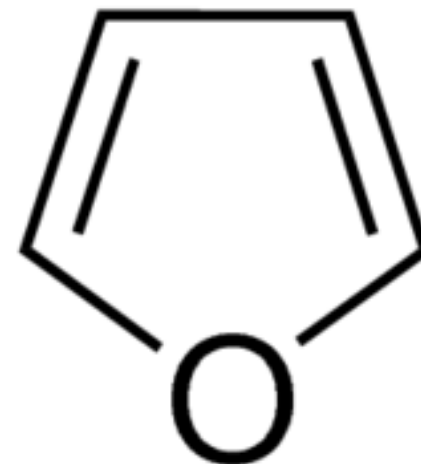


# Preparation and Properties of Furan

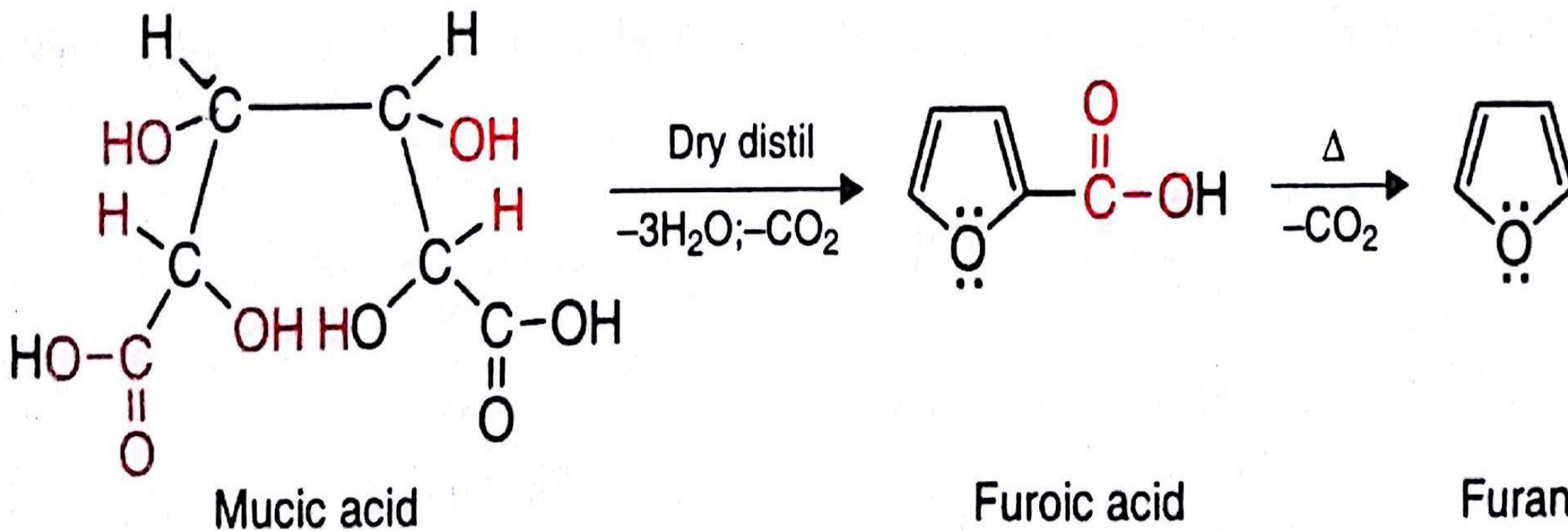
# Furan

- Furan is the oxygen-containing counterpart of pyrrole.
- It occurs together with its methyl homologues in wood-tar.
- Its vapours produce a green colour when brought in contact with a pine splint moistened with concentrated hydrochloric acid.

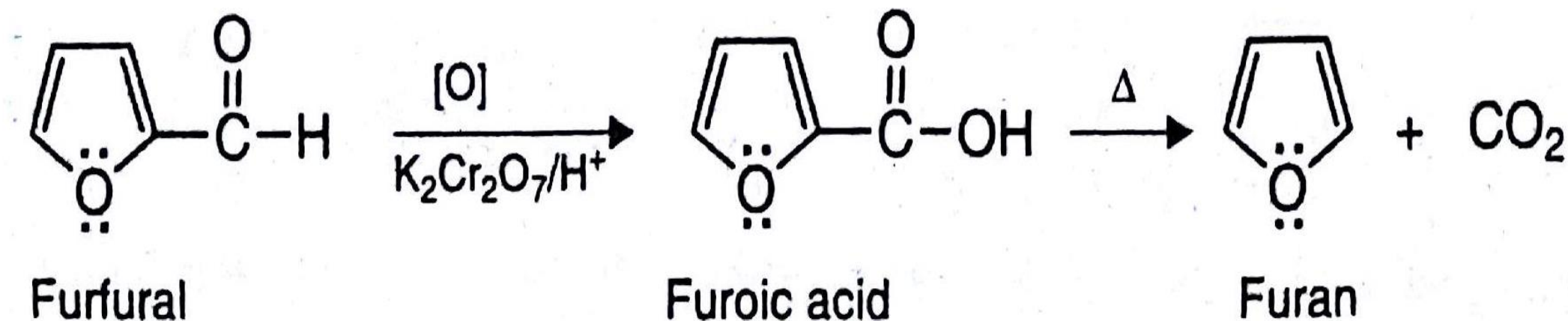


# Preparation Methods

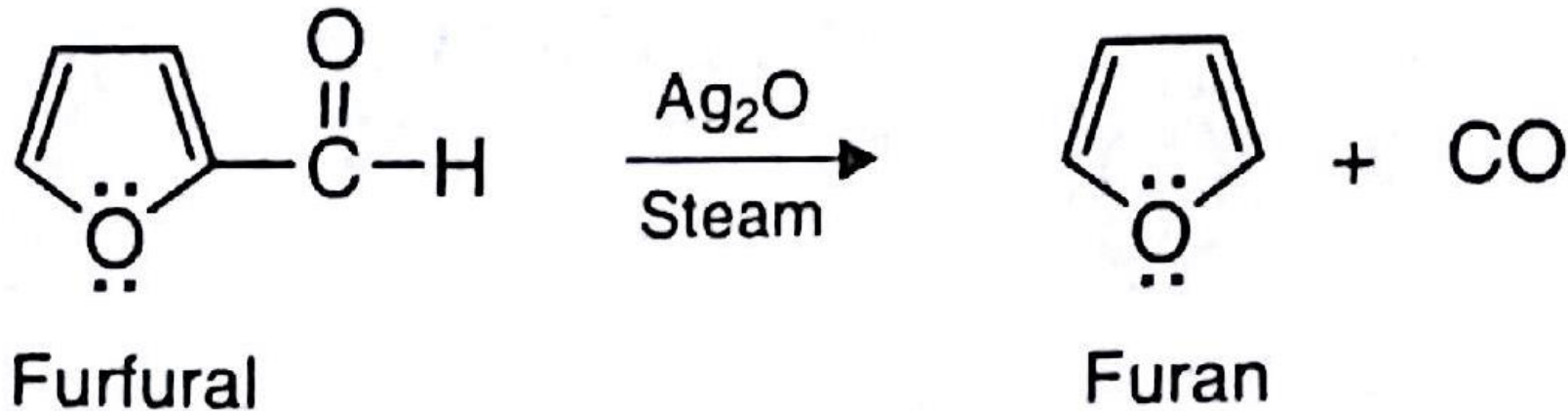
(1) By dry-distillation of mucic acid and heating the product, furoic acid (furan-2-carboxylic acid), at 200-300°C.



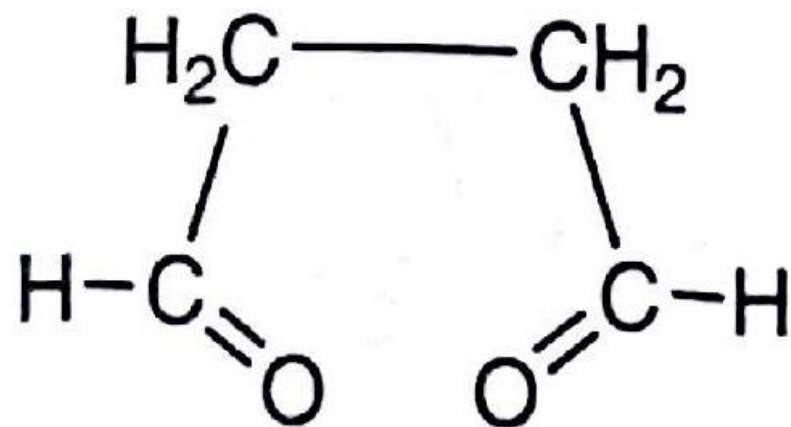
(2) By oxidation of furfural with potassium dichromate to give furoic acid and subsequent decarboxylation at 200-300°C.



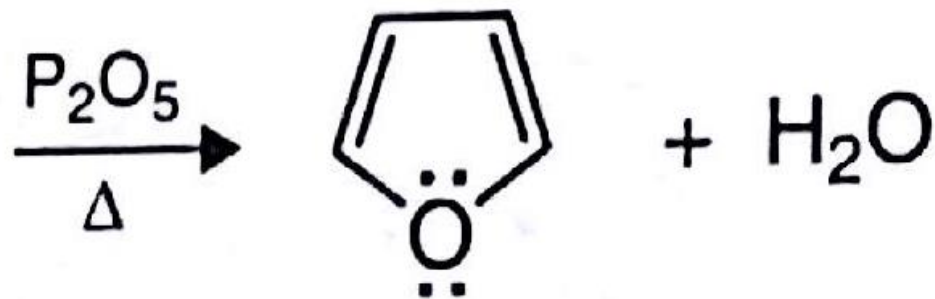
(3) By decarbonylation of furfural in steam in the presence of silver oxide catalyst (**Commercial Method of Preparation**).



(4) By dehydration of succinic dialdehyde by heating with  $P_2O_5$  or  $ZnCl_2$ .



Succinic dialdehyde



Furan

# Physical properties of Furan

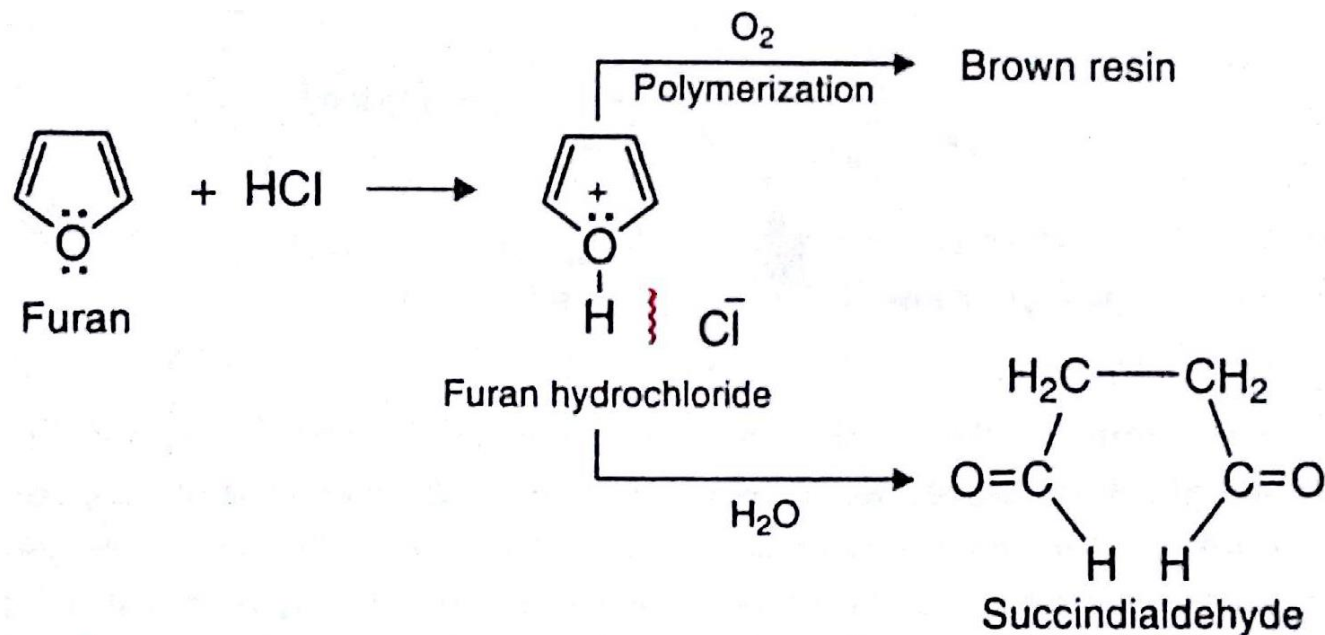
- Furan is a colourless liquid, boiling point 32C, with a chloroform like smell. It is only slightly soluble in water, but dissolves in most organic solvents.

# Chemical properties of Furan

**Furan is the most reactive of all 5-membered heterocycles.**

## 1. Basic Character:

- Furan is a weak base like pyrrole. It forms unstable salts with mineral acids. These salts may either polymerize to produce a brown resin or undergo hydrolysis to yield succindialdehyde.





## 2. Electrophilic Substitution

Like pyrrole, it undergoes electrophilic substitution at C-2. Substitution at C-3 occurs only when both of the C-2 positions ( $\alpha$  and  $\alpha'$ ) are already blocked.



**3. Reduction:** Furan is reduced by hydrogen in the presence of nickel to produce tetrahydrofuran

