# Reaction Of Carboxylic Acids:

## As Acids:

$$RCO_2H + NaOH \longrightarrow RCO_2^- Na^+ + H_2O$$

$$RCO_2H + NaHCO_3 \longrightarrow RCO_2^- Na^+ + H_2O + CO_2$$

## Reduction:

$$RCO_2H + LiAlH_4 \xrightarrow[2.\ H_2O]{1.\ \text{diethyl ether}} RCH_2OH$$

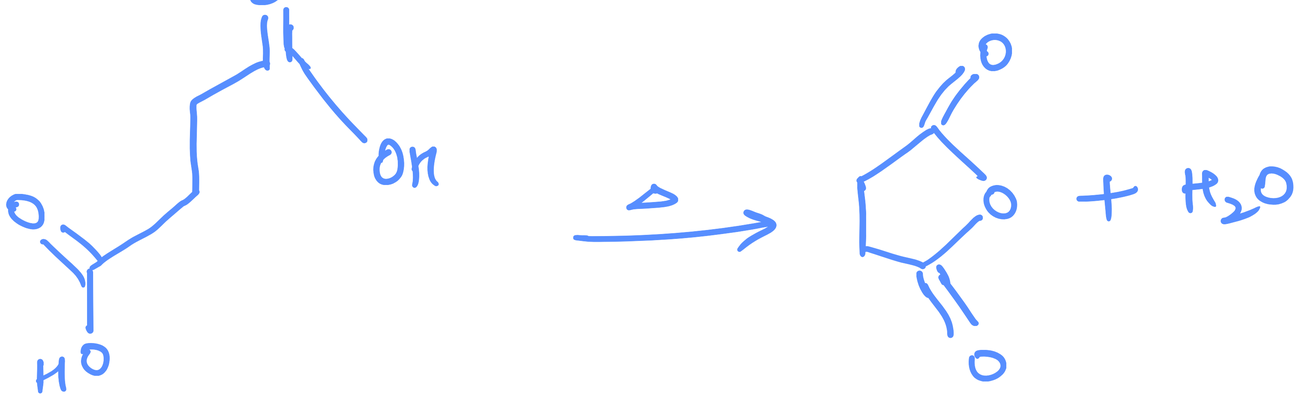
## Conversion to Acyl Chlorides:

$$RCO_2H + SOCl_2 \longrightarrow RCOCl + SO_2 + HCl$$

$$3RCO_2H + PCl_3 \longrightarrow 3RCOCl + H_3PO_3$$

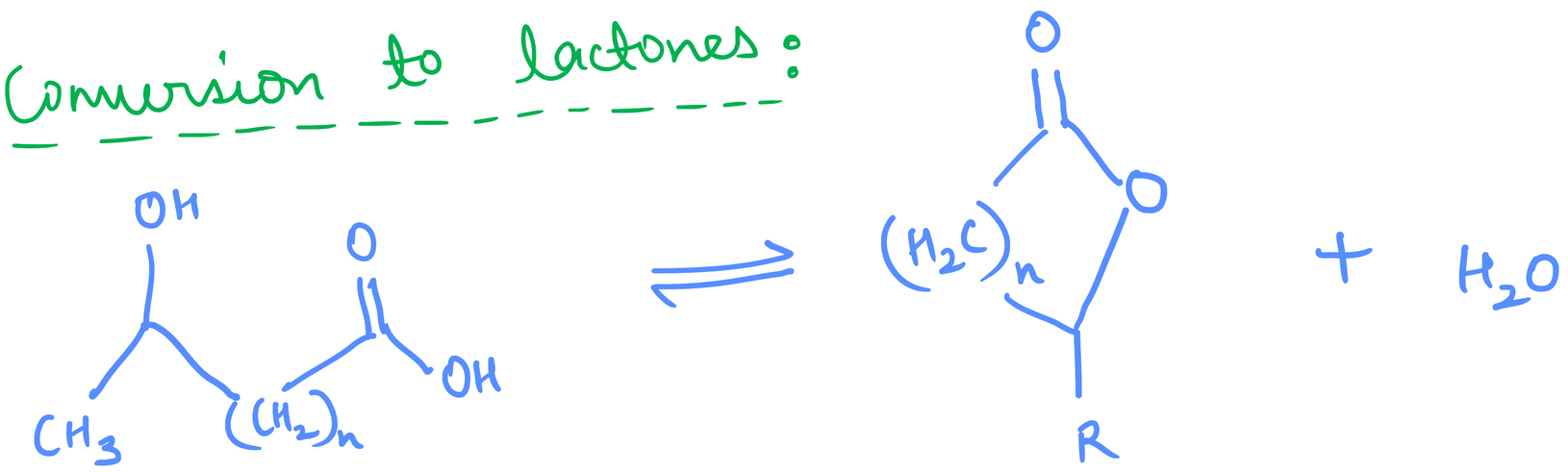
$$RCO_2H + PCl_5 \longrightarrow RCOCl + POCl_3 + HCl$$

## Conversion to Acid Anhydrides:

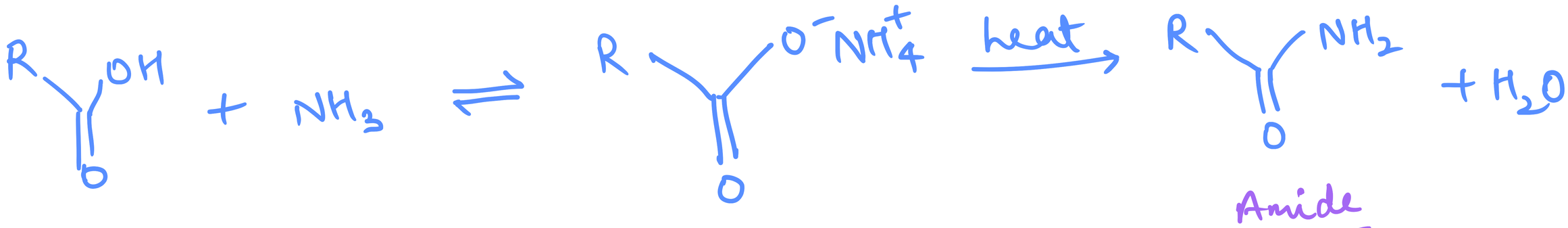


## Conversion to esters:

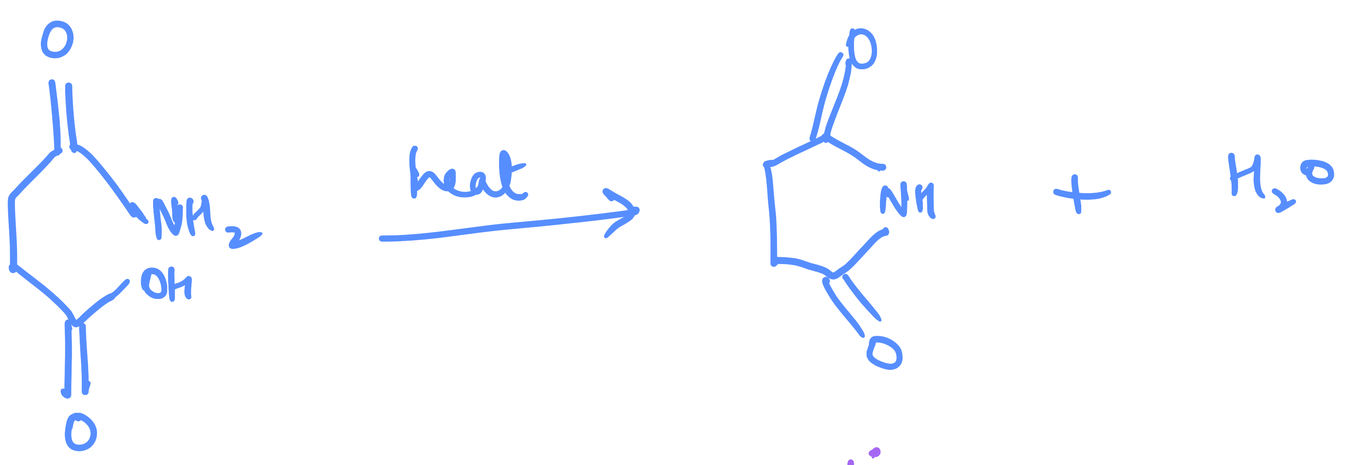
## Conversion to lactones:



## Conversion to Amides and Imides:

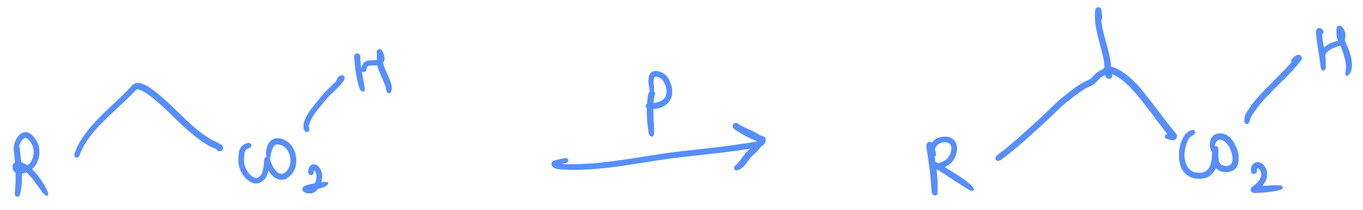



Amide

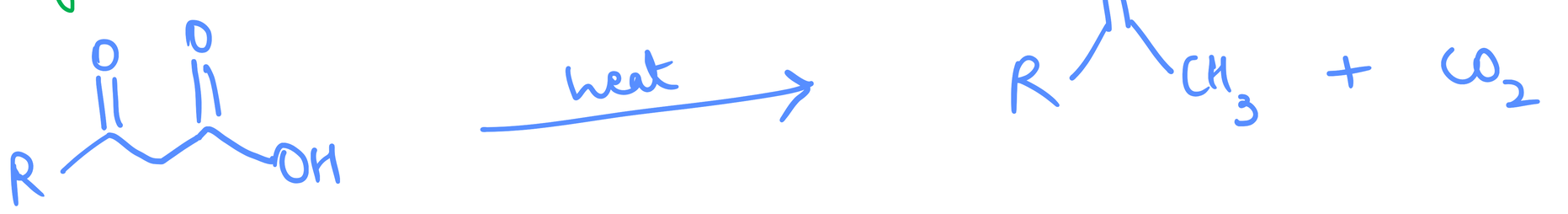



cyclic Imide

## α- Halogenation (The Hell- Volhard-Zelinsky Reaction)




## Decarboxylation:




β-keto acid

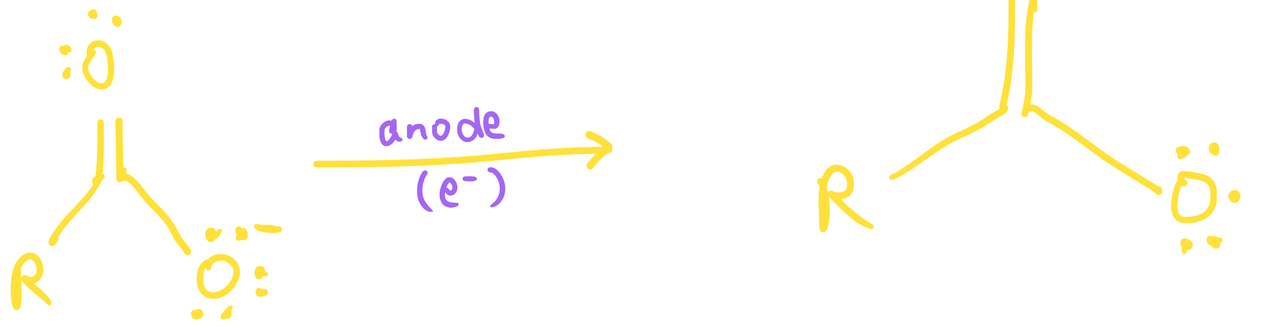

gem-diacid

# Decarboxylation :

## Kolbe Electrolysis :

An aqeous solution of sodium or potassium salt of carboxylic Acid is subjected to electrolysis. At the anode the carboxylate ion loses an electron to become a carboxyl radical.

Step 1 :




Then, the carboxyl radical decarboxylates and the alkyl radicals that are produced combine to form an alkane.

Step2 :




Step 3 : $2R^{\cdot} \longrightarrow R-R$

## Hunsdicker Reaction :

The silver salt of A carboxylic Acid is heated with Bromine in $CCl_4$. A carboxyl radical is produced in a two step process as follows:

Step 1




Step 2