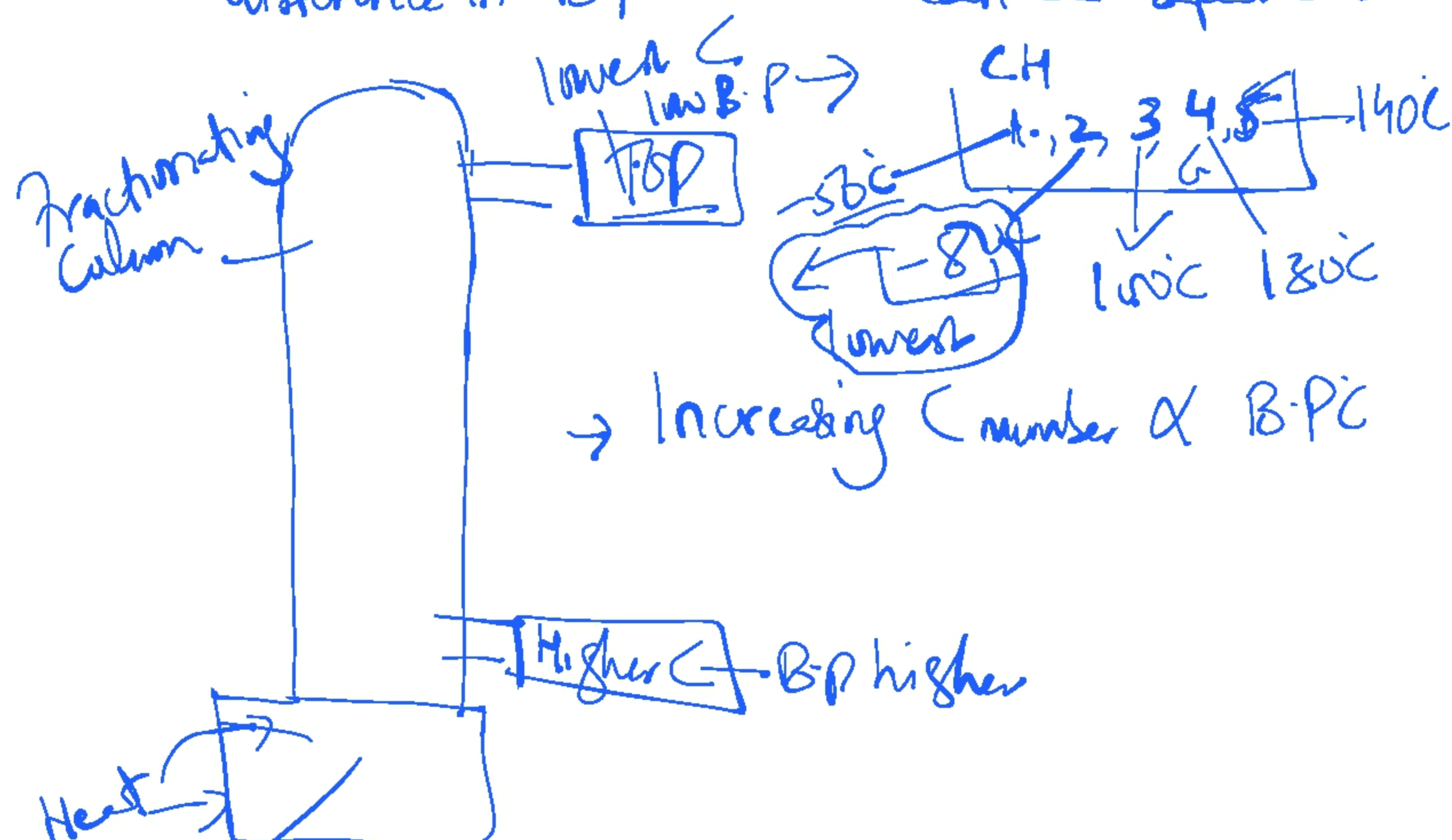
Petrol $\rightarrow$

Diesel oil $\rightarrow$

Kerosene oil $\rightarrow$

Fractional Distillation
difference in B.P

miscible liquids
Can be separated



Petroleum Mixture

less C in chain

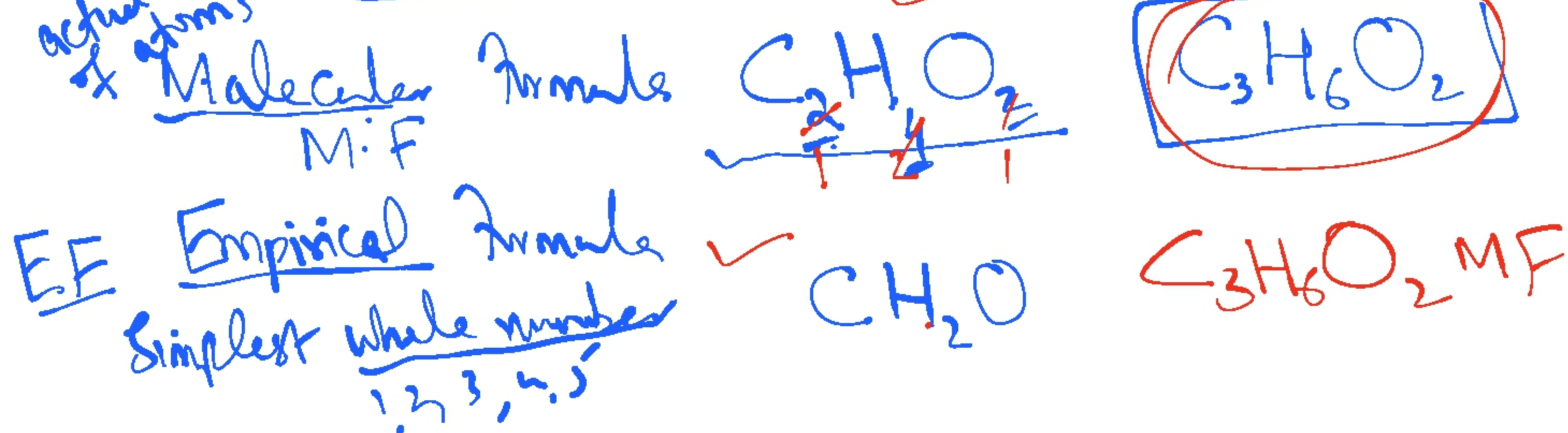
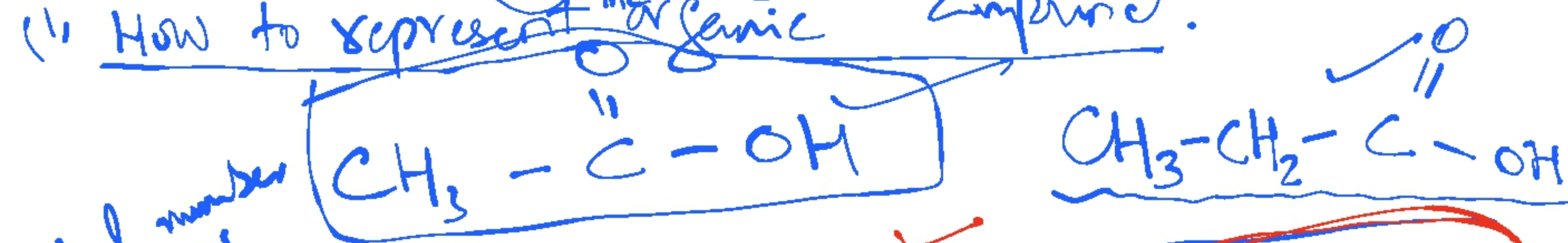
- low B.P
- low viscosity
- high volatility
- high flammability

nail polish remover

number of flammability

Naming Organic Compound

(1) How to represent the organic compound.

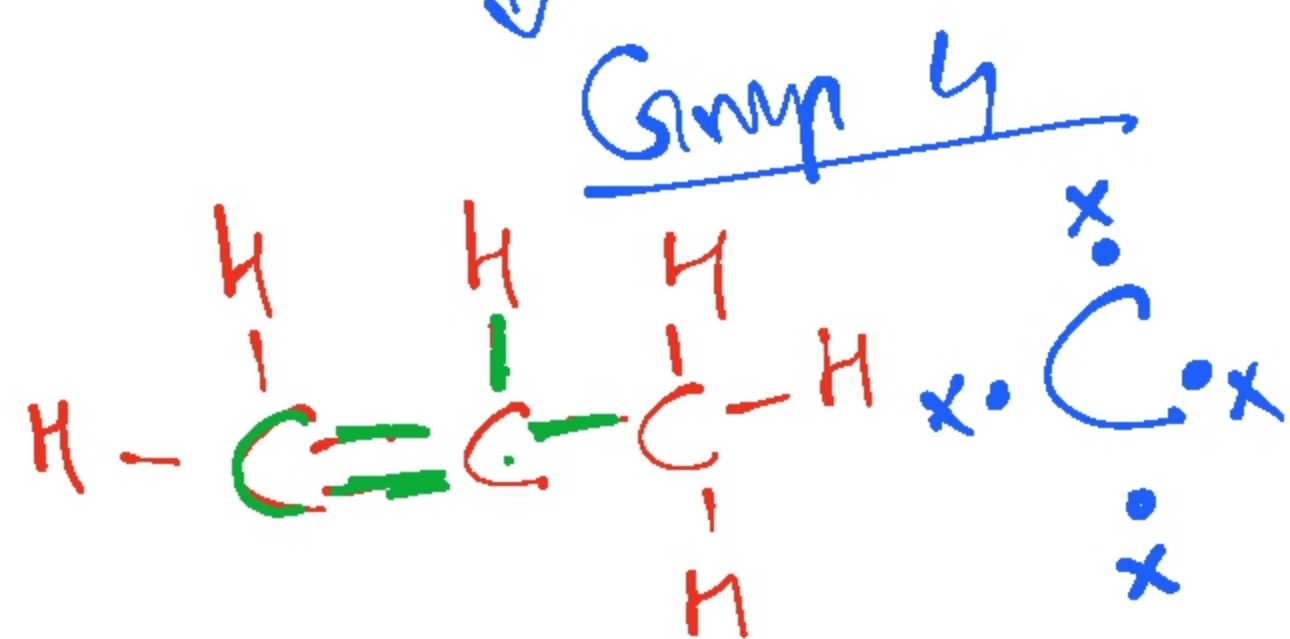
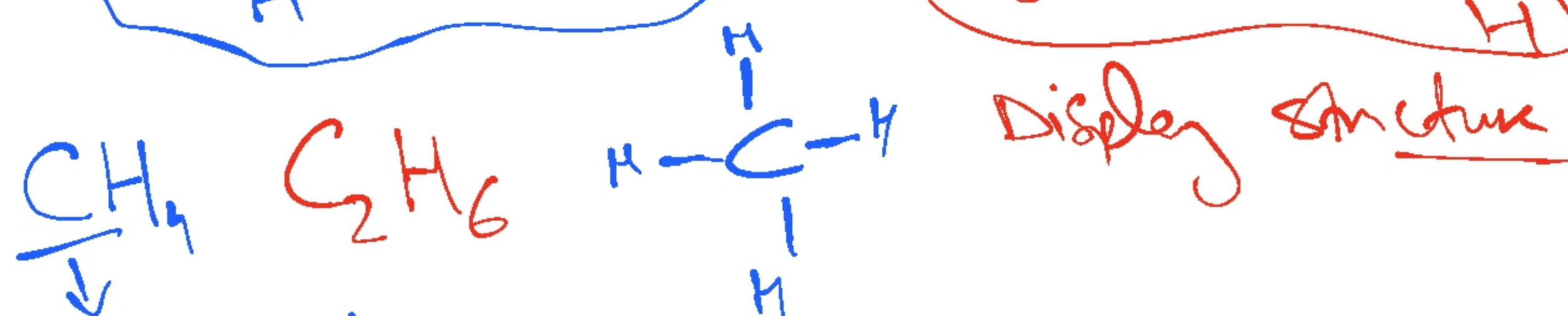
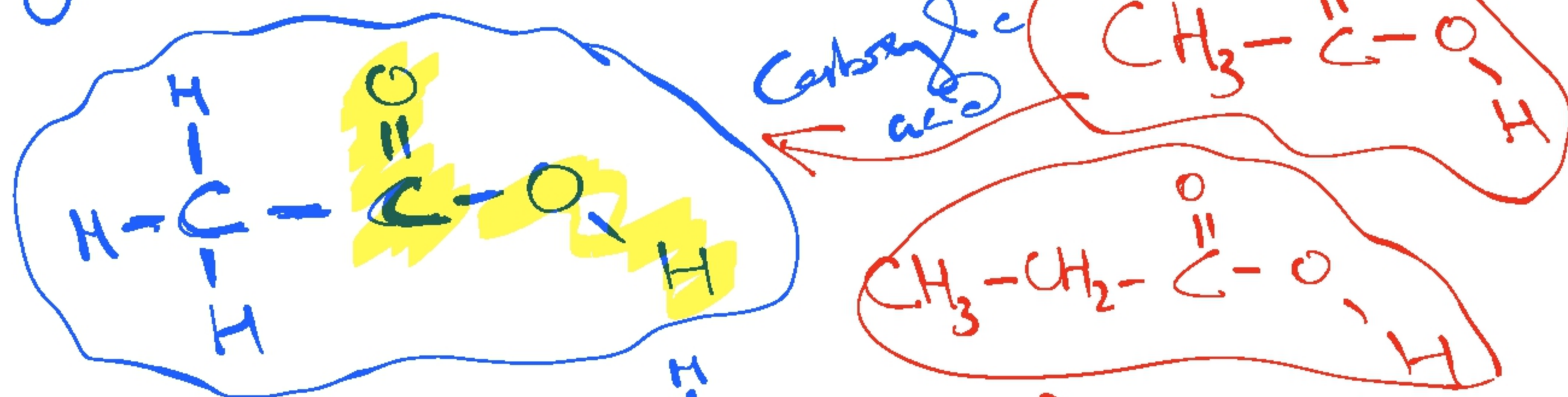


tip

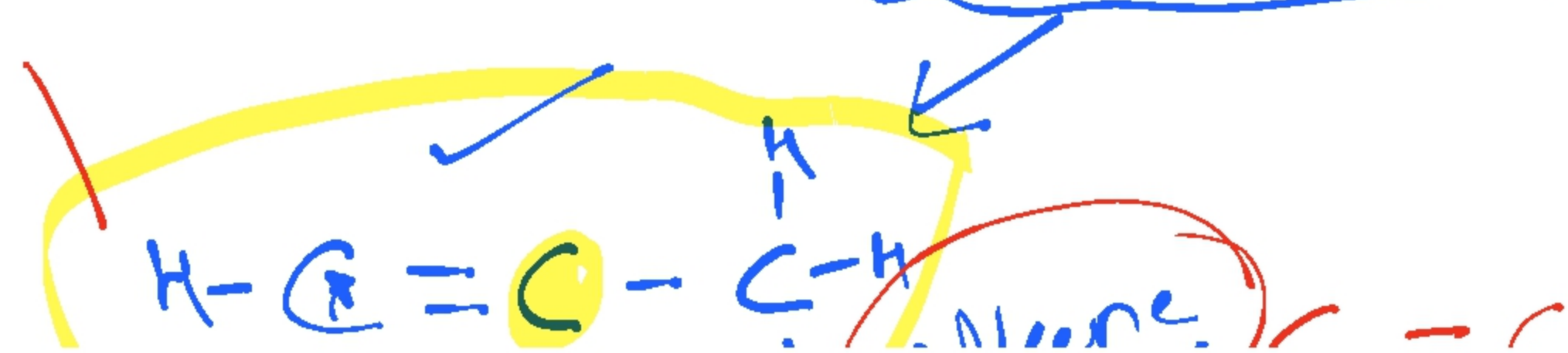
(E.F) simply

(M.F)

Display Formula (You have to represent each bond)



Alkene

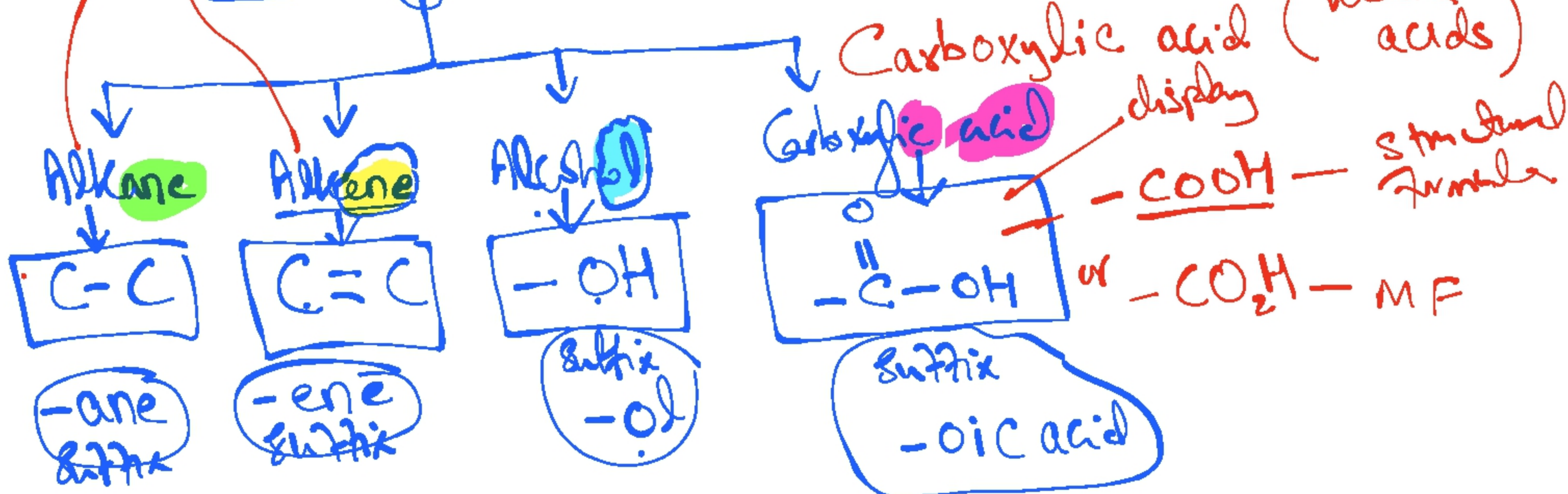




Hydrocarbon

Homologous Series

Functional Group



$\text{C}_1 \rightarrow$ Meth Prefix

$\text{C}_2 \rightarrow$ Eth "

$\text{C}_3 \rightarrow$ Prop "

$\text{C}_4 \rightarrow$ But "

$\text{C}_5 \rightarrow$ Pent "

$\text{C}_6 \rightarrow$ Hex "

Prefix Suffix
Meth

Alkane



Methane

Hydrocarbon

$\text{C}+\text{H}$

Carboxylic Acid

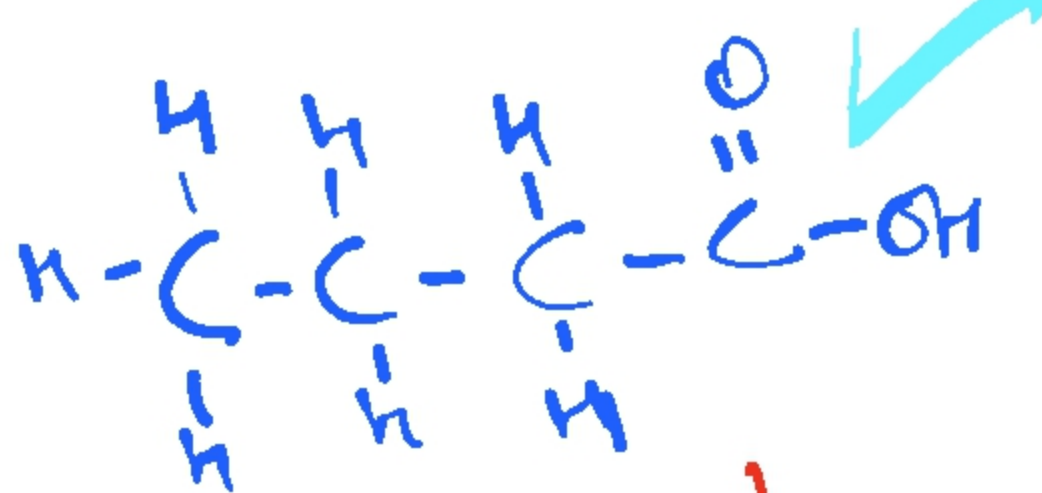


Methanoic acid

Methanoic acid



Ethanoic acid



When C number are more than 3, specify double bond position

Alkene

$\text{C}=\text{C}$

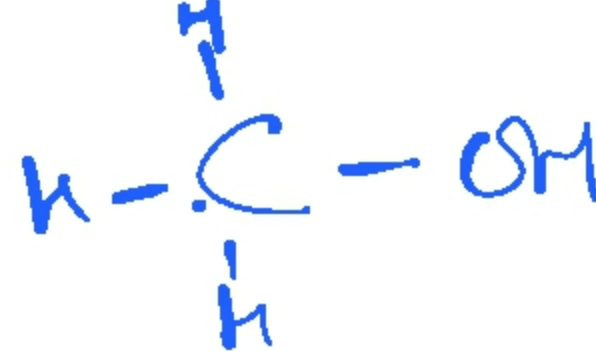
ethene



When C number is more than 3, then specify OH position

Alcohol

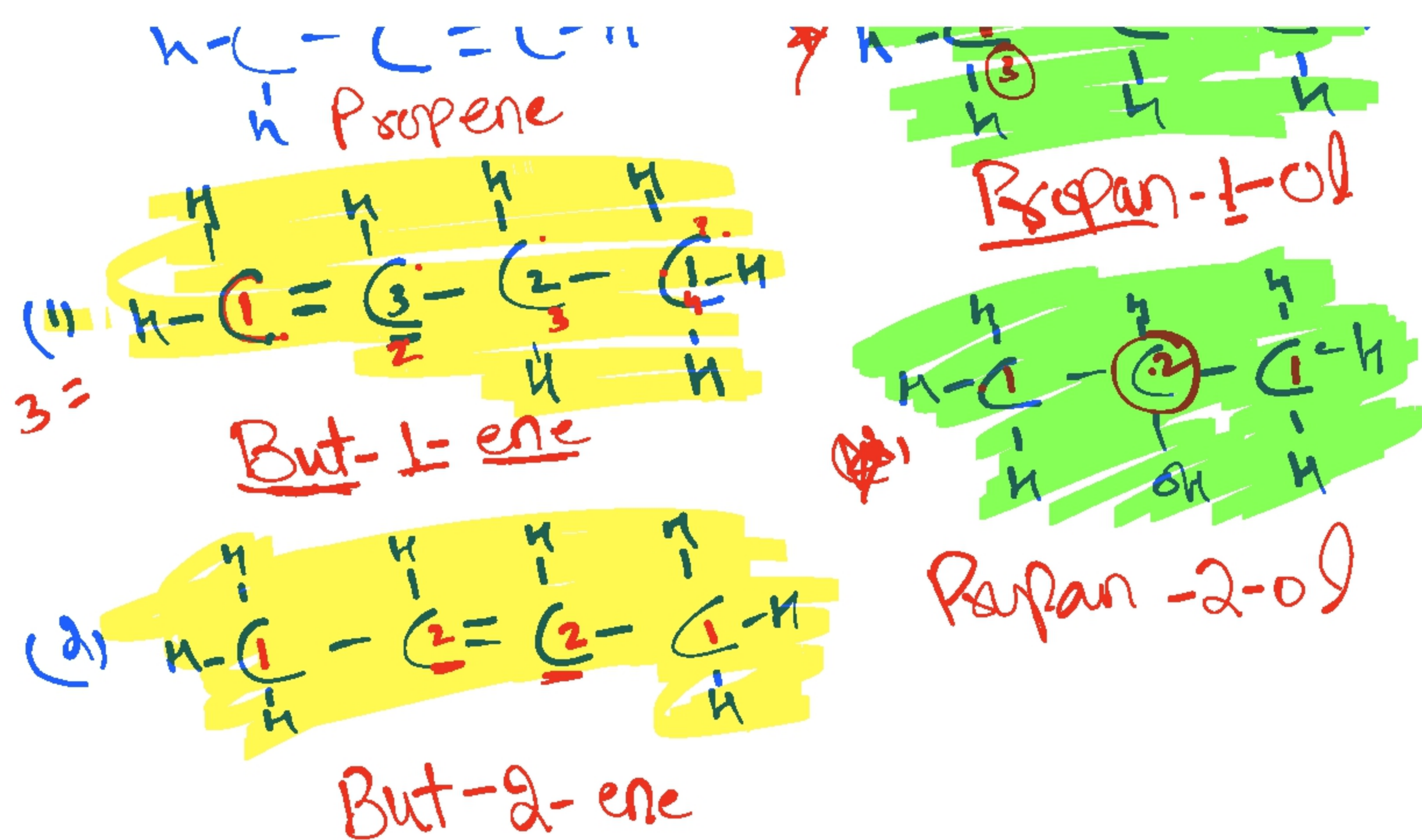
$-\text{OH}$



Methanol

Methanol



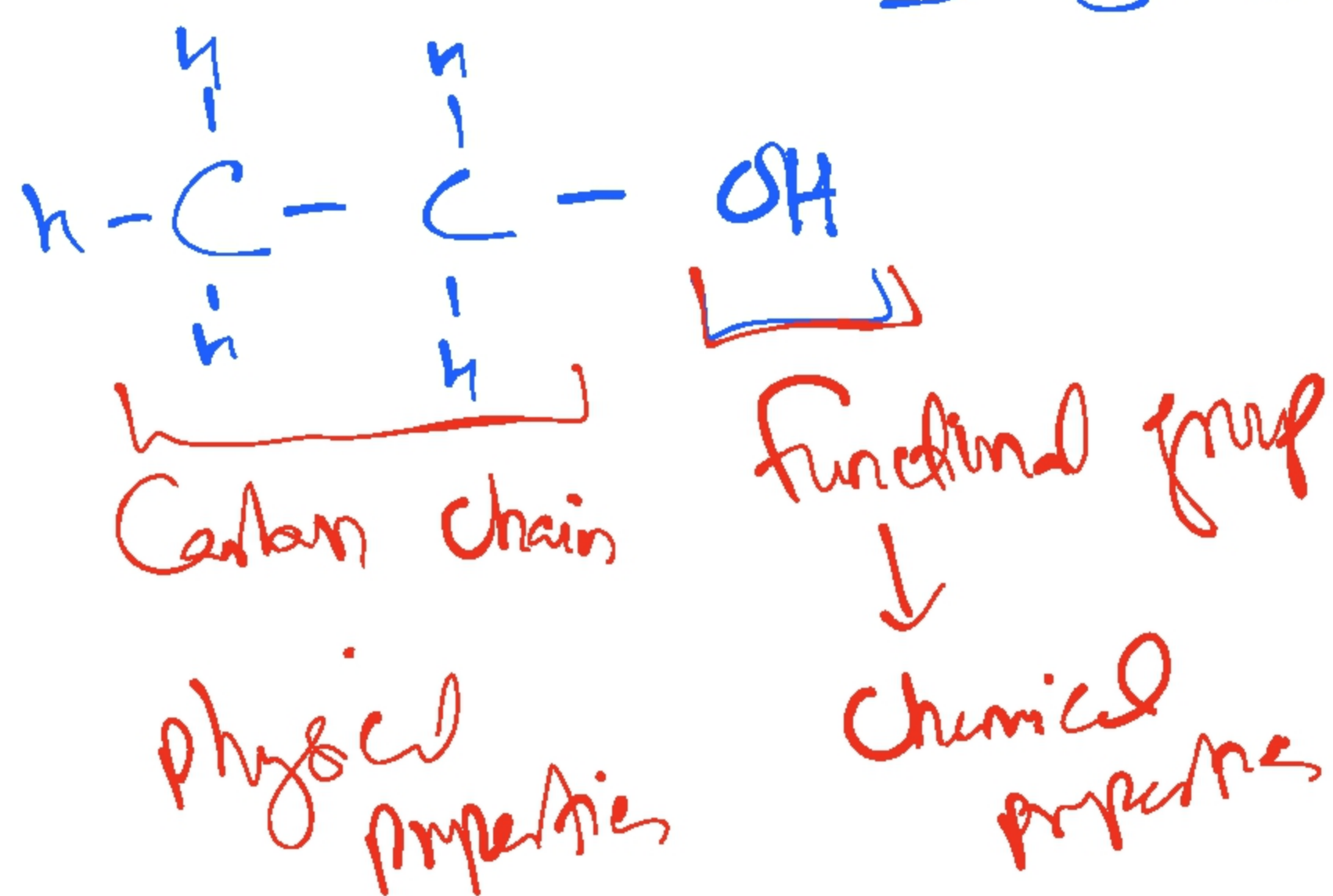
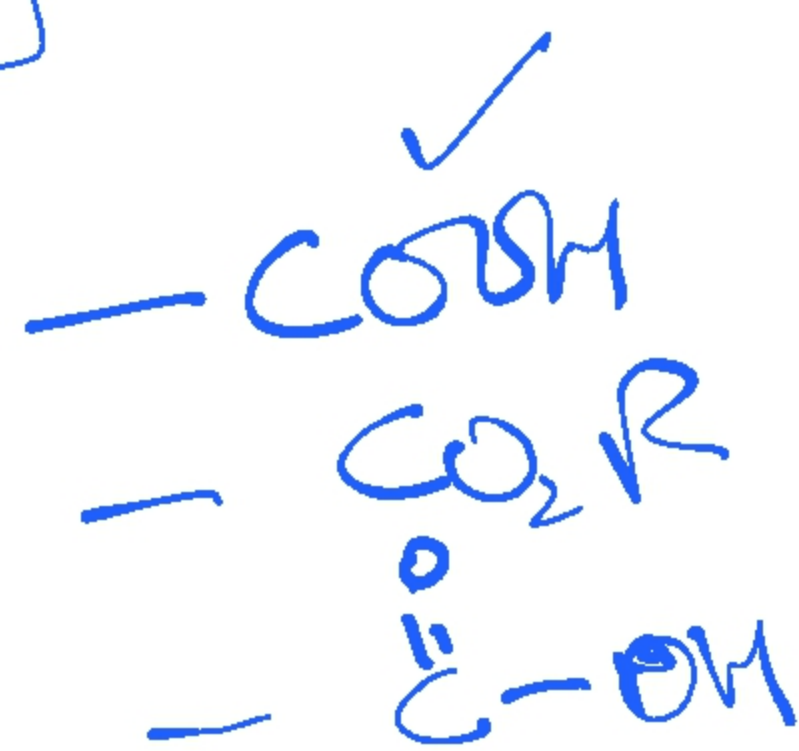


Same parts
Isomerism Compound having same
 M.F but different structural formula.

→ But-1-ene & But-2-ene are
 isomers of each other

→ Propan-1-ol & Propan-2-ol
 are isomers of each other.

Alkane $\text{C}_n\text{H}_{2n+2}$ $n = \text{number of C}$
 Hexane C_6H_{14}



Alkane $\text{C}-\text{C}$
 General formula $\text{C}_n\text{H}_{2n+2}$

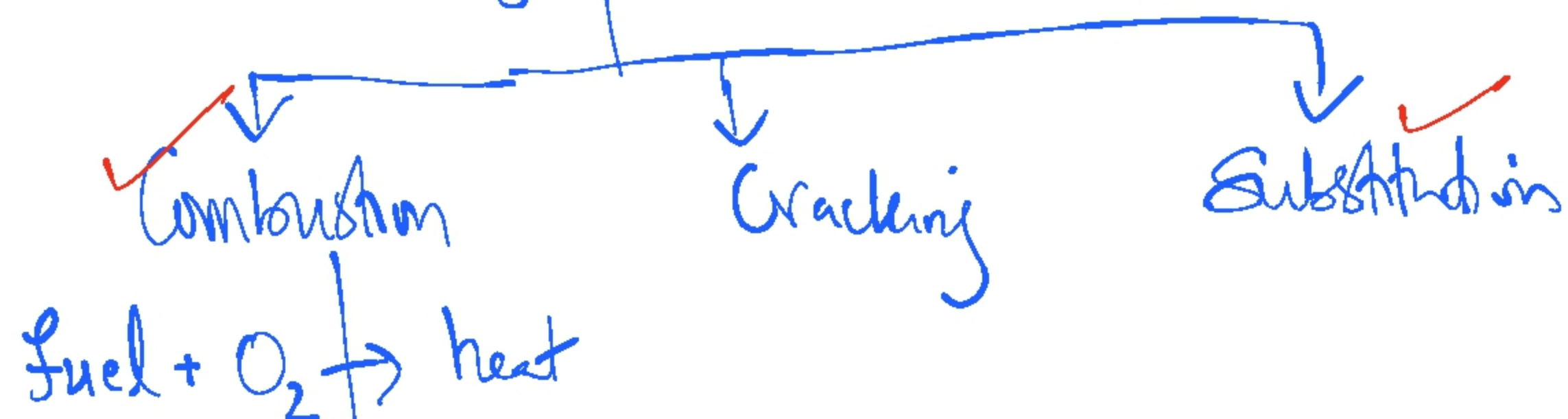




Butane

Alkanes are unreactive / less reactive

↓
Single bond C-C



Cracking

✓ Substitution

Complete
excess of O₂
Products CO₂, H₂O

Incomplete Combustion
limited of O₂

Products CO, H₂O

C Carbon Soot.

Greenhouse gas
CO₂

CO
H₂ → silent killer
no smell
no colour
→ Substitution

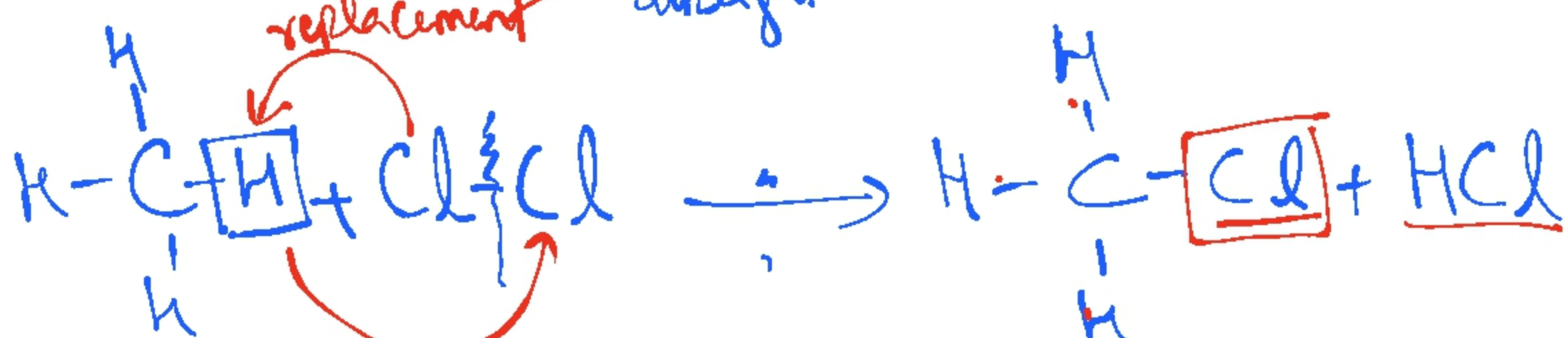
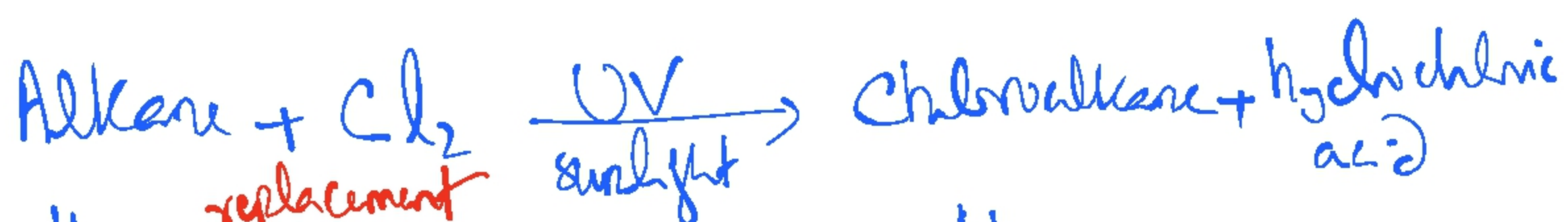


number of C → balancing of CO₂

number of H / 2 → balancing of H₂O

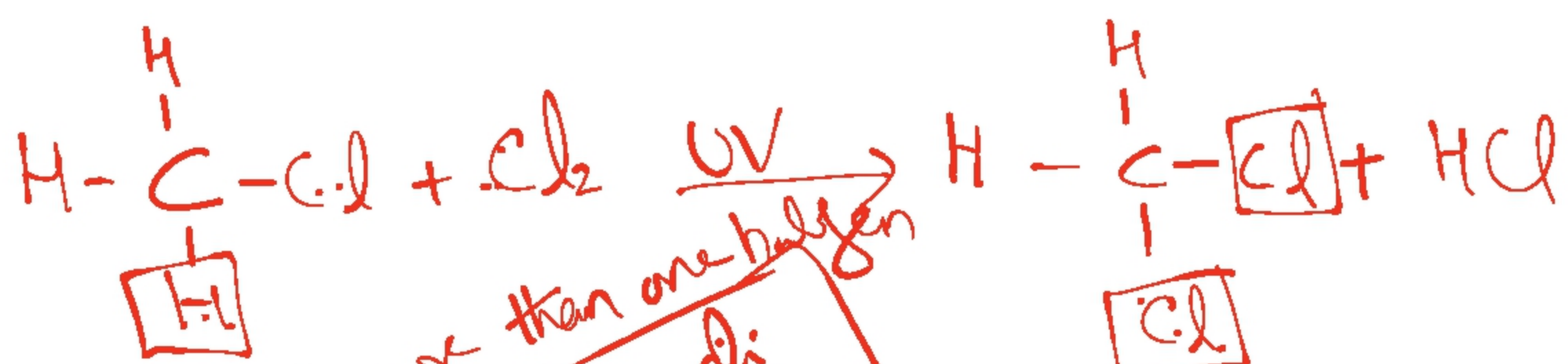
Substitution (photochemical Reaction)

↓
Replacement of H atom by halogen atom



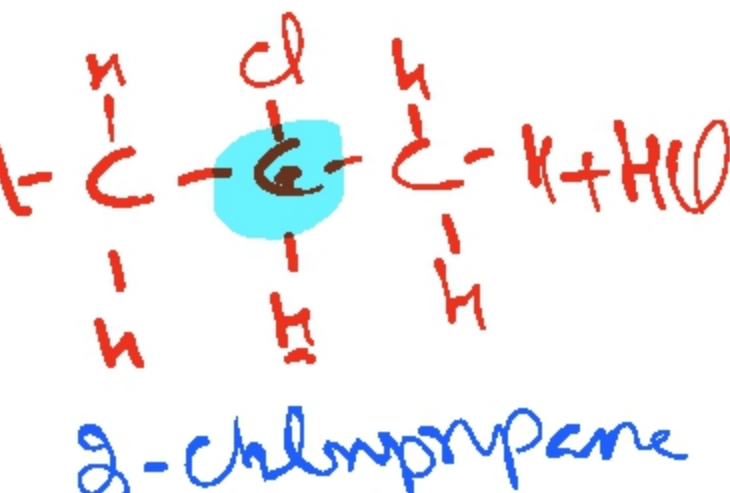
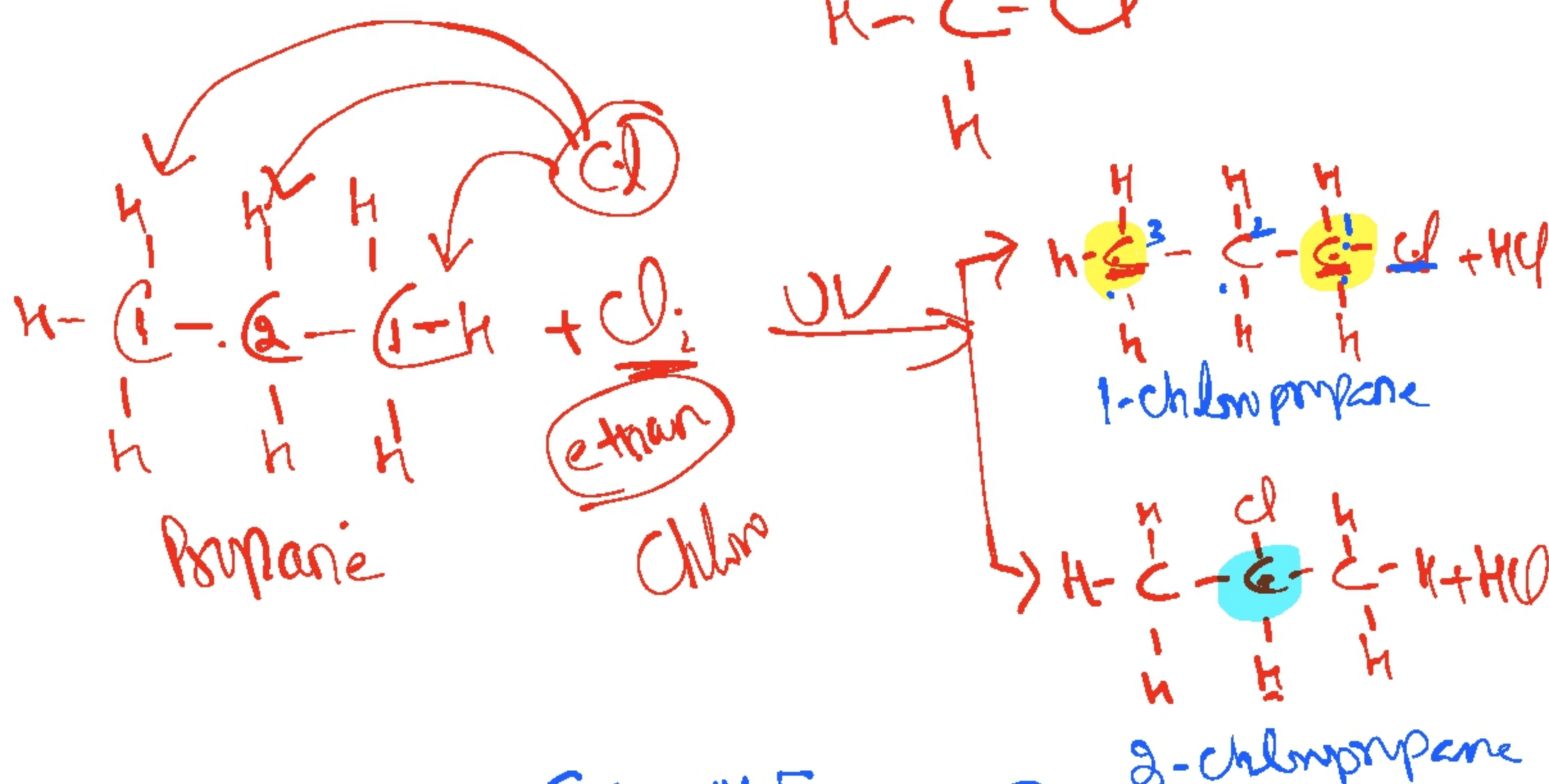
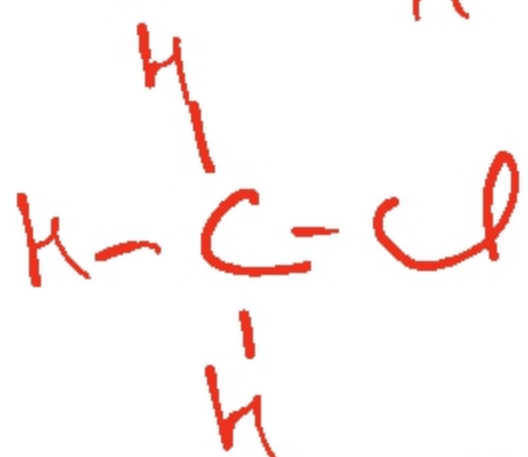
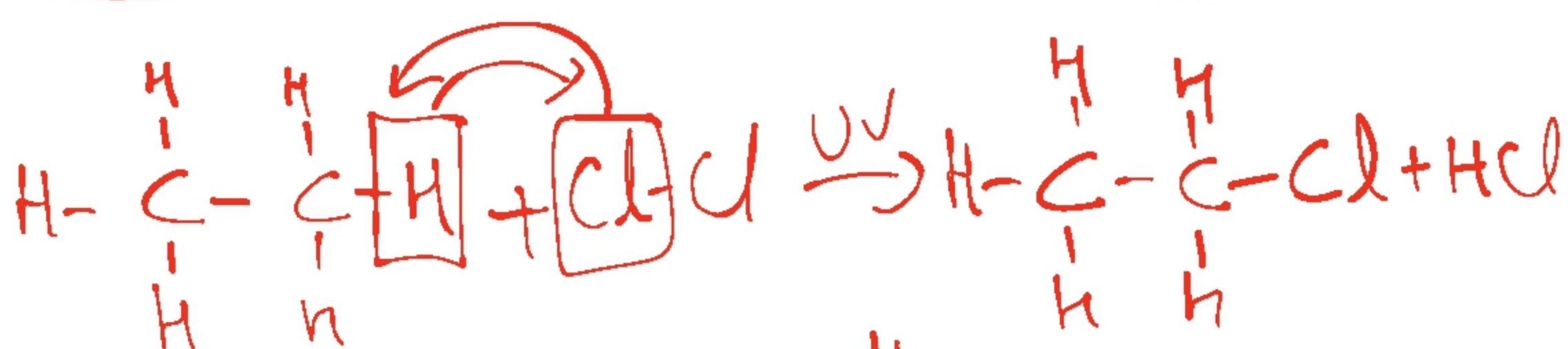
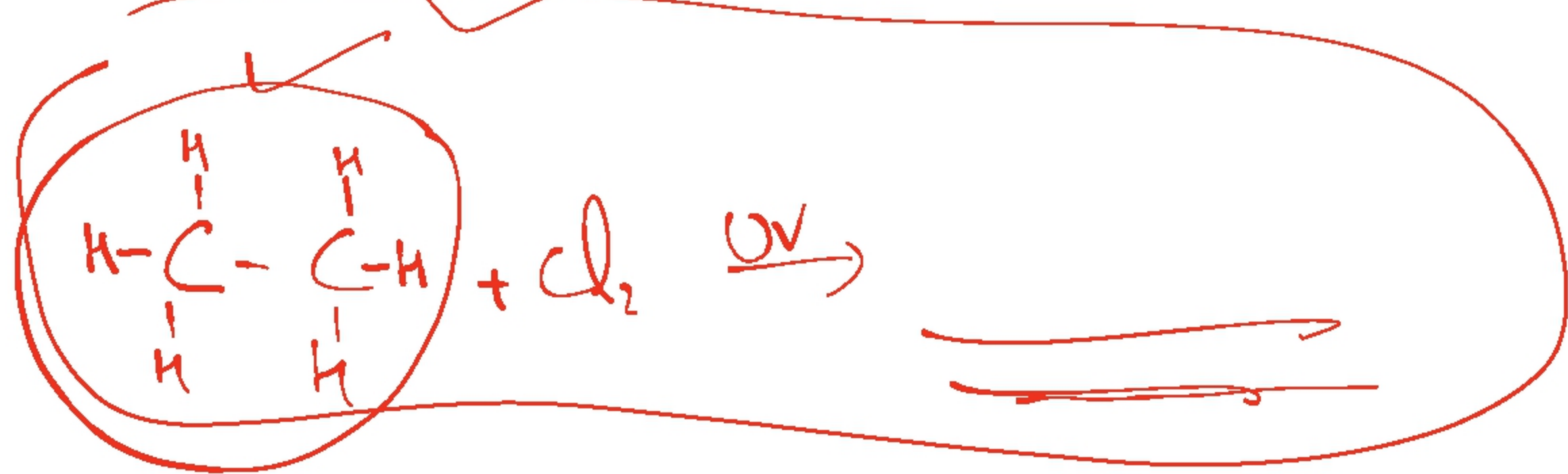
Alkane substitution of hydrogen
Namely → halogen C chain

Chloromethane



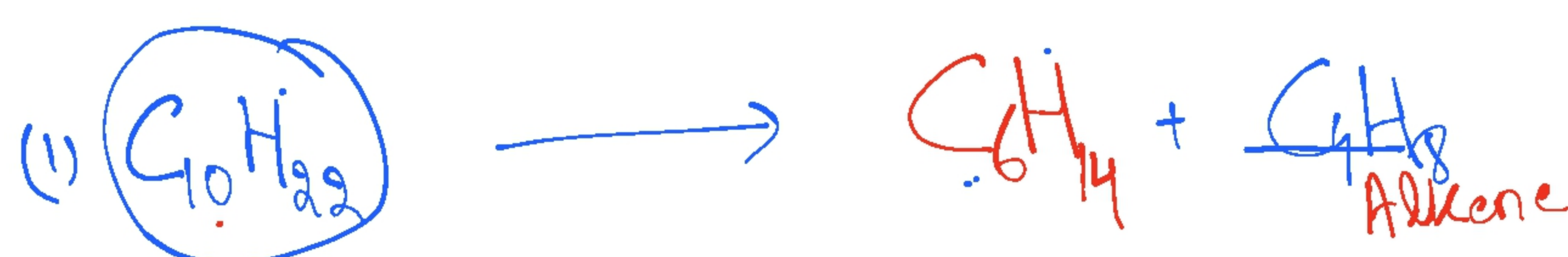
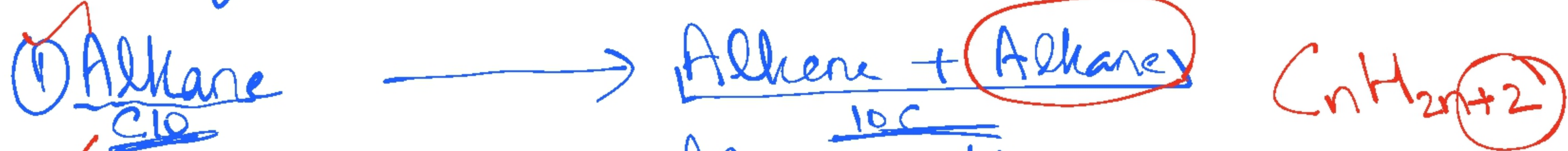
if more than one halogen
Prefix → 2- di
3- tri
4- tetra.

dichloromethane



Same M.F. ← isomers →
different structural
formulae

Cracking Breaking big hydrocarbon into smaller ones
Catalyst: Silica SiO_2 , Al_2O_3

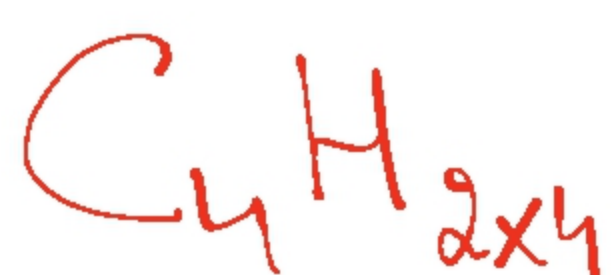
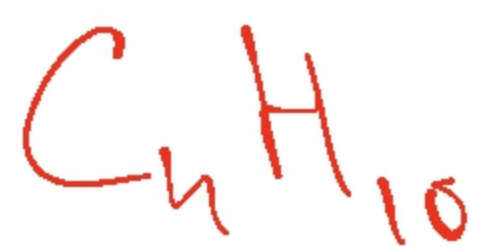
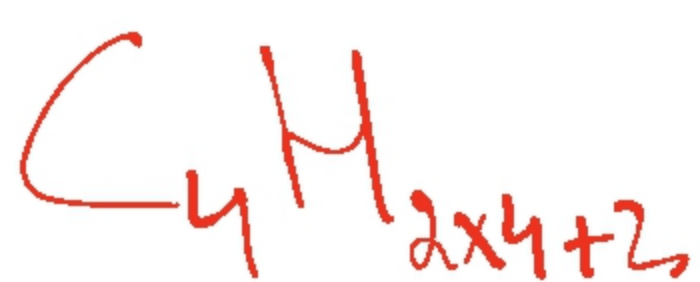




General formula C_nH_{2n+2}
 Alkane

C_nH_{2n}
 Alkene

number = n



Big hydrocarbon $\rightarrow$ Smaller hydrocarbon

Uses are limited

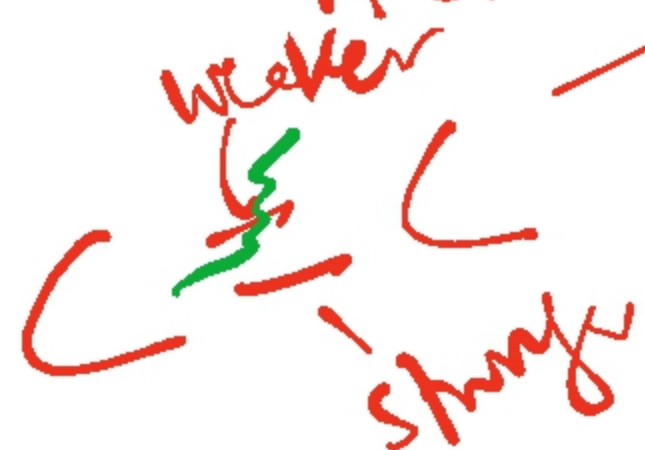
more uses.

$\rightarrow$ fuel
 $\rightarrow$ chemical stock (raw materials)

Saturated
 Hydrocarbon



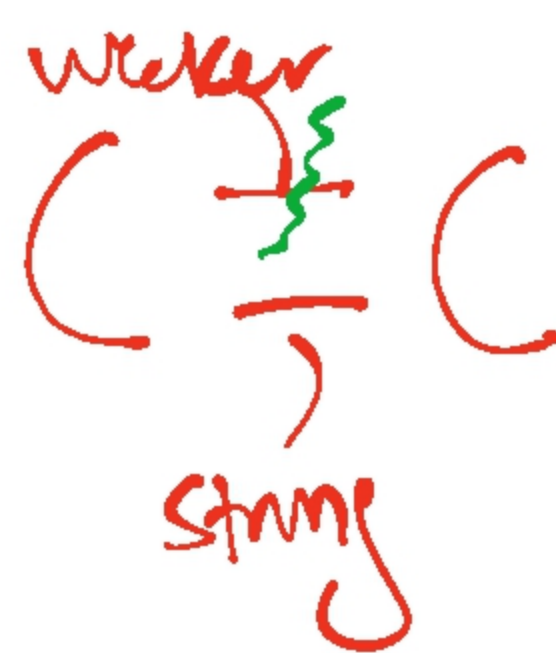
Alkane



Unsaturated
 hydrocarbon.



Alkene

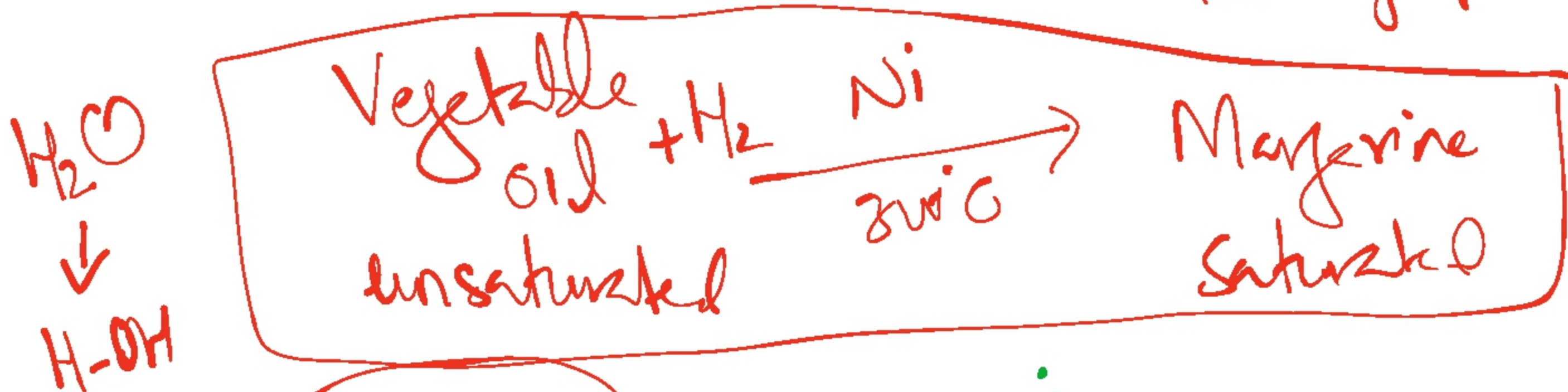


Addition Reaction

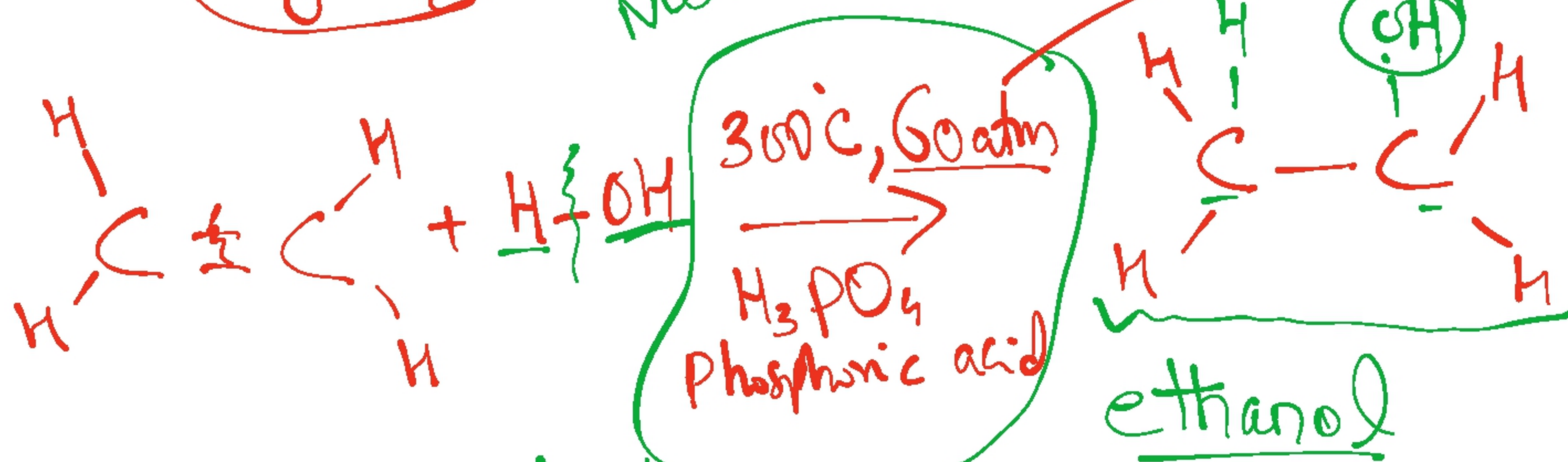
2 Reacts $\rightarrow$ Single product

($C=C$) Unsaturated $\rightarrow$ Saturated ($C-C$)



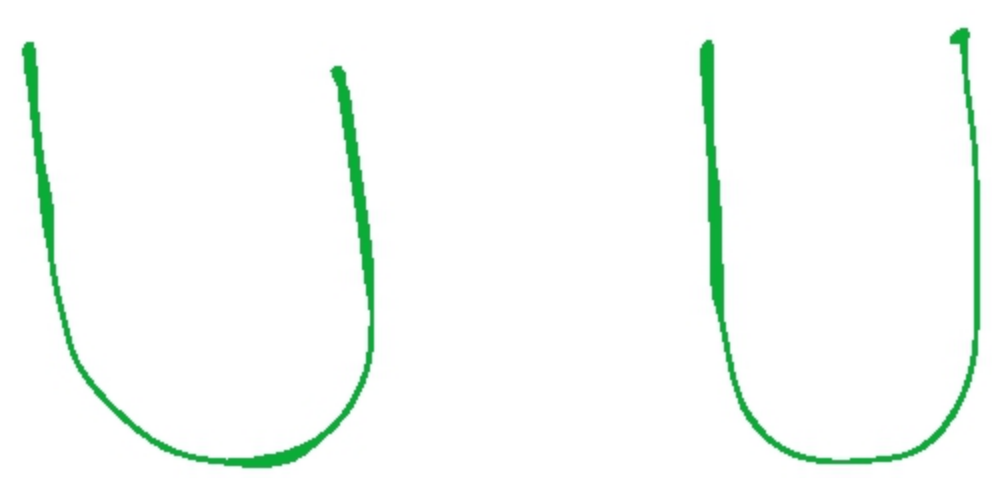


Hydrogenation
Memorising

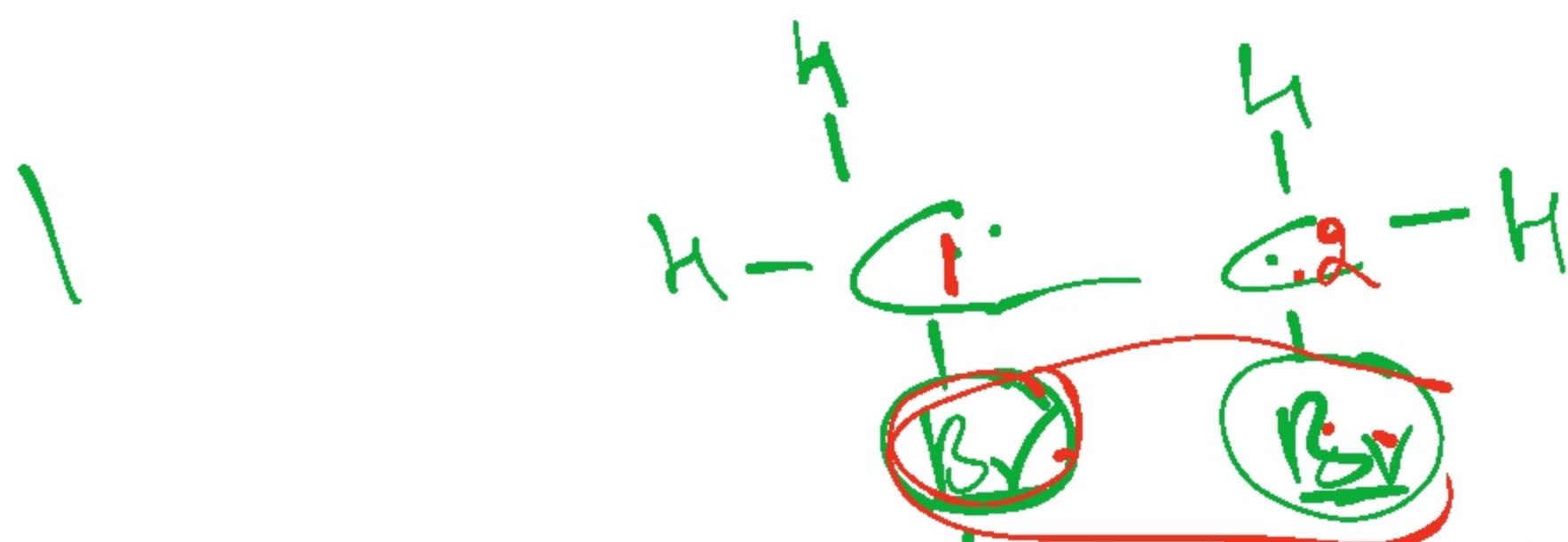


H_2O on reactant
Hydration

H_2O on the product $\rightarrow$ removal of H_2O
Dehydration



Alkene
Alkane
 Br_2



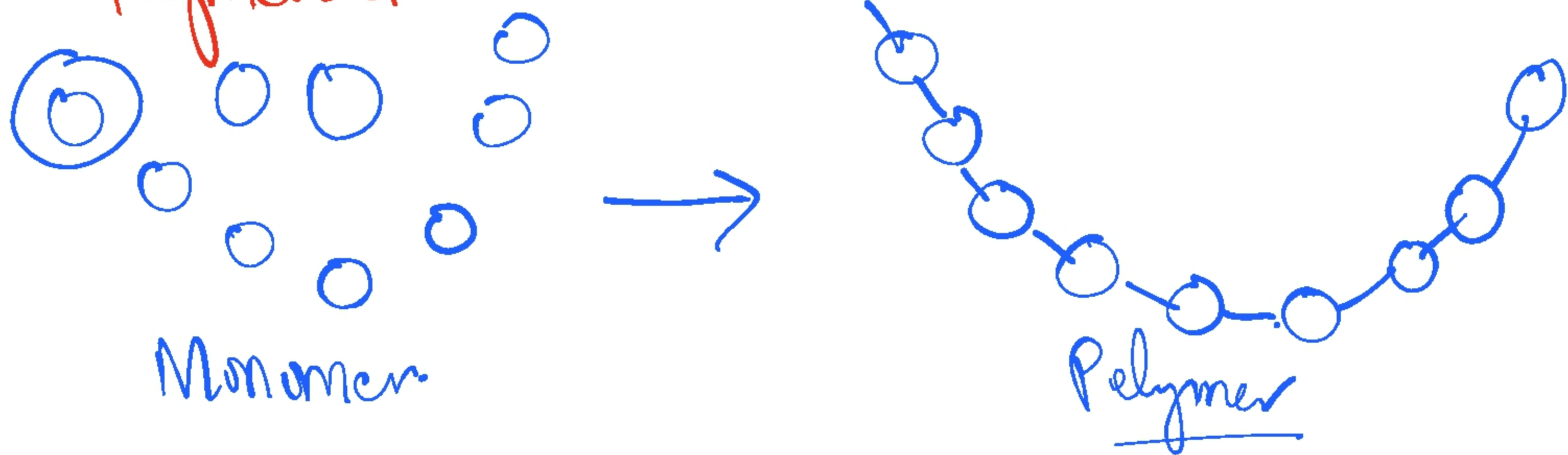
1, 2-dibromoethane

$\text{C}=\text{C}$ Addition Polymerisation
many parts

$\times \frac{6000 \text{ kPa}}{100} = 60 \text{ atm}$

Many small ^{Part} (monomers) joined together to make a big structure which is called Polymer and this process is called

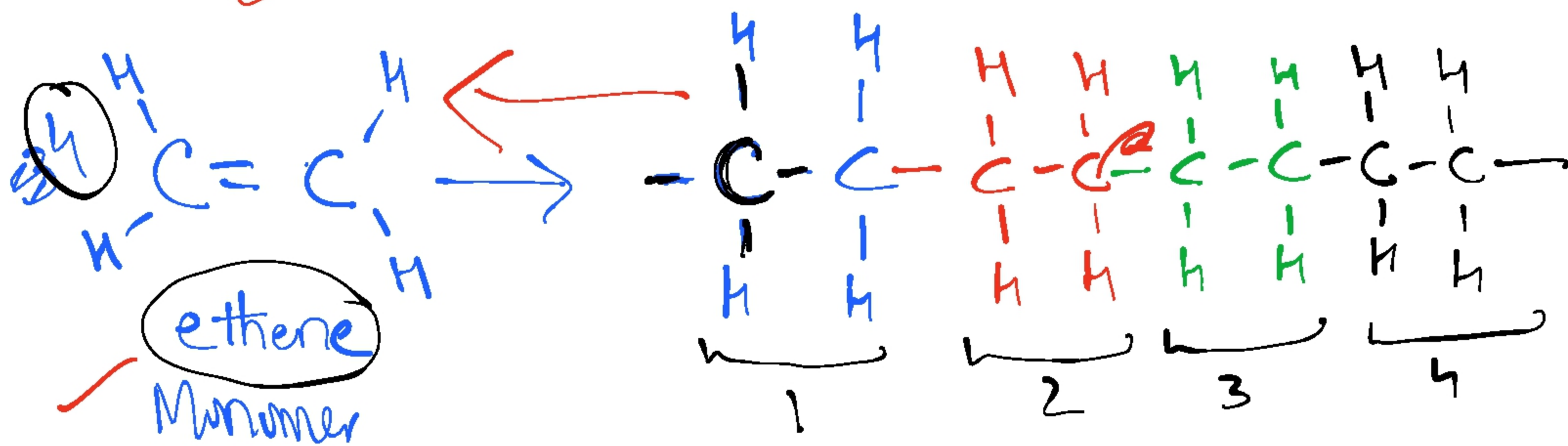
Polymerisation



Monomers

→ Must have $C=C$

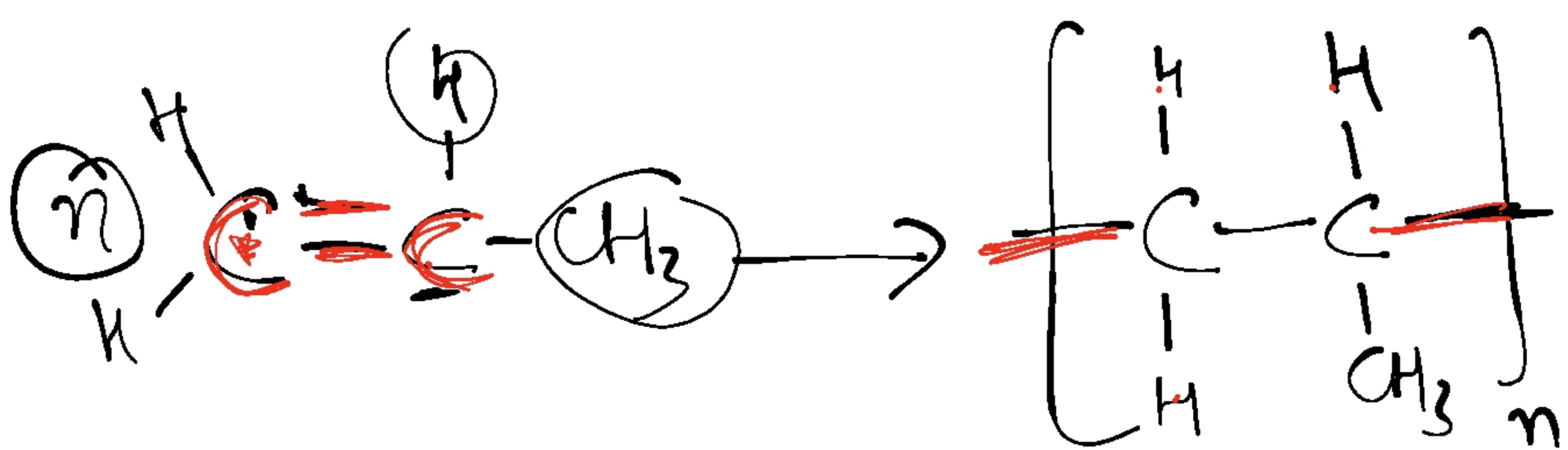
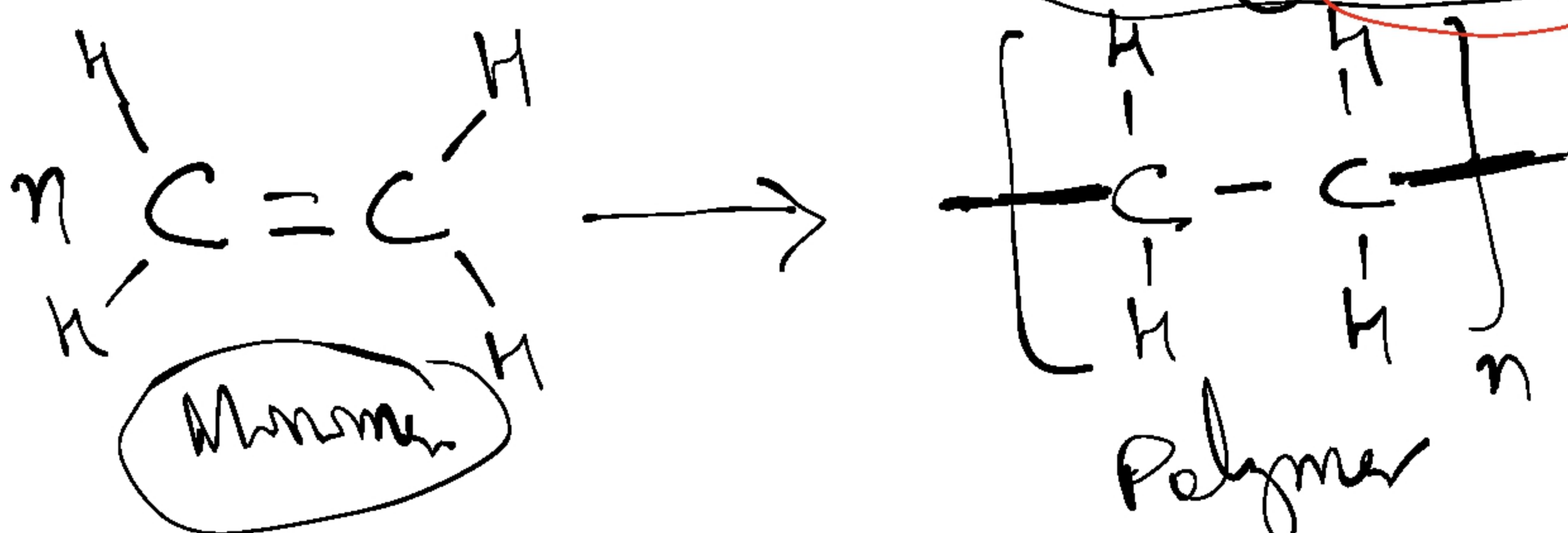
Polymer (show the wings on both ends)
 $C-C$

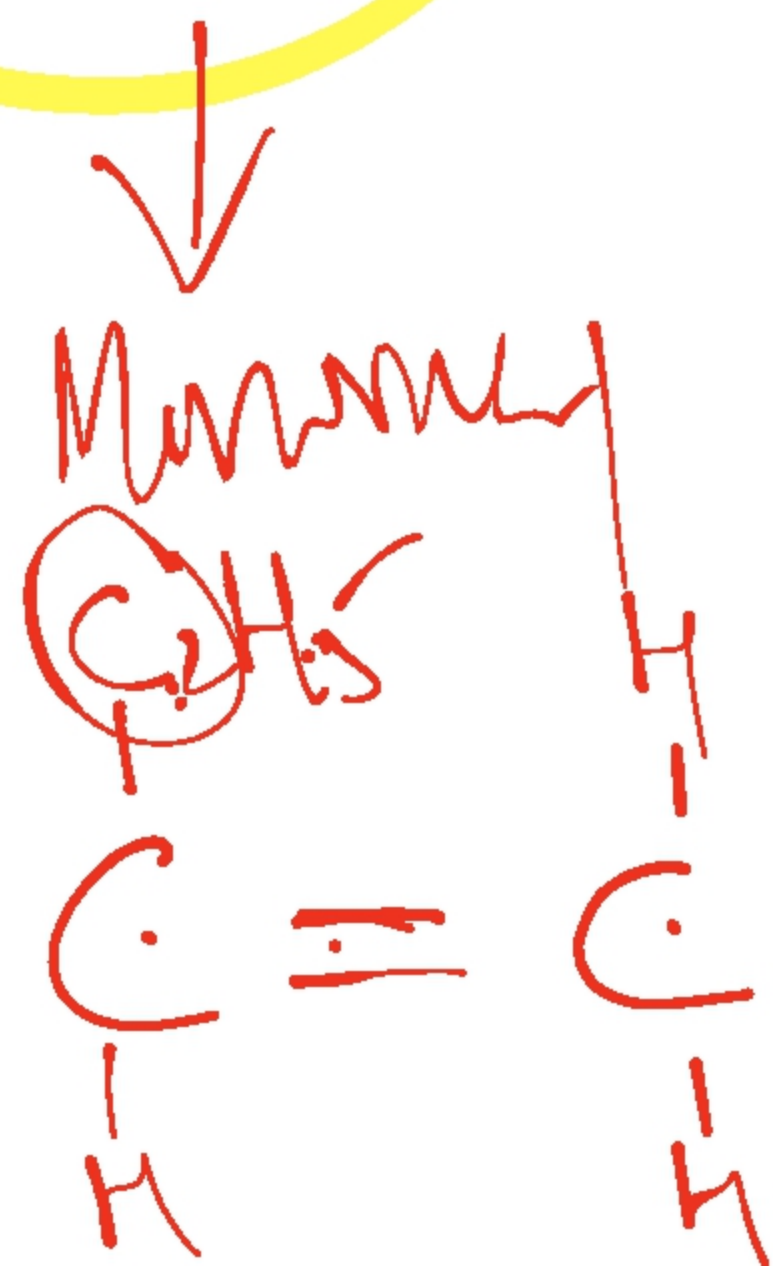
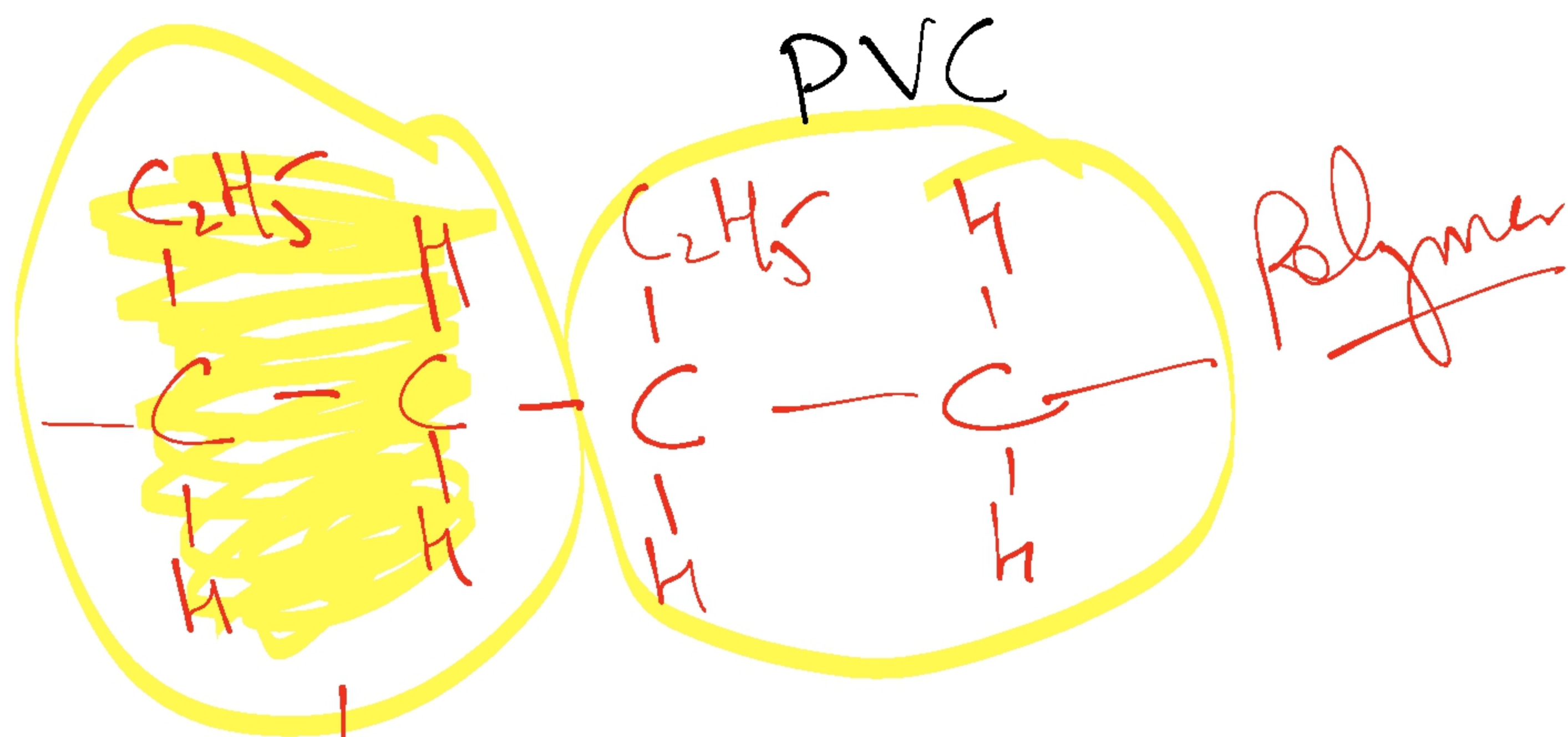


ethene

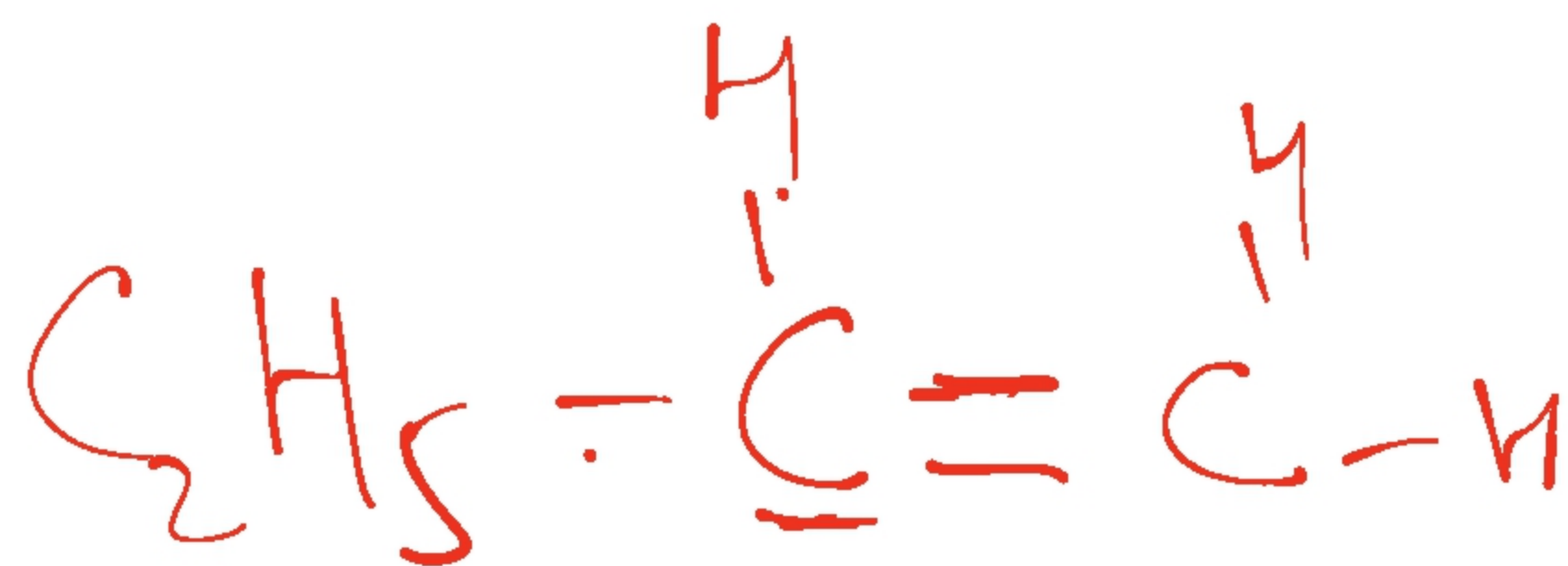
Polyethene

03452048907





Monomer 2



But-1-ene
Butene

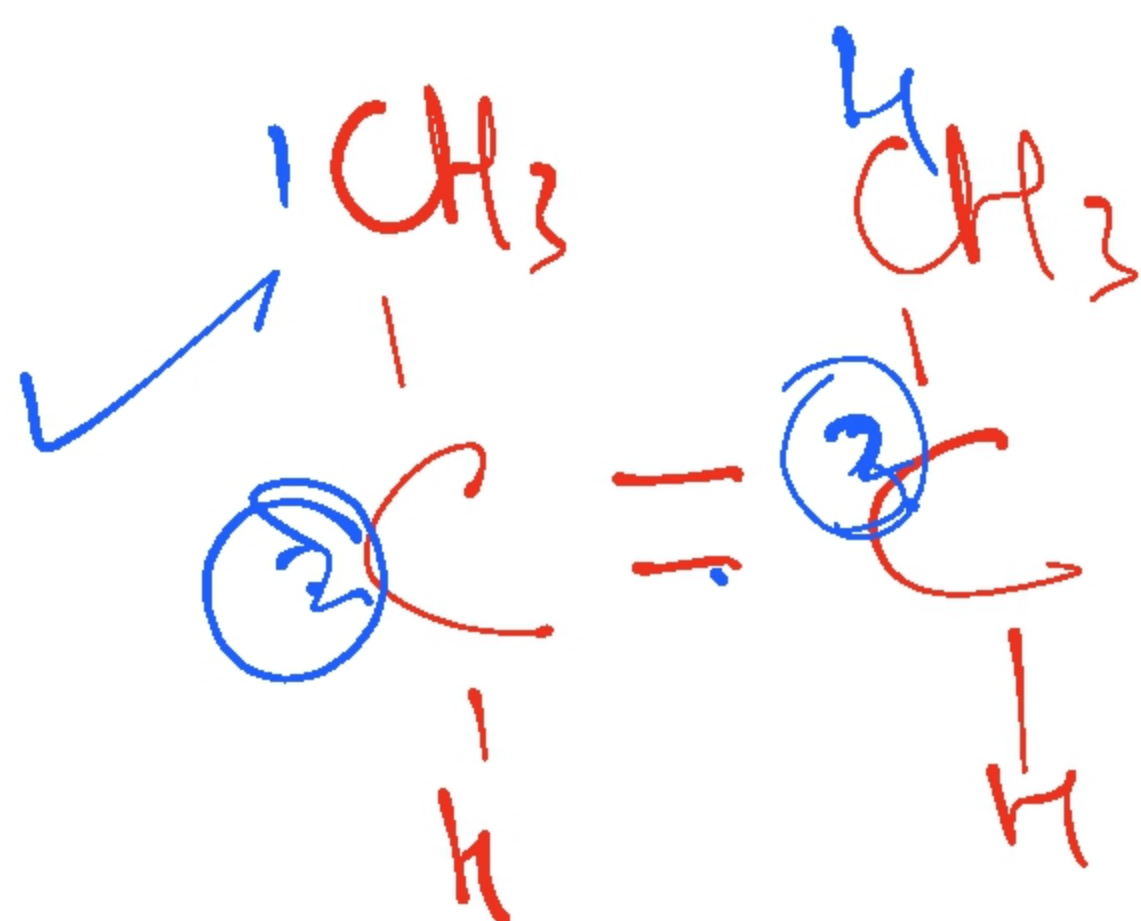
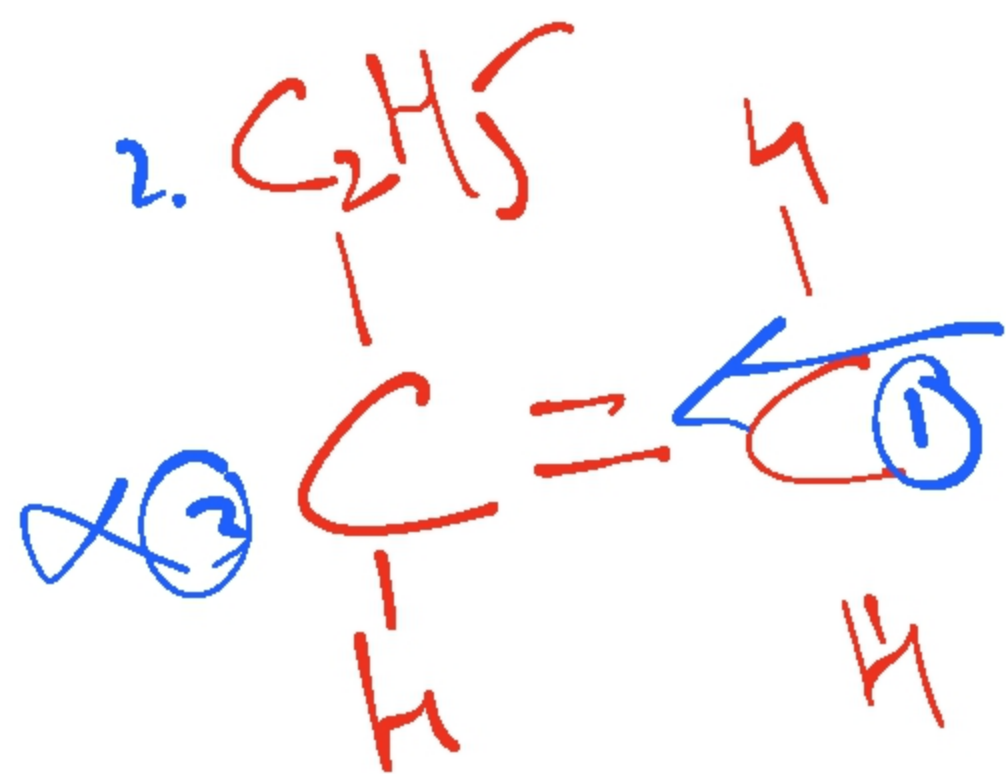
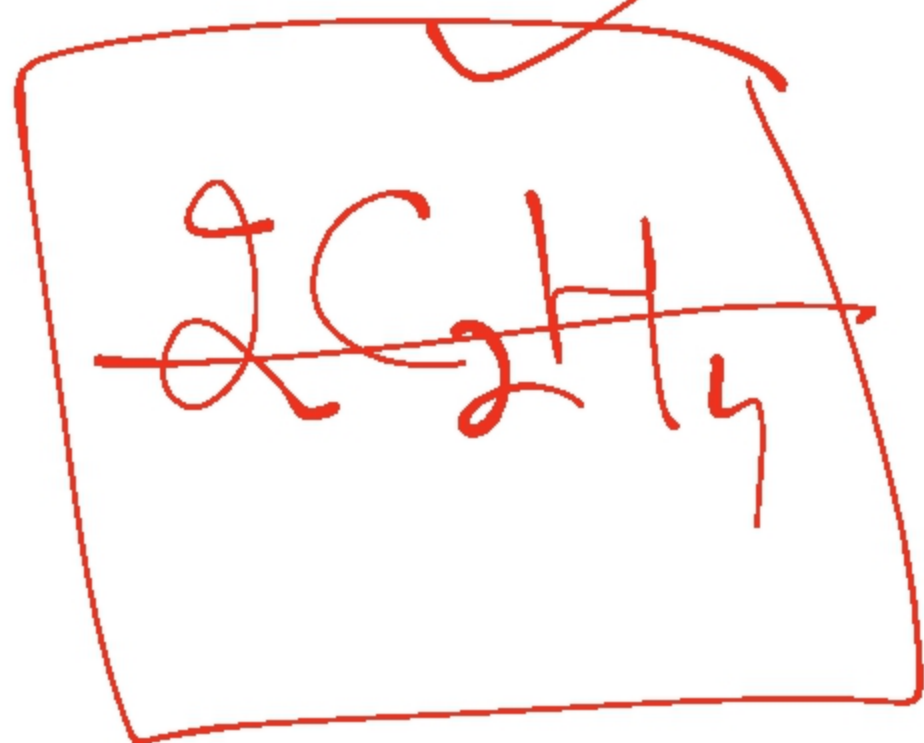
C_nH_{2n}
 $C_2H_{2 \times 2}$

ethene

Alkene

2:1 mole ratio

$C_{12}H_{26}$



C_4

Monomer

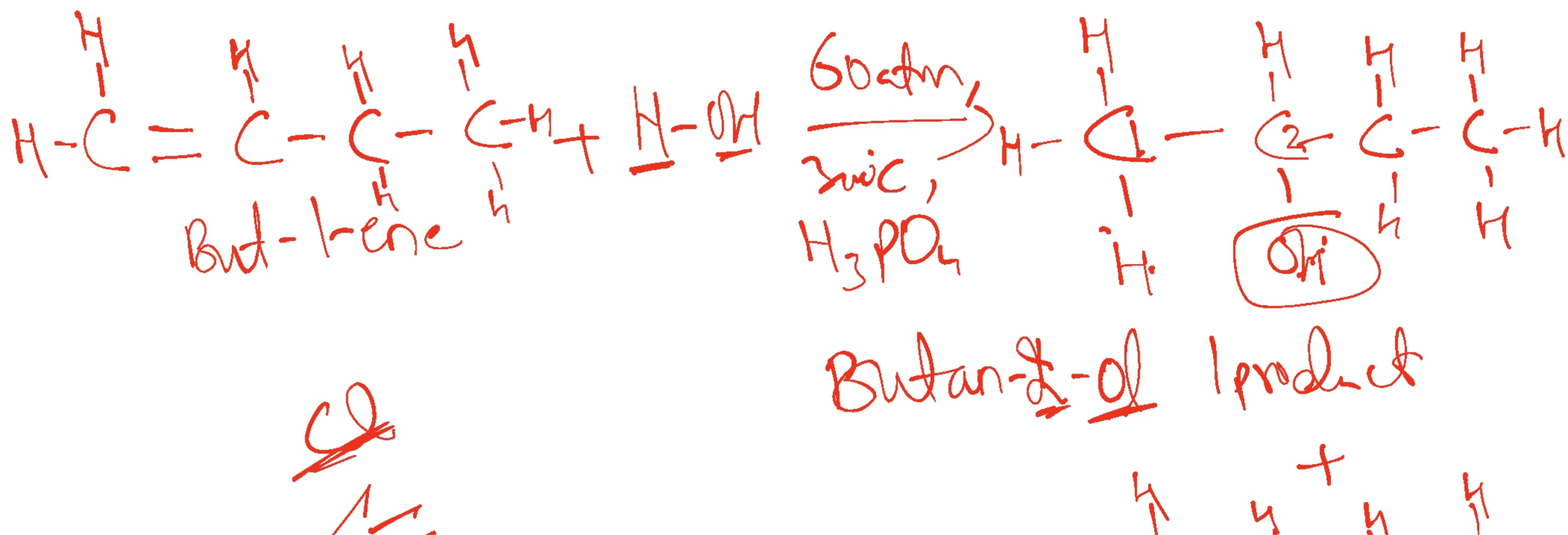
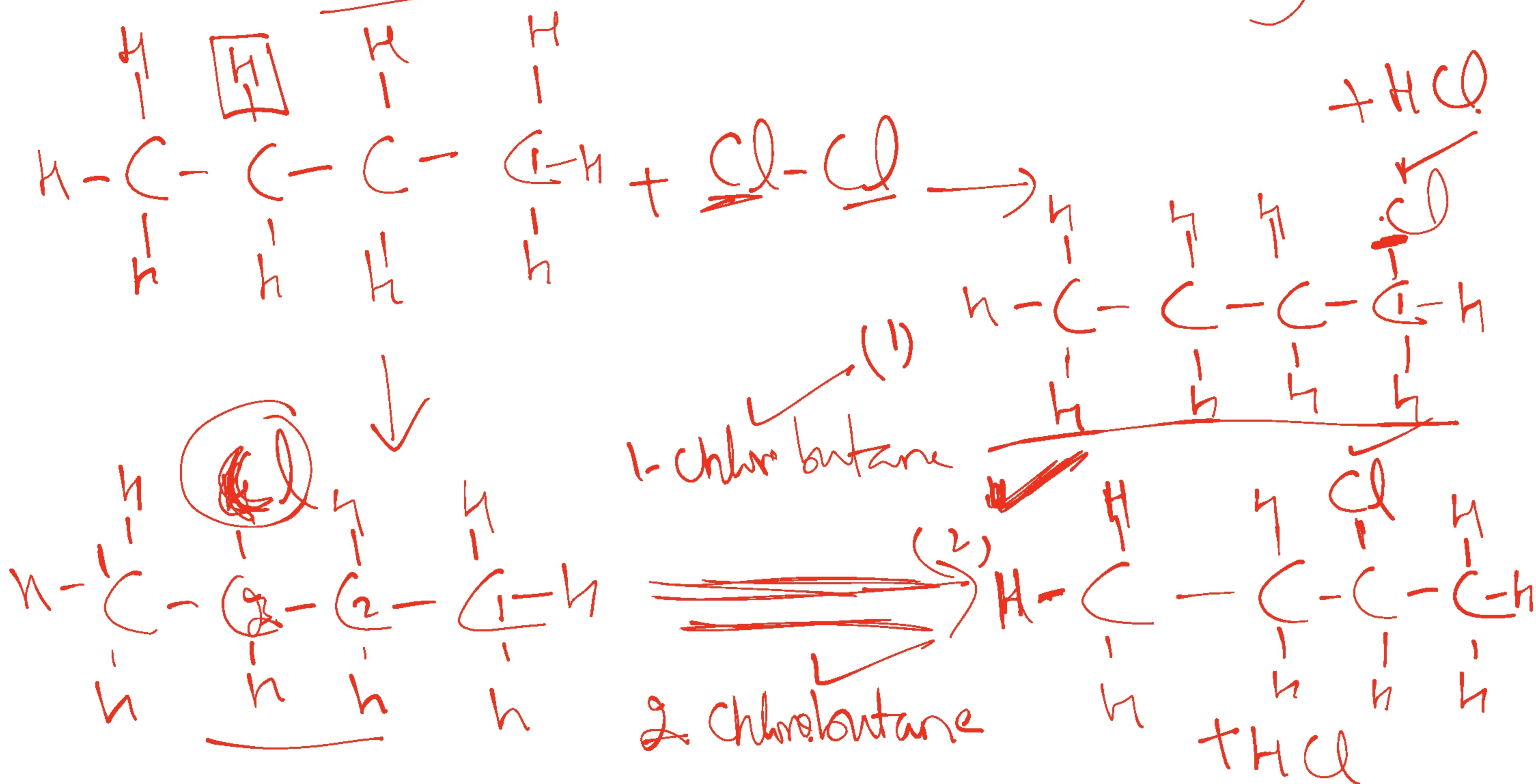
Alkene
Alkene

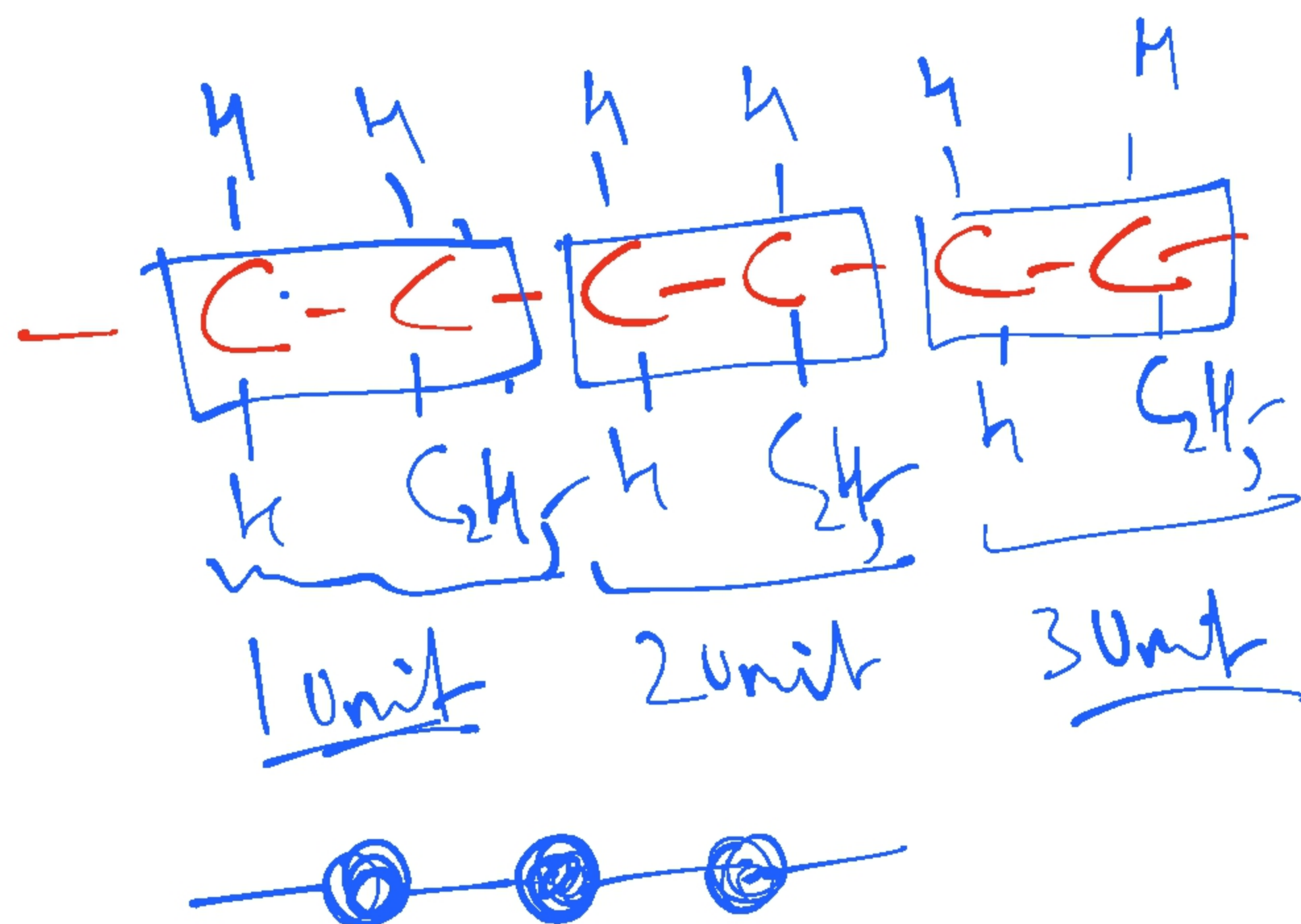
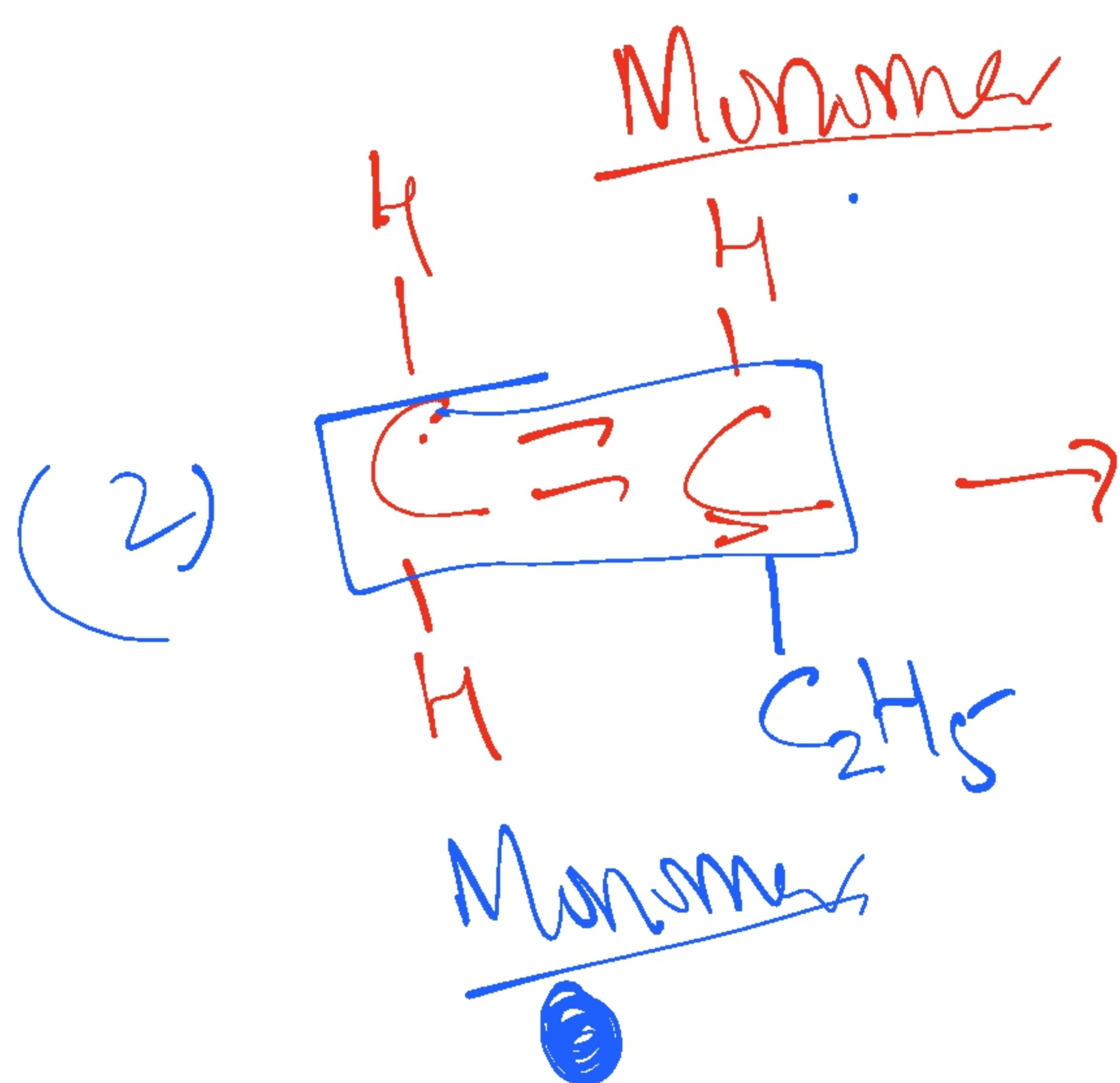
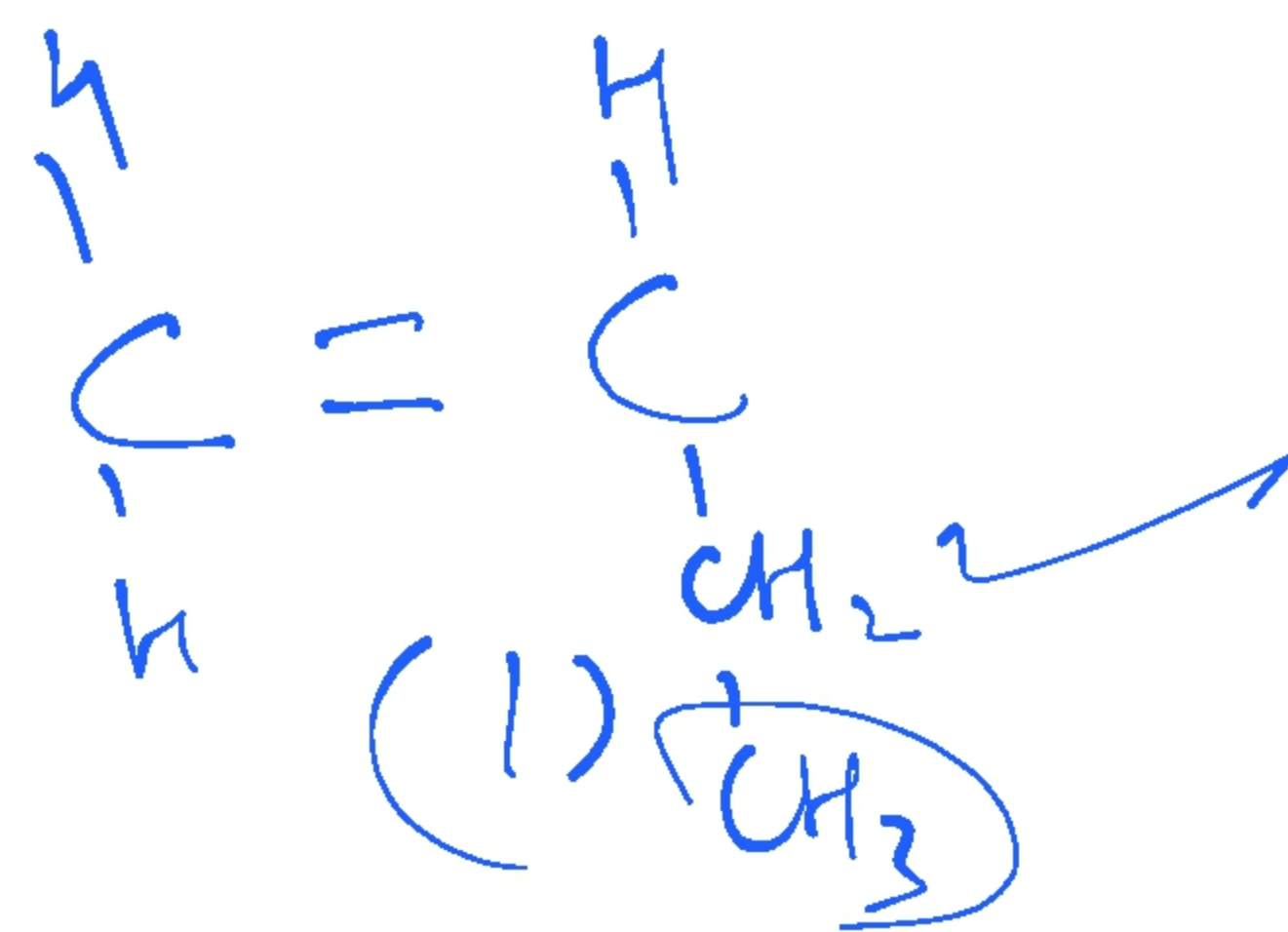
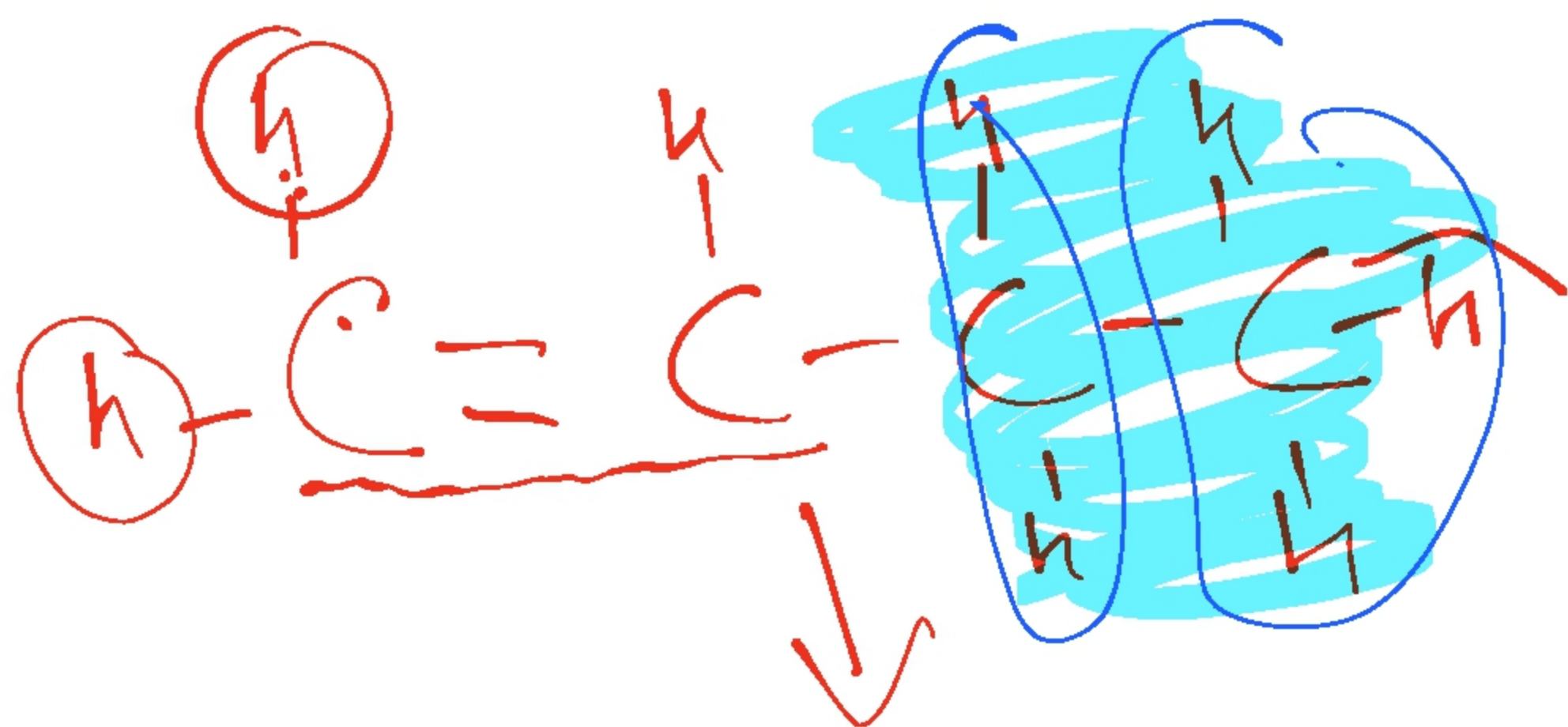
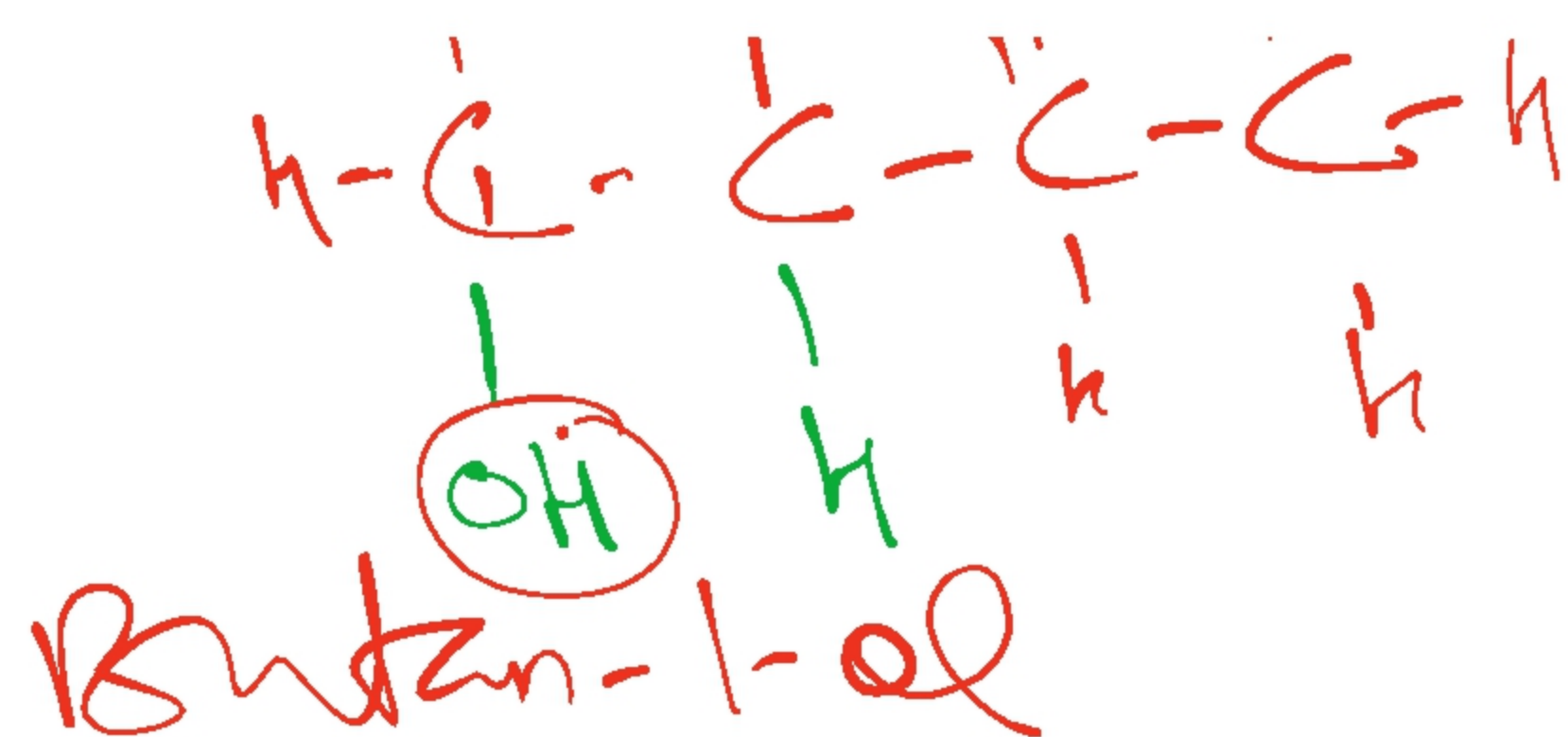
diffusion $\propto \frac{1}{n}$

Mr.

photochemical reaction

To provide Activation energy





Alcohol



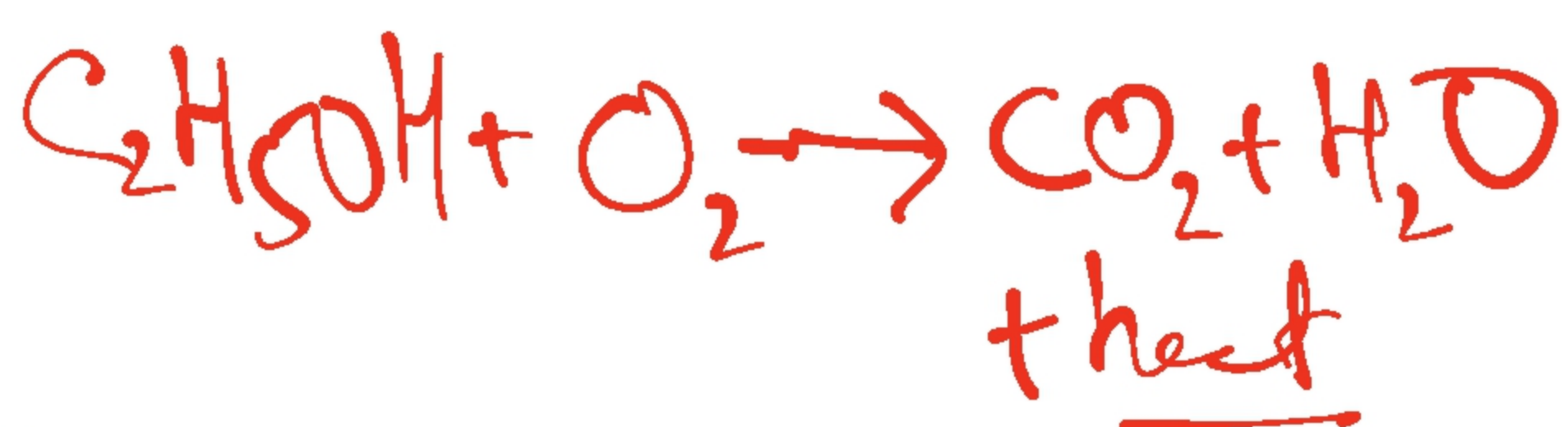
-OH functional group

→ First 5 Alcohol member
with their name and display

Formula.

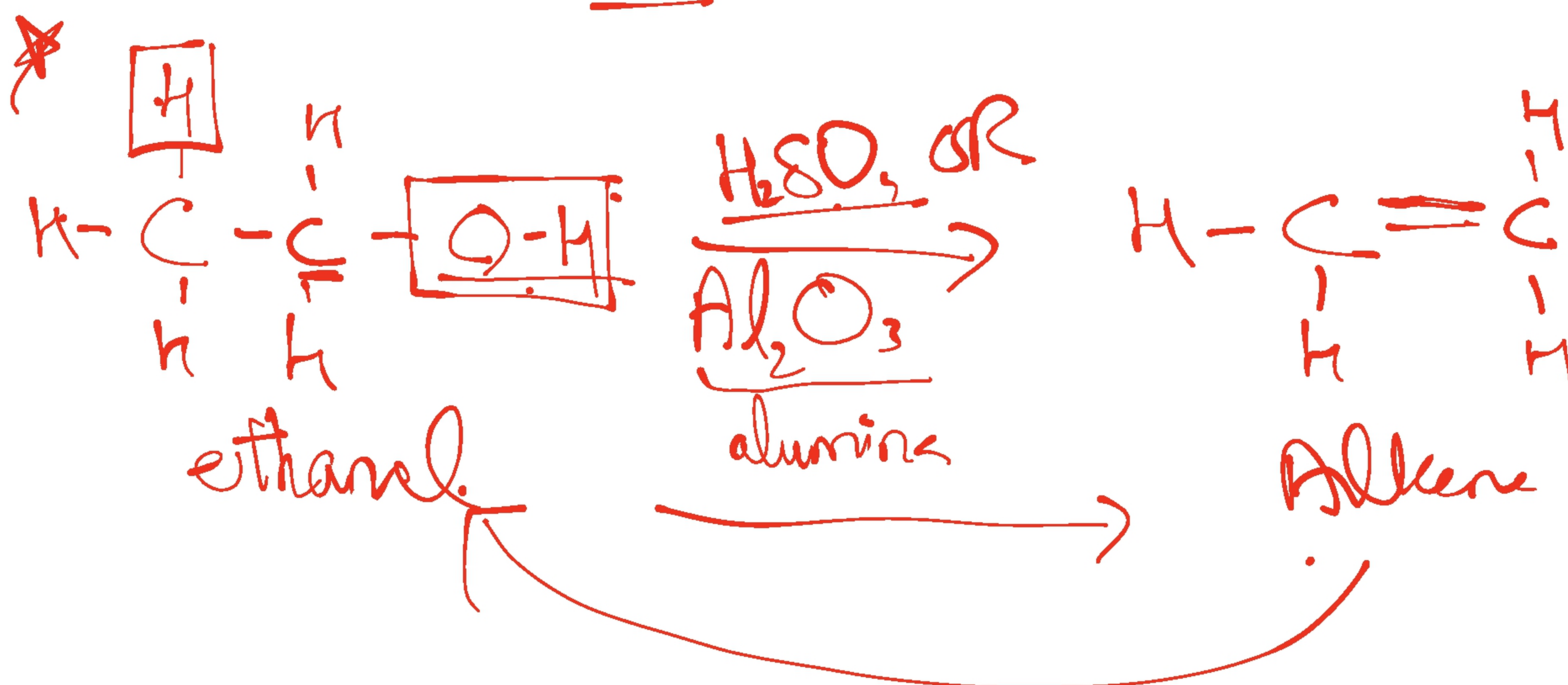
Reactions of Alcohols

① Combustion



② Dehydration
removal of $H + OH$

oxidation
(prepare Carboxylic acid)



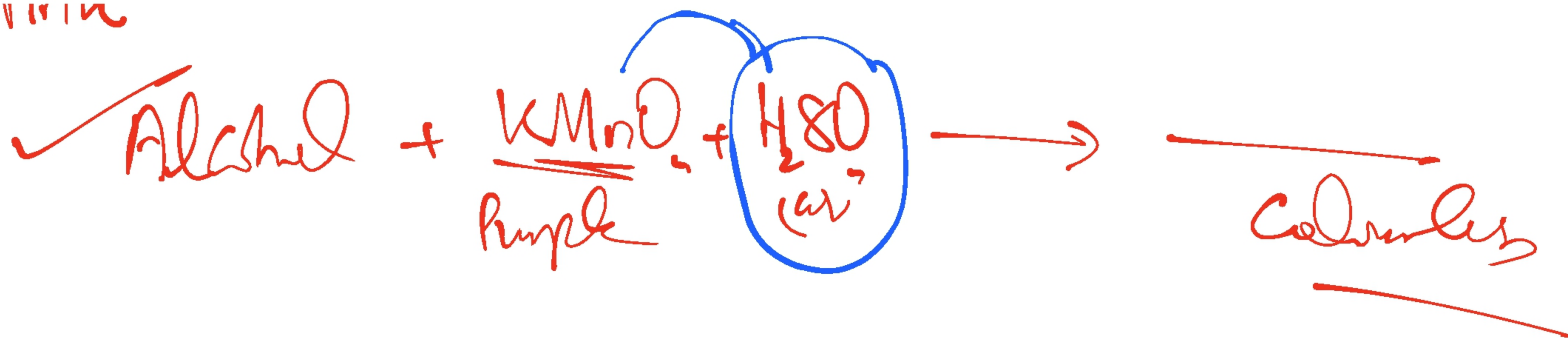
③ Oxidation loss of e^- OIL
Increase in oxidation state

~~oxidizing agent~~ Gain of oxygen. ~~oxidizing agent~~

$KMnO_4/H_2SO_4$
(ox)
Potassium manganate
 $\downarrow$
Purple or Pink $\rightarrow$ Colourless

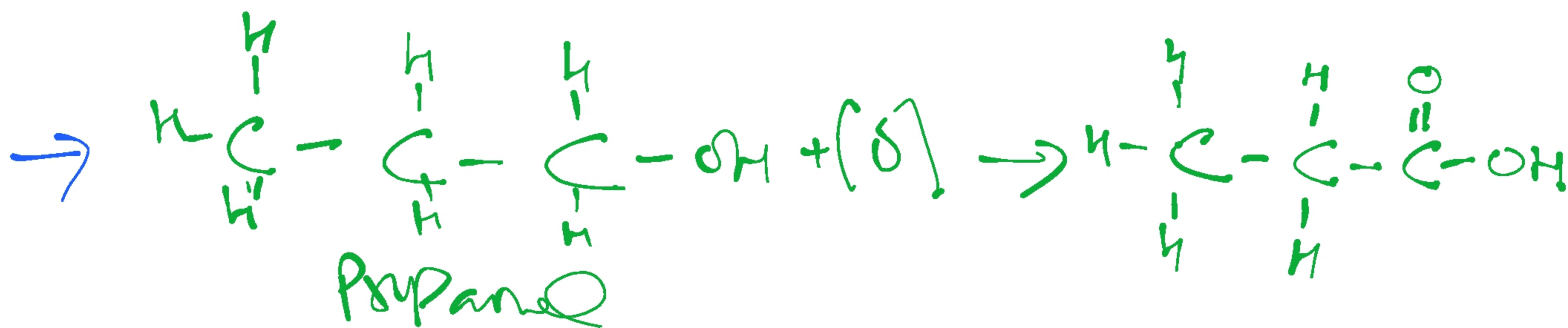
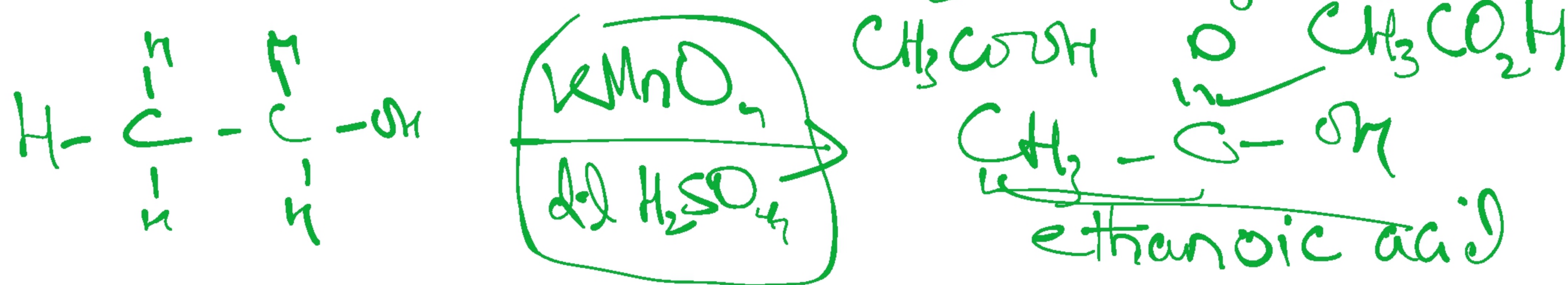
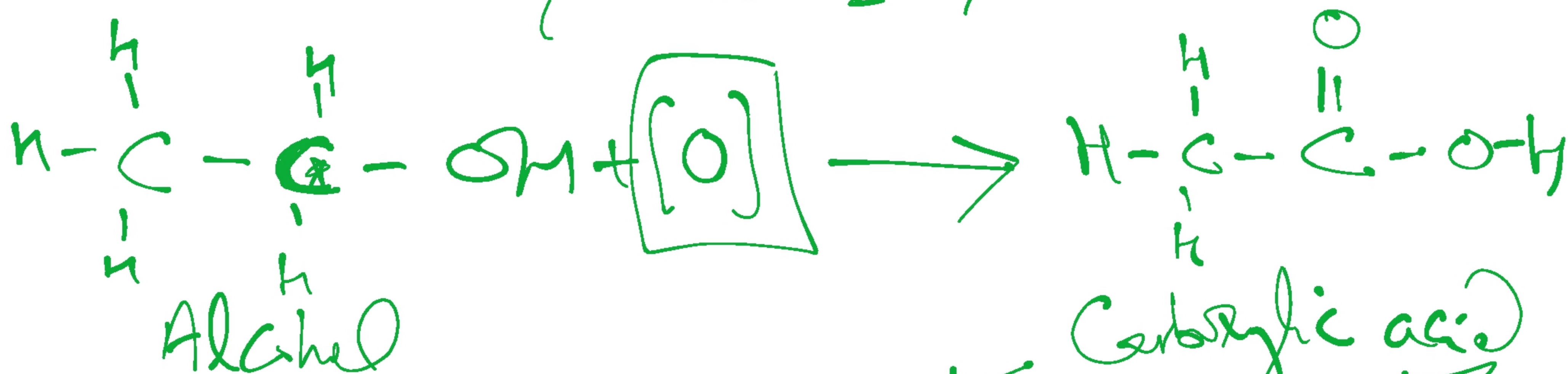
$K_2Cr_2O_7/H_2SO_4$
(ox)
Potassium dichromate
 $\downarrow$
orange $\rightarrow$ green colour

11/1/22



Oxidising Agent

which oxidises other (alcohol)
 but reduce itself.



hr

Fermentation breakdown of glucose into simple substance by microorganisms such as Yeast / Bacteria without using oxygen. (anaerobic process)

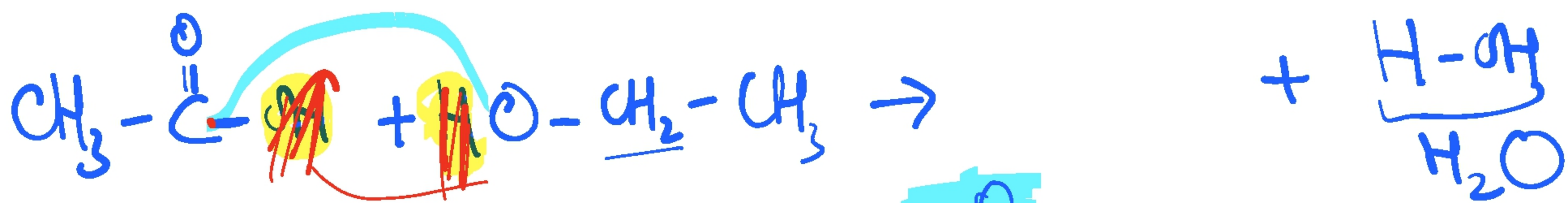
Catalyst
non living

enzymes
living catalyst

Addition reaction you will give product

Ester

Carboxylic acid + Alcohol $\rightarrow$ **Ester** + Water.



Carboxylic
acid
(2)

Alcohol
(1)

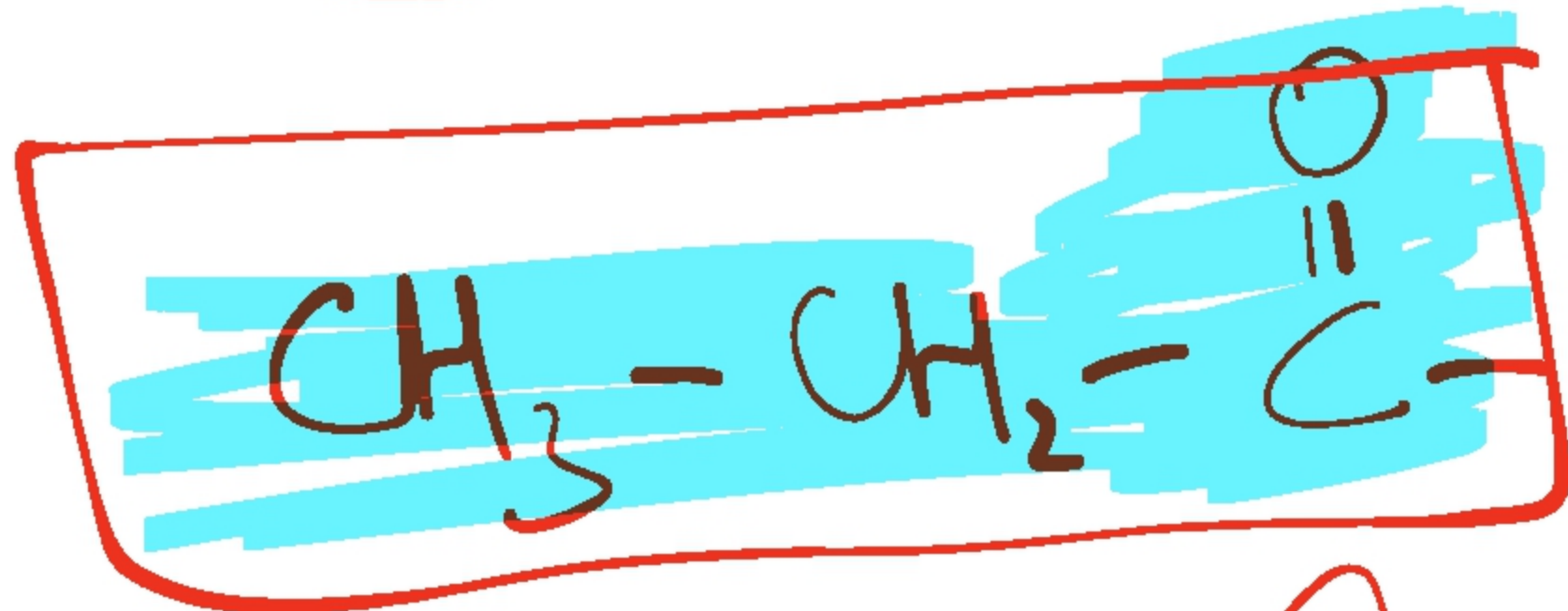
How to name
ester

Suffix -oate

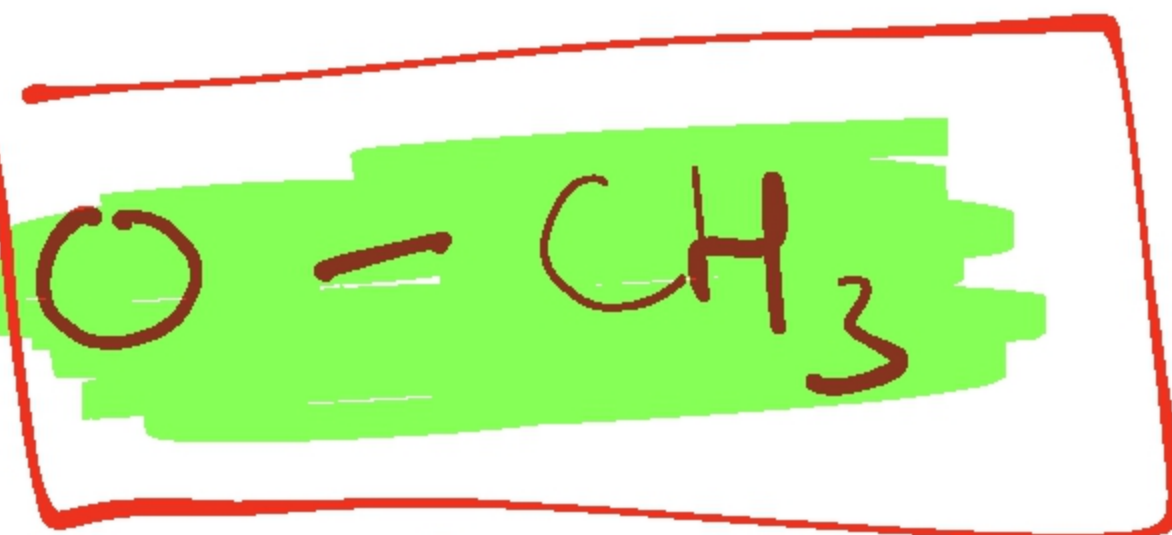
Suffix -yl



Ethanoate

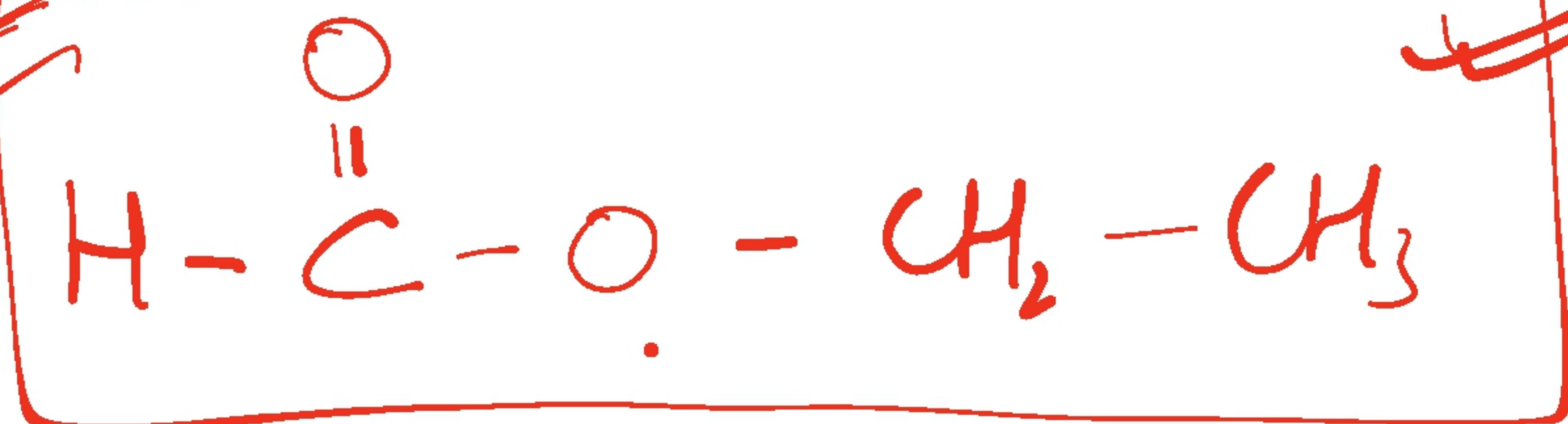


Carboxylic acid
-oate



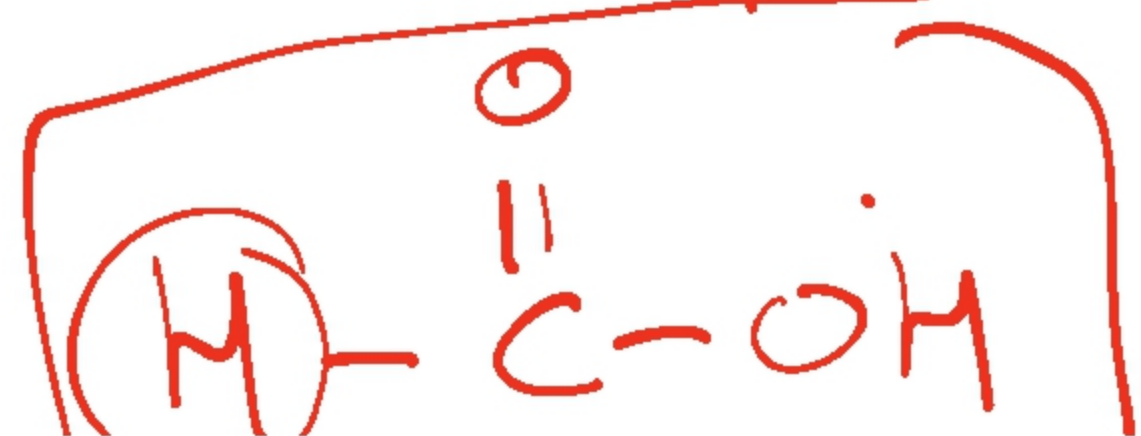
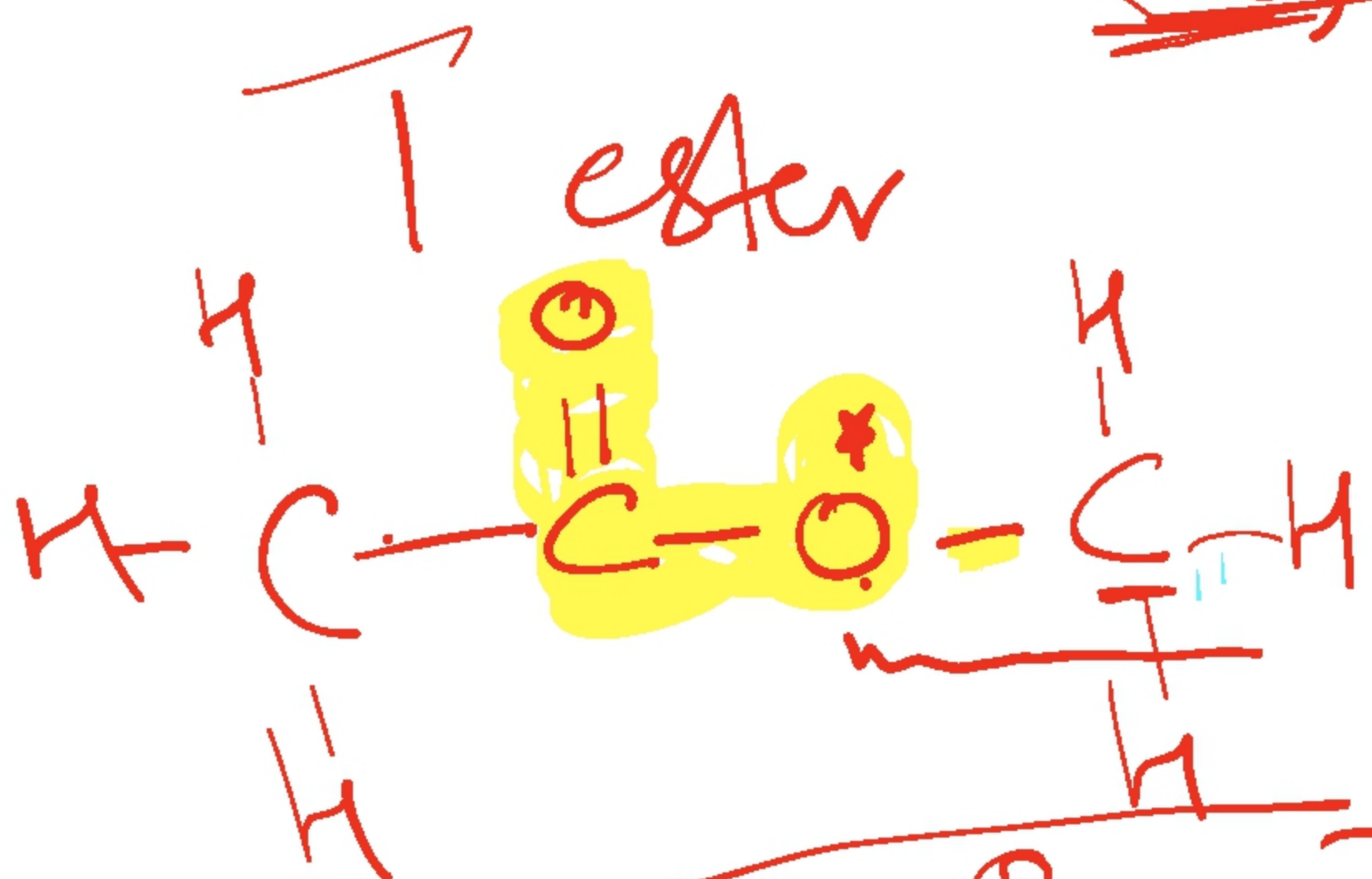
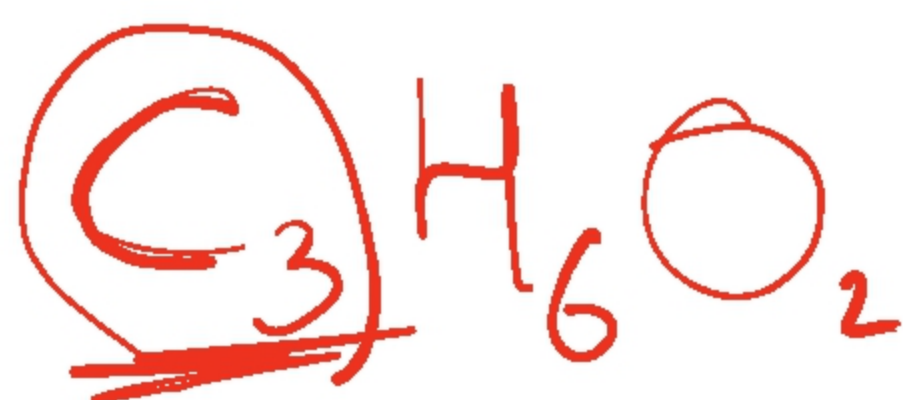
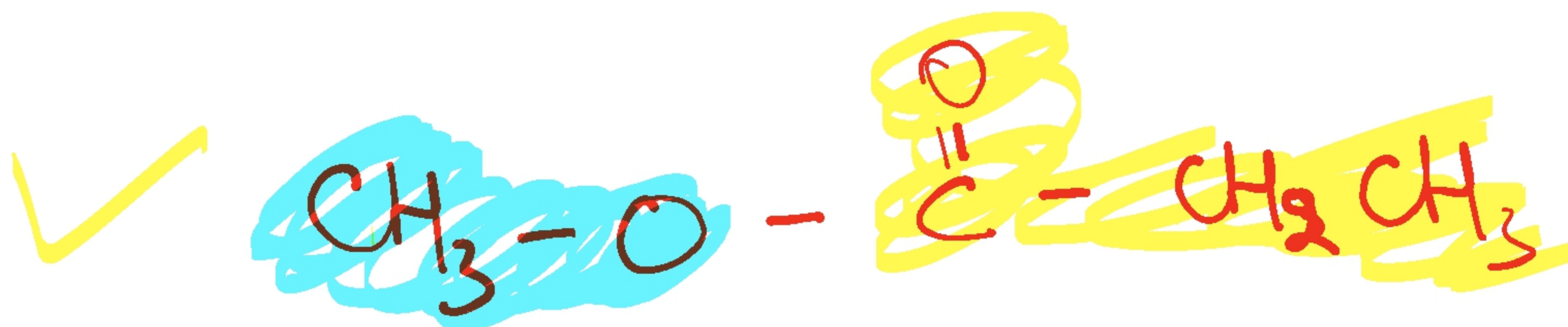
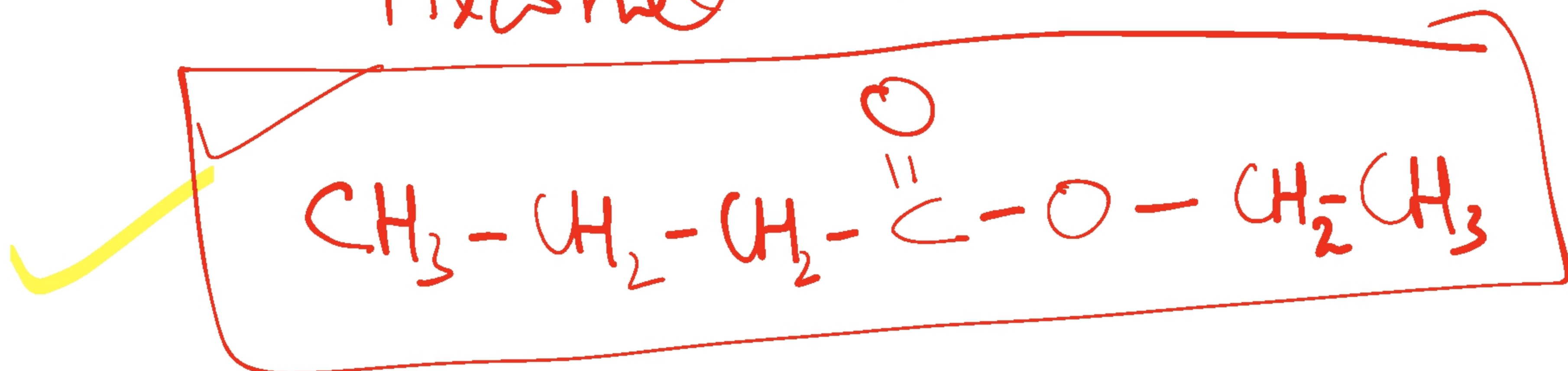
Alcohol
-yl

~~ester~~

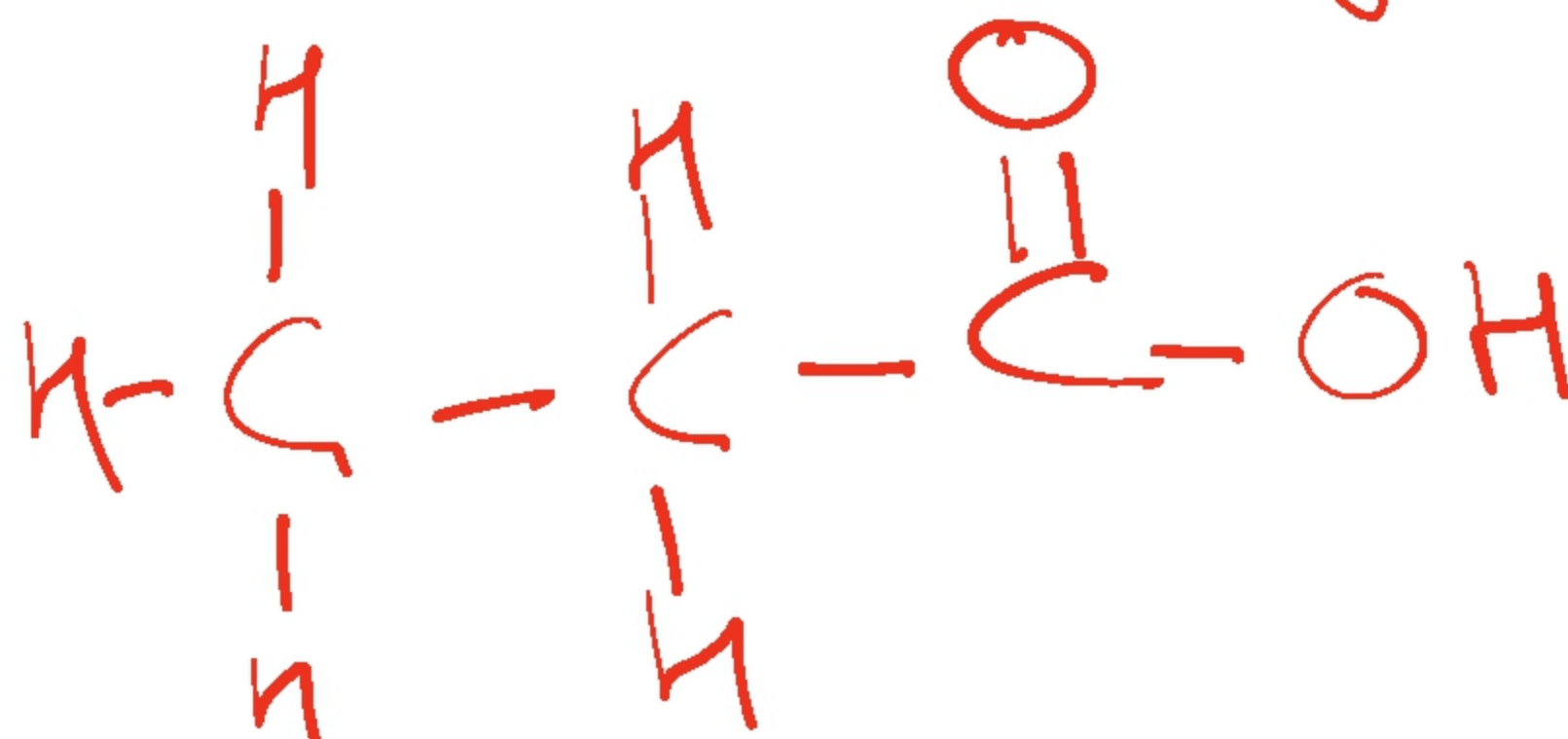


Carboxylic acid name Methanoic acid

Alcohol name ethanol



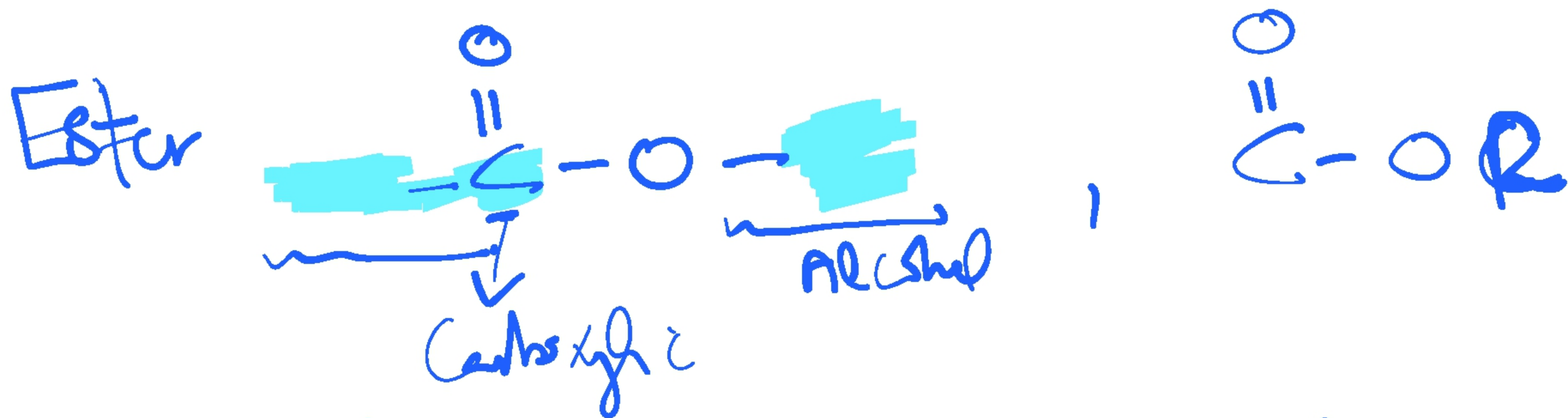
✓ Carboxylic acid



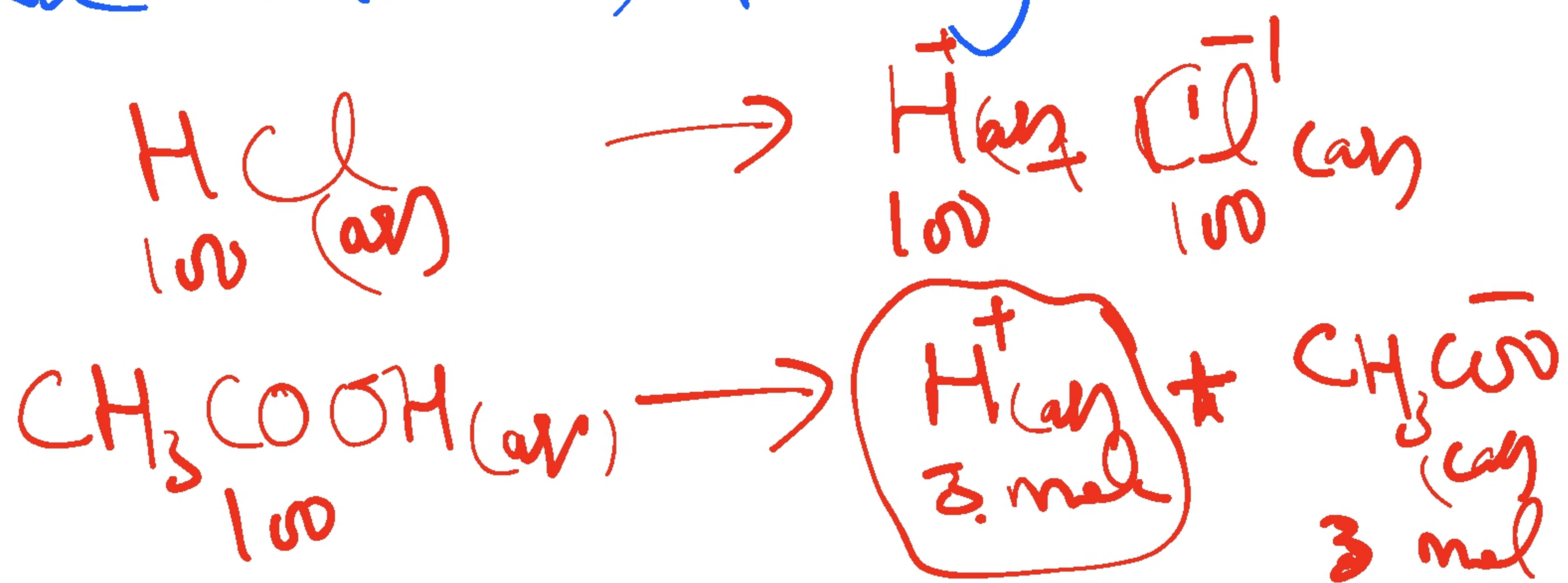


Methyl butanoate

Carboxylic Acid



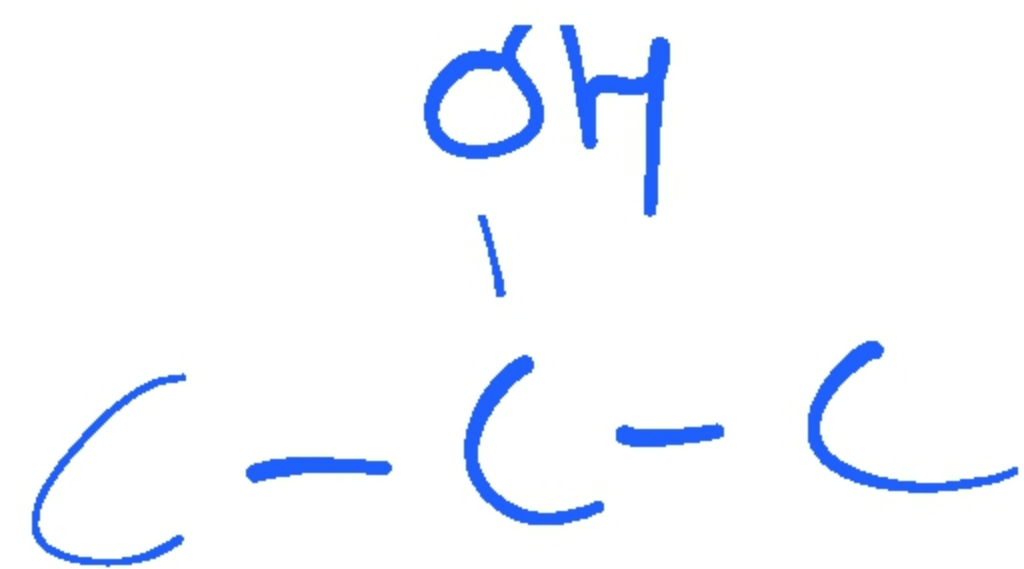
Carboxylic Acid $\rightarrow$ Acid (weak)
 weak Acid $\rightarrow$ Partially dissociated



(Alkyl) R $\rightarrow$ Branch means

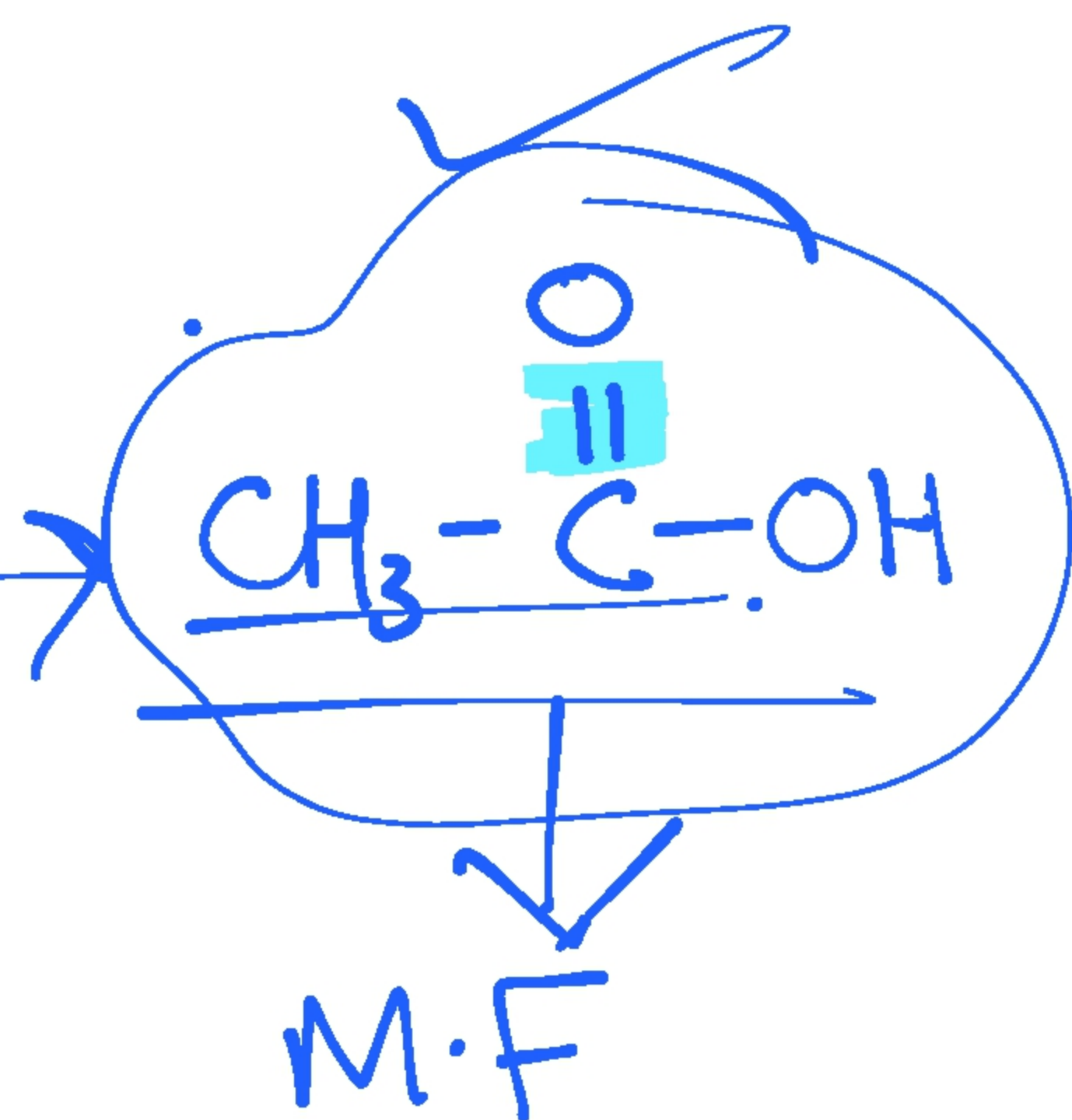
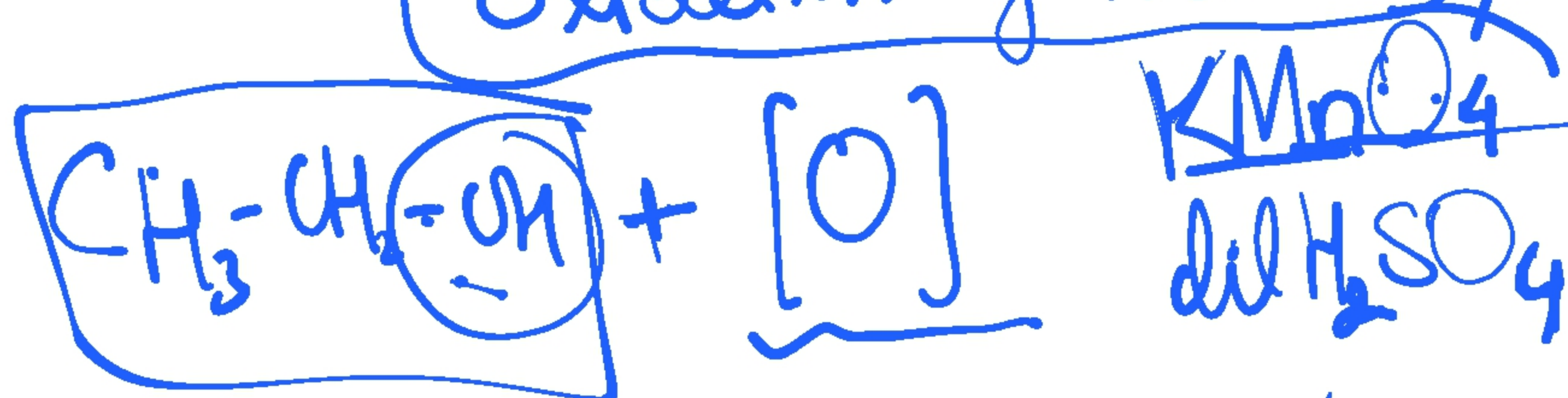
R = Alkane
 but with 1 hydrogen less

Methyl CH_3 — CH_4
 Ethyl C_2H_5 — C_2H_6



Preparation

Oxidation of Alcohol



Observation

Purple colour $\rightarrow$ colourless

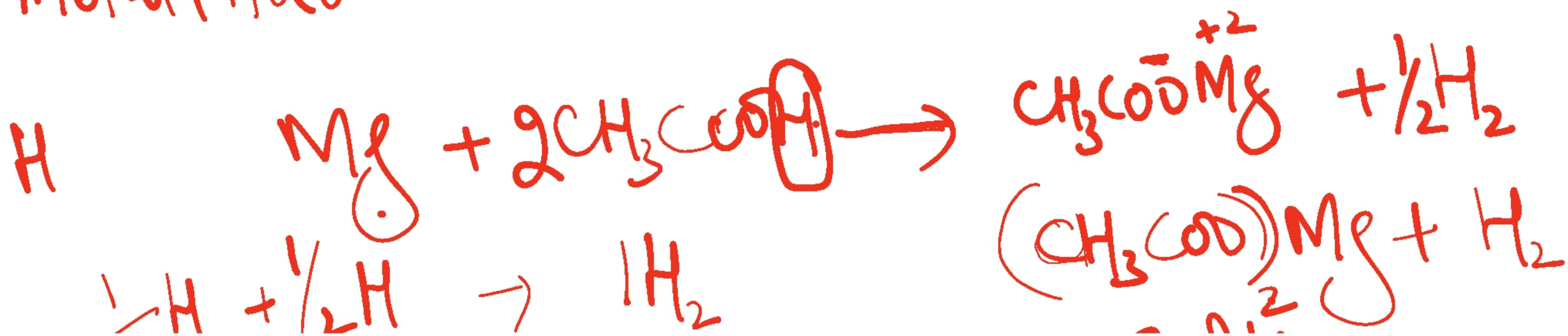


Reactions of Carboxylic Acid

Metal + Acid

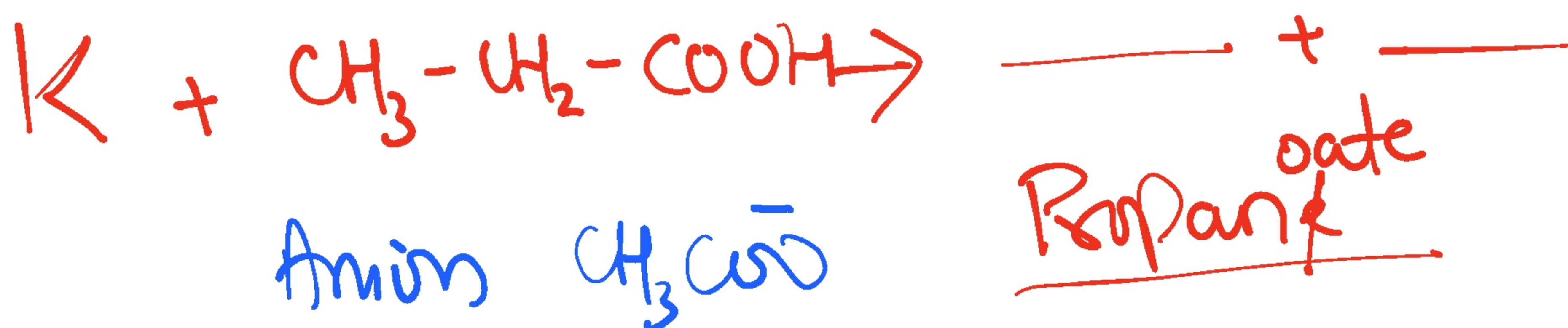
Metal Carbonate + Acid

Base/Alkali + Acid



2

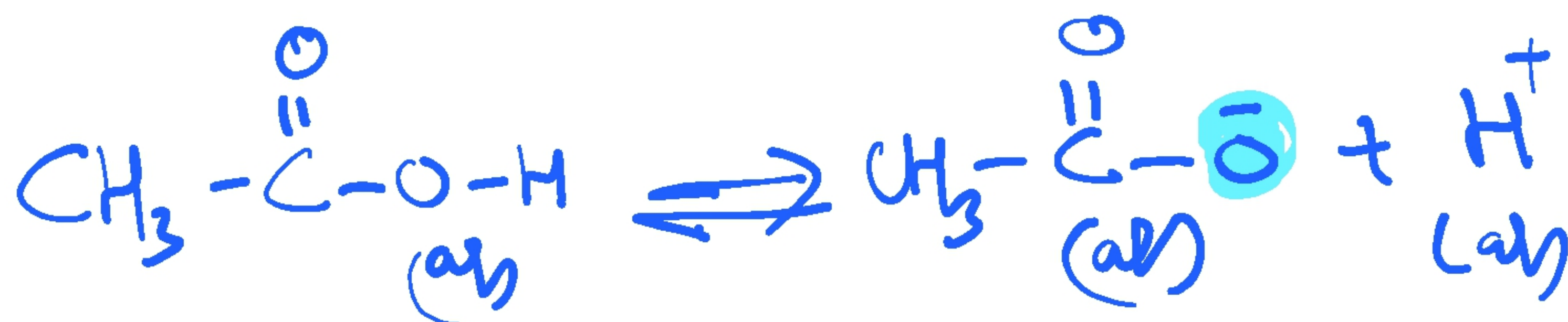
Magnesium ^{Salt}ethanoate



(2) Reaction with Base (alkali):



(3) Reaction with Carbonates



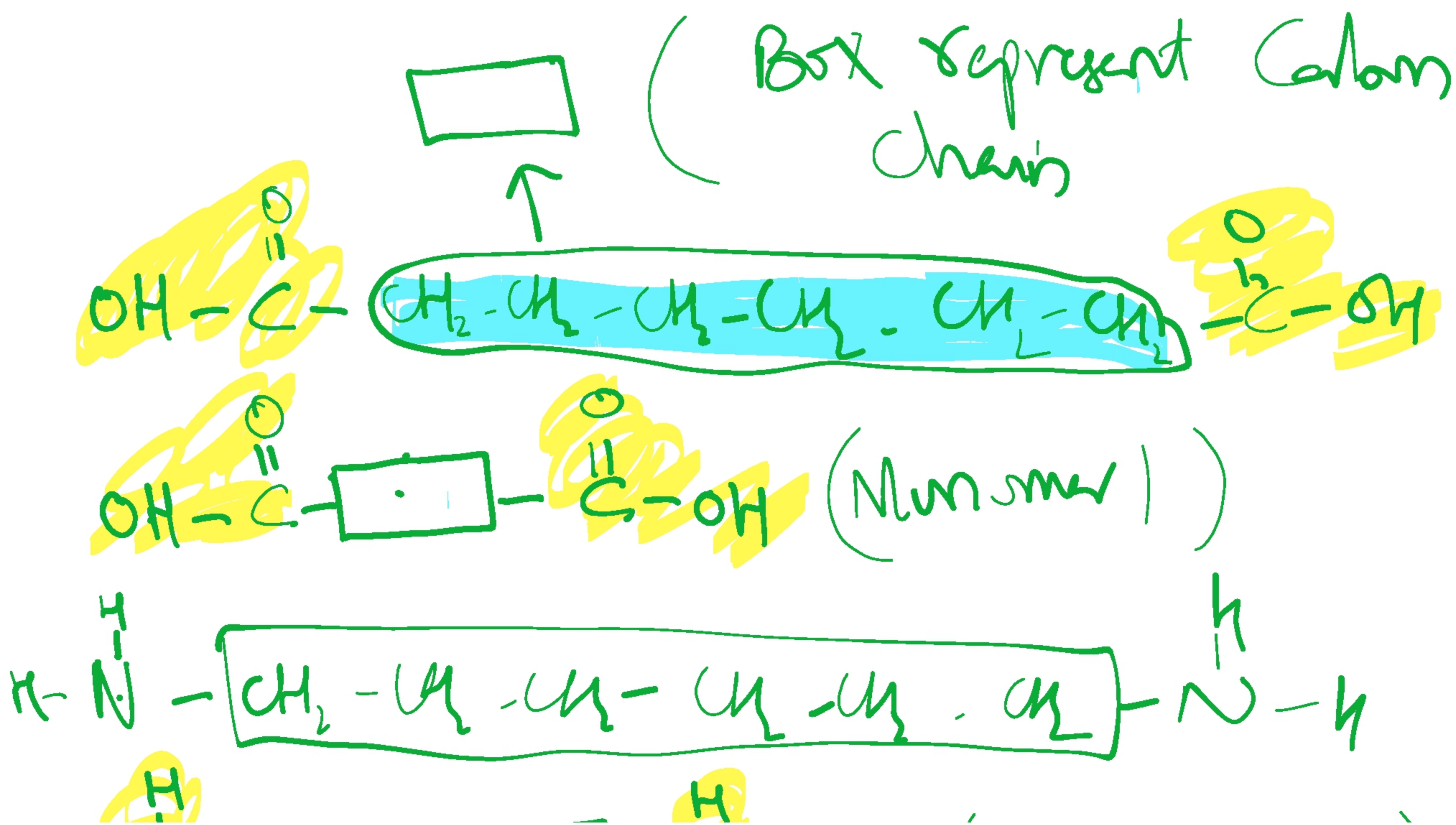
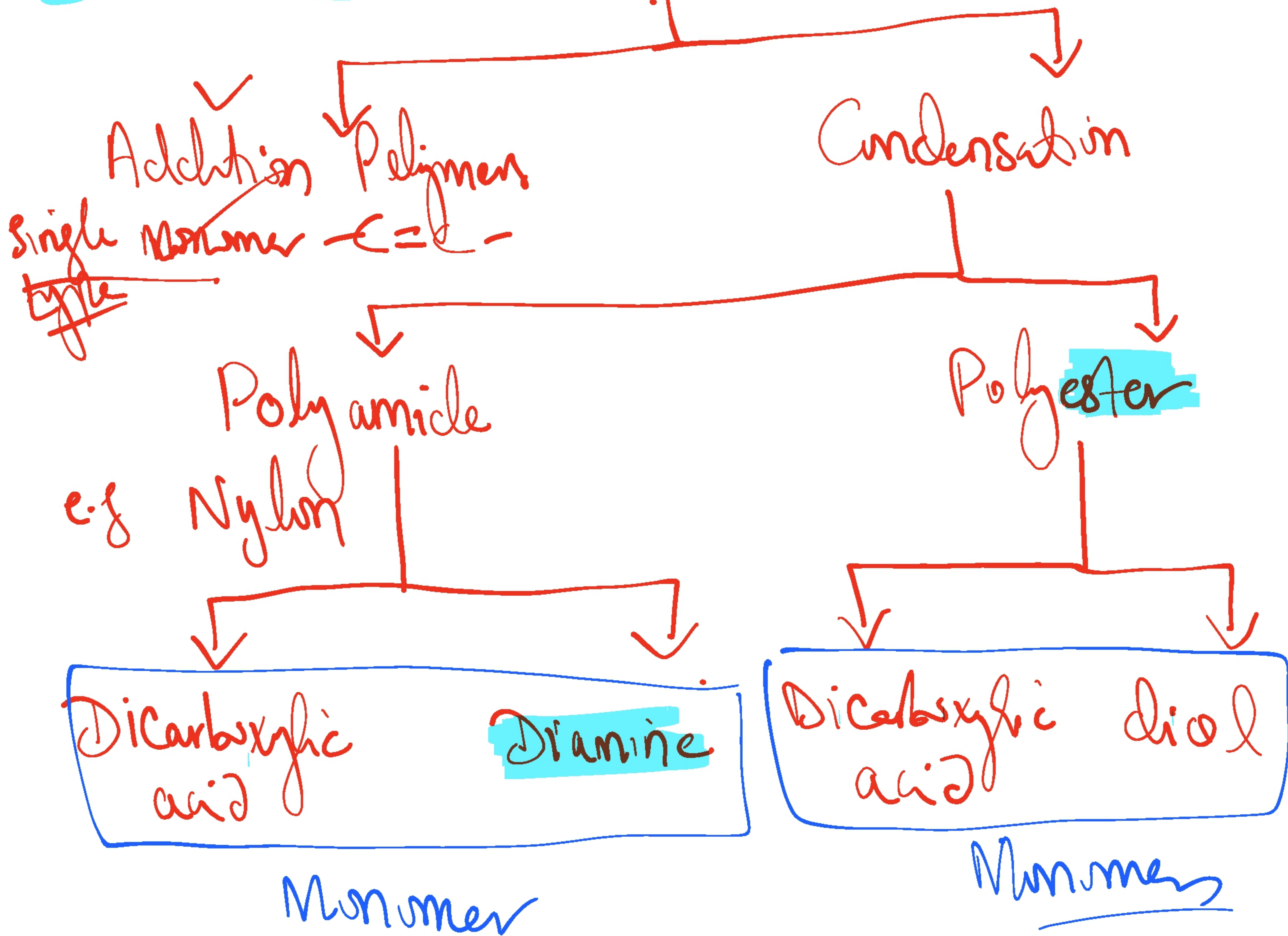
organic ester is formed by reaction of Carboxylic acid with Alcohol

→ Ester can be used as artificial flavors

→ It can be used as solvent

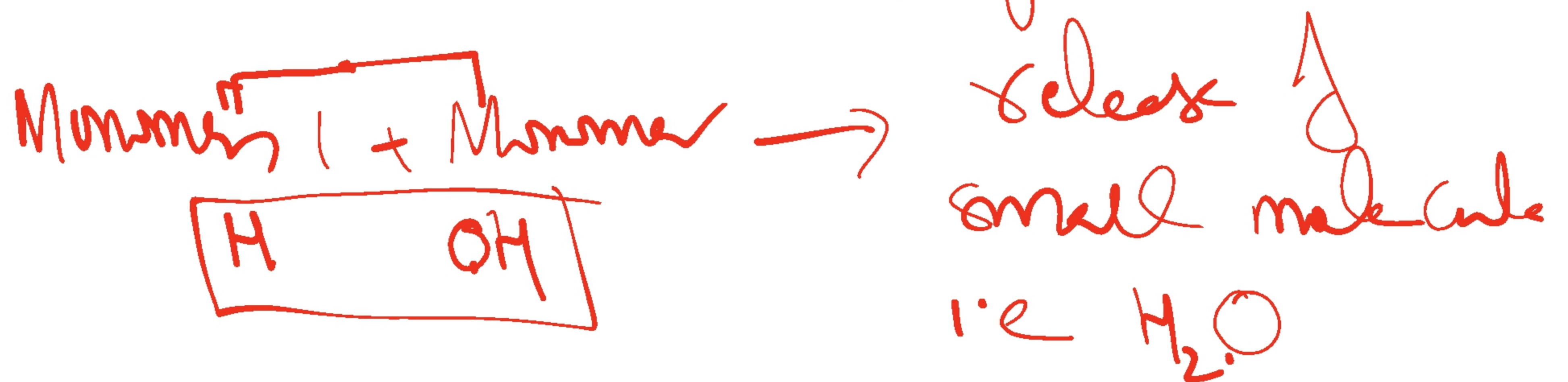
Naturally

~~Starch~~ ← ~~Glucose~~ Polymerisation ← $\text{O}-\text{C}_6\text{H}_4-\text{O}$ Artificial
Protein ← A.A



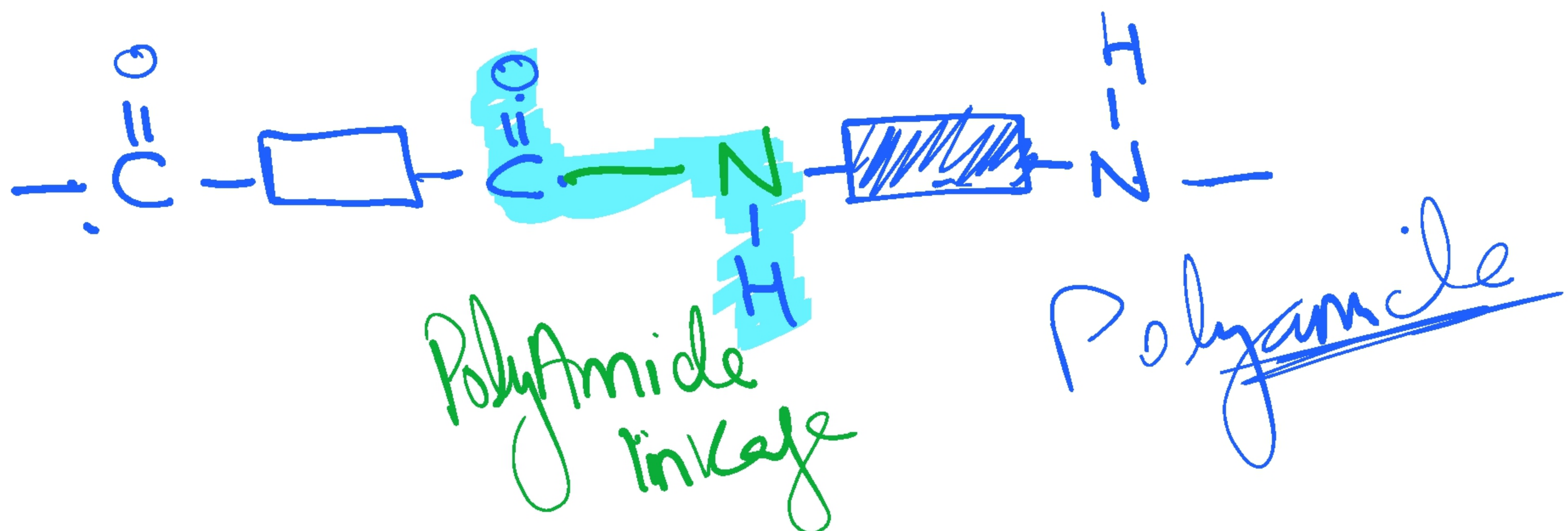
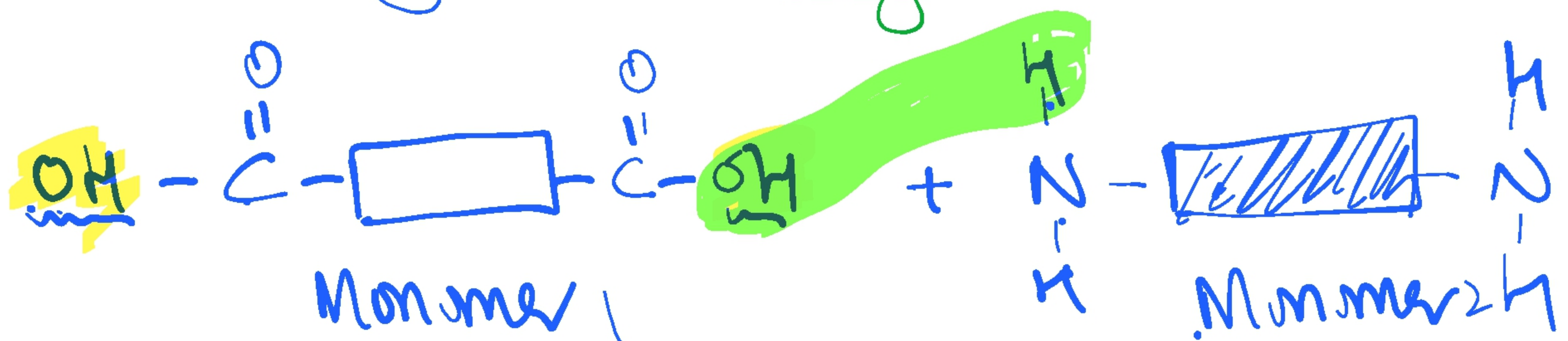


Condensation Polymer



is a chemical process in which small molecules (Monomers) joined together to form a large molecule (Polymer) and small molecule (H_2O) will be released.

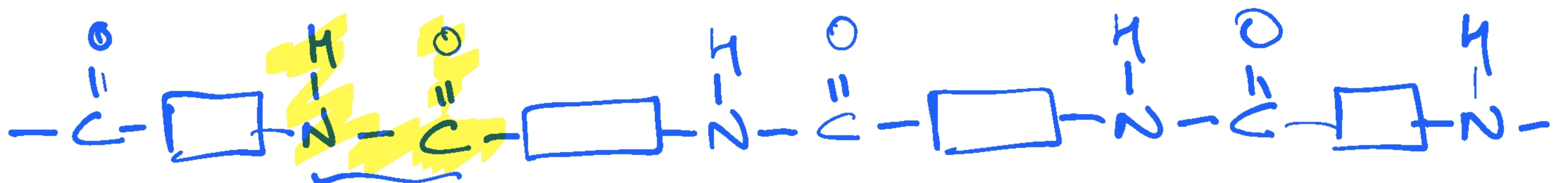
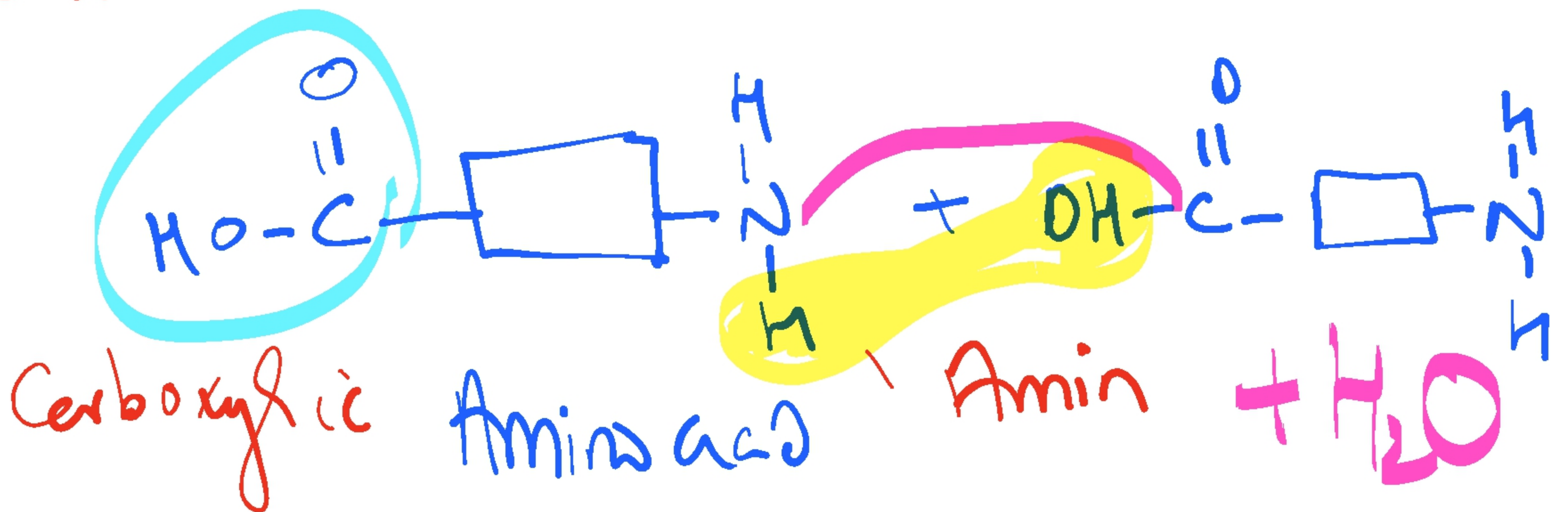
Polyamide (Nylon)



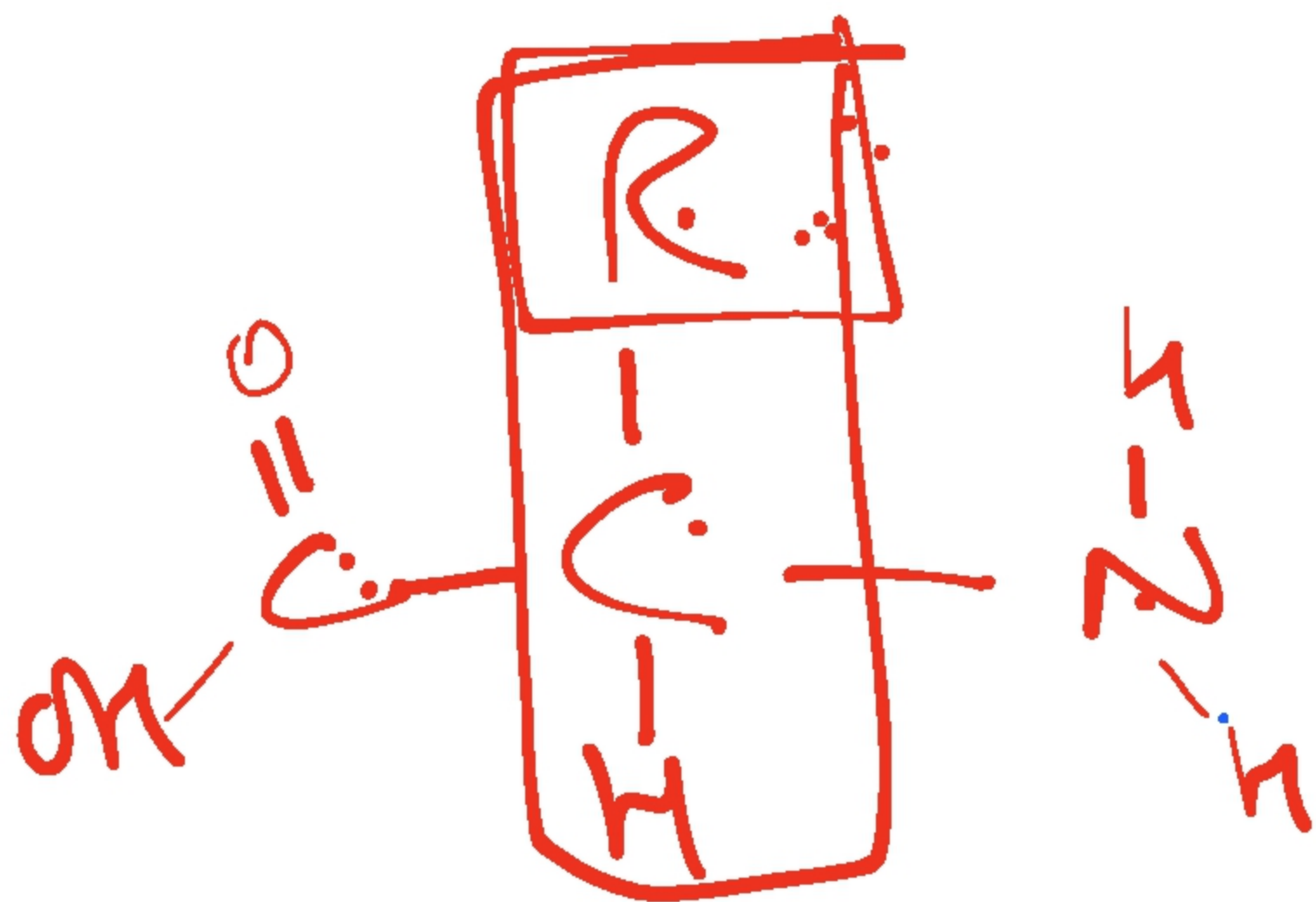


Natural Polyamide

Monomer
Amino acid $\rightarrow$ Protein



Amide
linkage



Polyester $\rightarrow$ PET Terylene

Dicarboxylic
acid

Diol
2(OH)





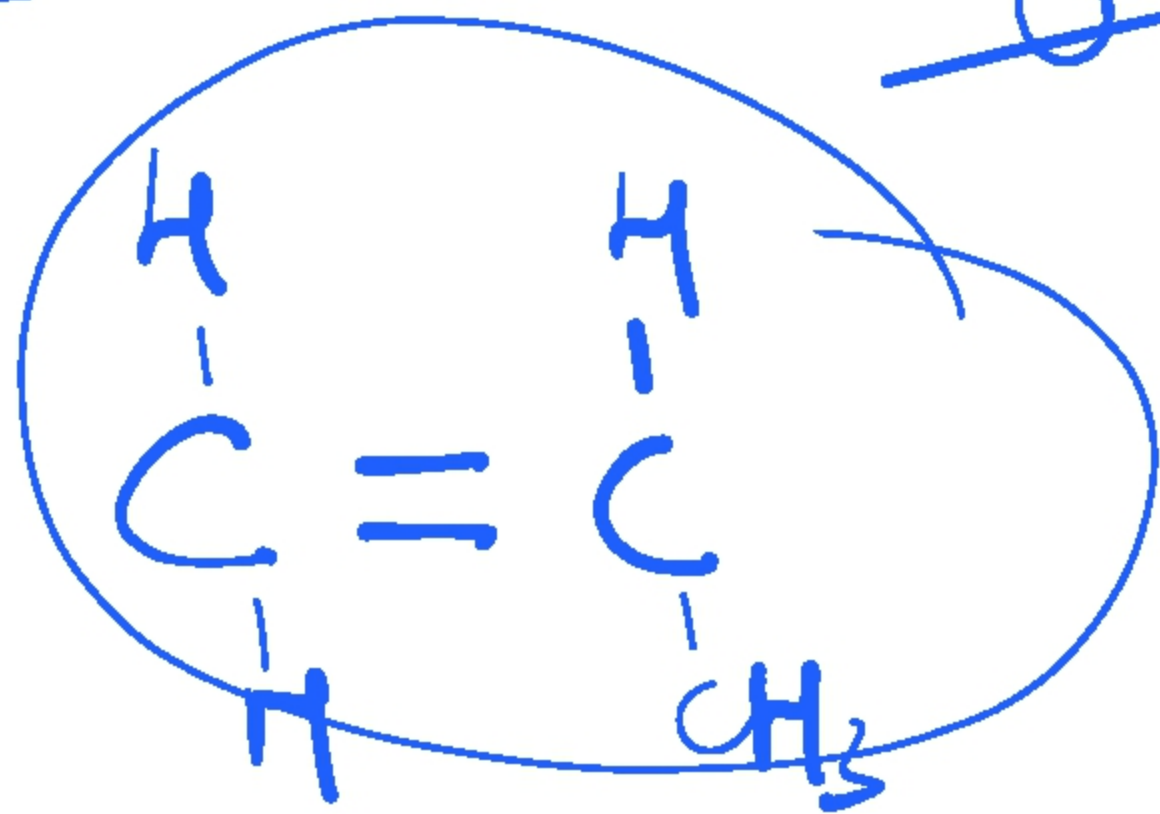
Polyester linkage



Polyamide



Polyester



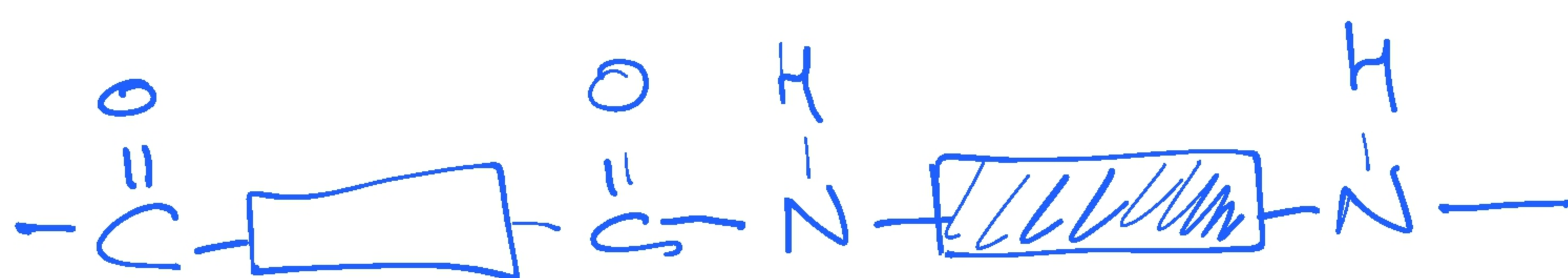
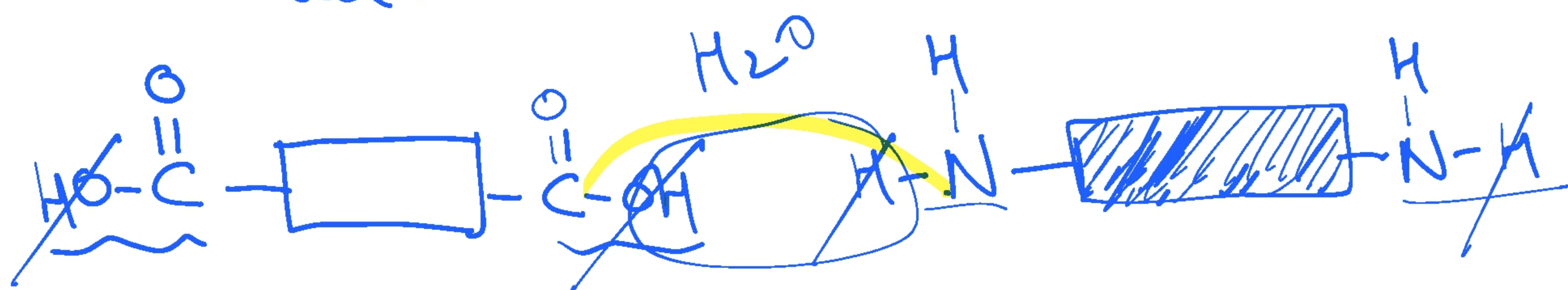
Condensation Polymerisation

Polyamide
Nylon

Polyester
PET

DiCarboxylic
acid

Diamine



Polyester

DiCarboxylic
acid

H_2O

Diol