

HYDROXY ACID & DICARBOXYLIC ACID

16-05-2020

Lecture-2

Deg-II (Sub.)

Topic - Chemical Properties & Uses of Dicarboxylic Acid

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CHEMICAL PROPERTIES

Dicarboxylic acids give the same reactions as those of monocarboxylic acids in duplicate. Thus, they give mono- and di- derivatives such as salts, esters, amides and acid halides.

However, the lower members in which the two $-COOH$ groups are closer together the possibilities of mutual interactions increases.

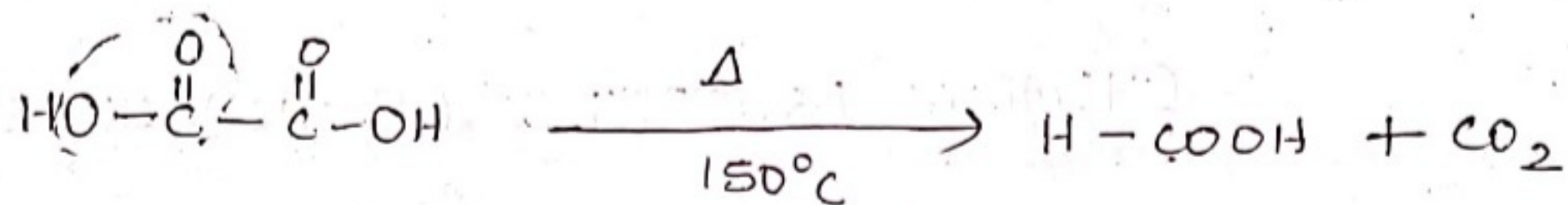
From this point, the action of heat on dicarboxylic acids is very interesting and needs a special attention.

Action Of Heat On Dicarboxylic Acids

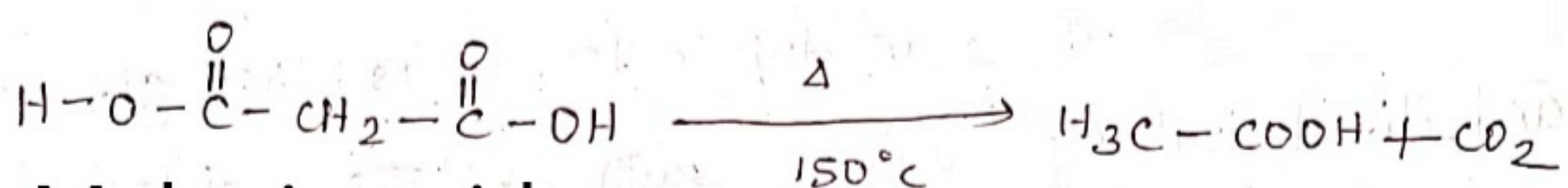
The reactions that occurs when dicarboxylic acids are heated, are unique indeed. These depend on the carbon chain length separating the two $-COOH$ groups.

1. Acids with 1-C or no 'C' Chain undergo Decarboxylation.

Oxalic acid and malonic acid decarboxylates, when heated to form monocarboxylic acids.



Oxalic acid

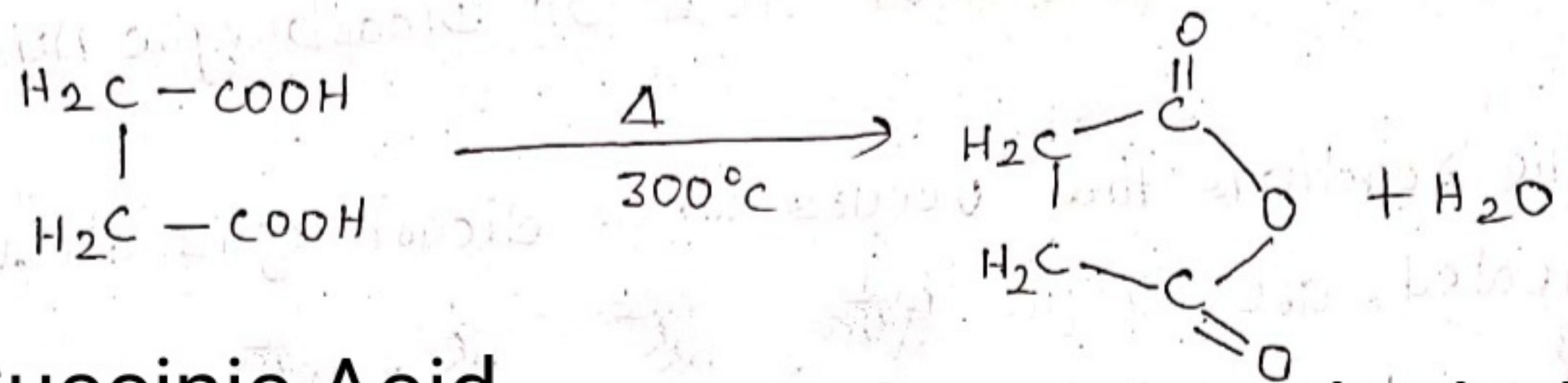


Malonic acid

Acetic acid

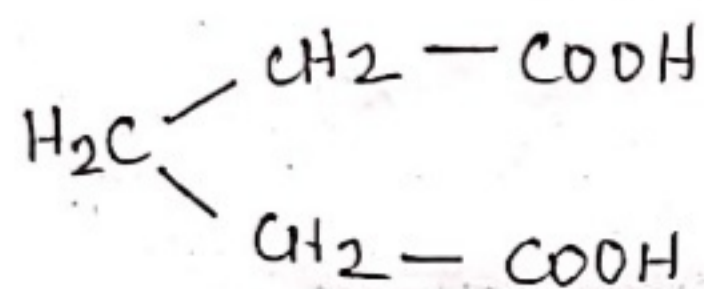
2. Acids with 2-C & 3-C chains undergo cyclodehydration.

Succinic acid and glutaric acid react by intramolecular dehydration to give cyclic anhydrides that have 5 and 6-membered ring respectively.

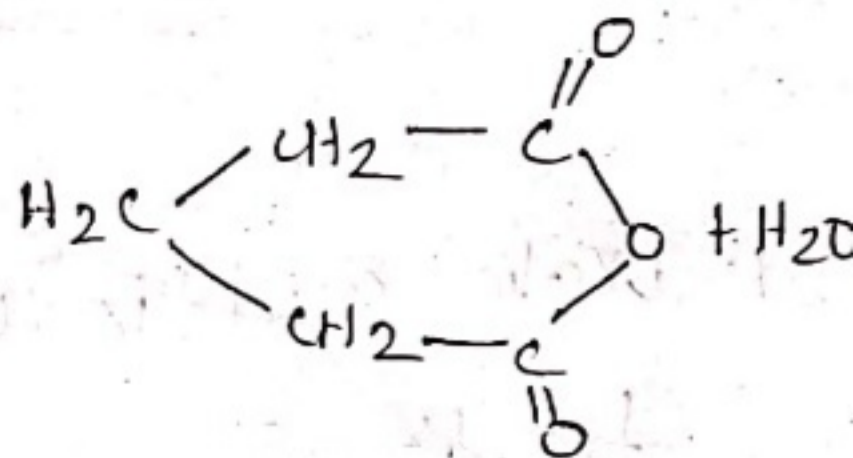
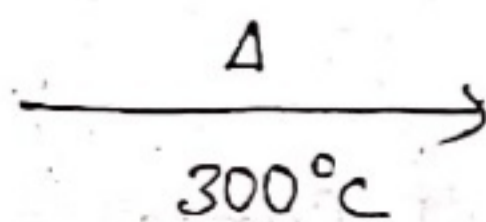


Succinic Acid

Succinic anhydride

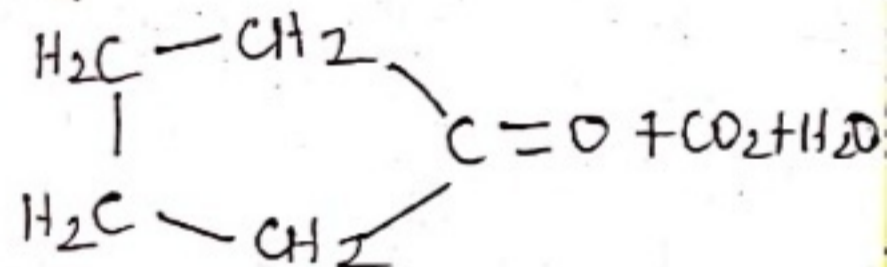
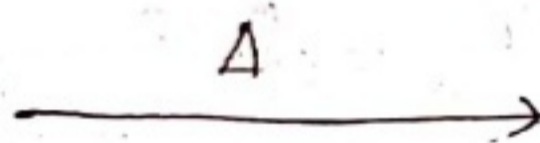
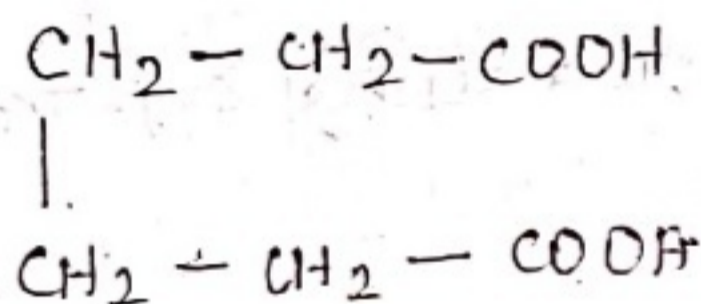


Glutaric Acid

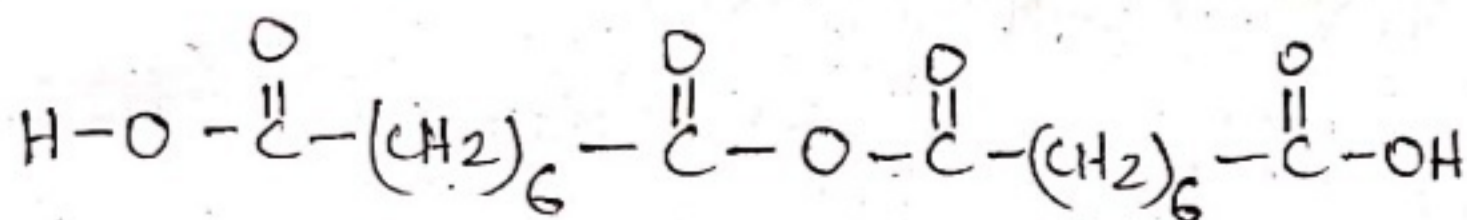
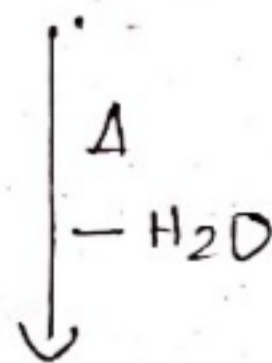
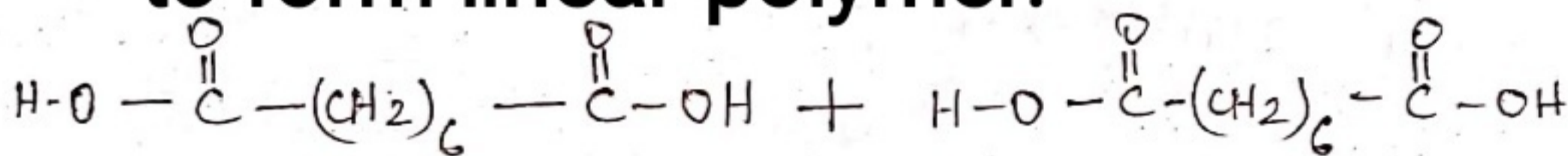


Glutaric anhydride

3. Acids with 4-C & 5-C chains Undergo cyclization to ketones.



4. Acids with 6-C or higher chains undergoes intermolecular dehydration to form linear polymer.



* This reaction continues with 'n' molecules to yield a linear polymer.

USES OF DICARBOXYLIC ACID

1. Oxalic acid is used for removing ink stains and for bleaching straw for hats.
2. Oxalic Acid is used in Redox Titration.
3. Diethyl ester of malonic acid is a valuable synthetic reagents.

*** Completed ***

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