

AIM - To prepare urea formaldehyde resin

Chemicals - Urea (10g), 40% of a formaldehyde soln (20ml) and conc H_2SO_4 (3-4 drops)

Observation - Weight of empty watch glass \rightarrow 14g

Weight of watch glass + urea formaldehyde resin = 43.3g

Weight of urea formaldehyde resin \rightarrow $43.3 - 14 = 29.3g$

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Experiment - 4

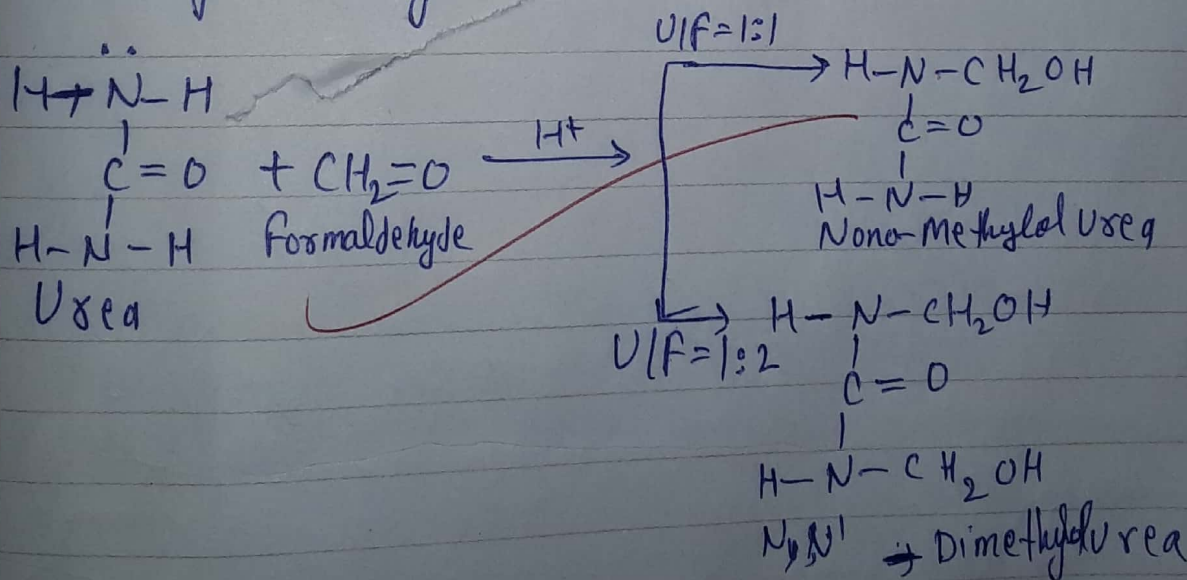
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Aim \Rightarrow To prepare urea formaldehyde resin.

Chemicals used - Urea (10g), 40% aqueous formaldehyde solⁿ. (20 ml) and conc. H_2SO_4 (3-4 drops)

Theory \Rightarrow Urea formaldehyde resin are thermo-setting amino polymers which are formed by condensation of urea formaldehyde acidic acid by the following steps

Step I - Formation of methyl urea derivatives \Rightarrow Initially urea and formaldehyde react to form methylol urea derivatives depending upon urea to formaldehyde ratio (U/F) Ratio

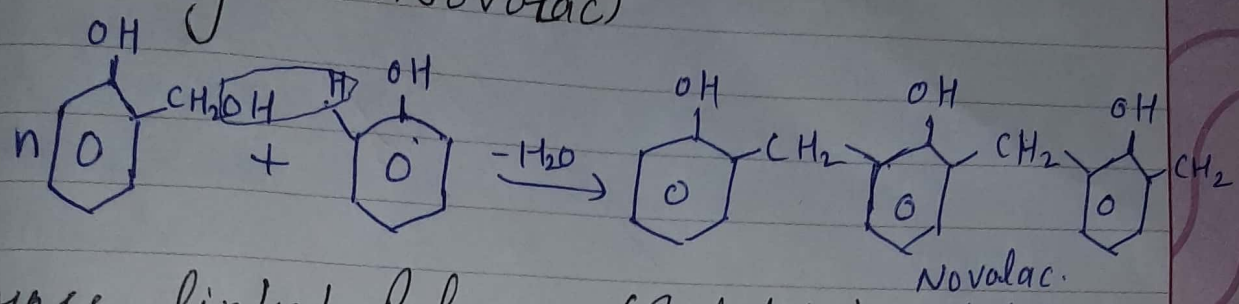


Step II - The methylol phenol derivatives react among the molecules or with phenol to give a

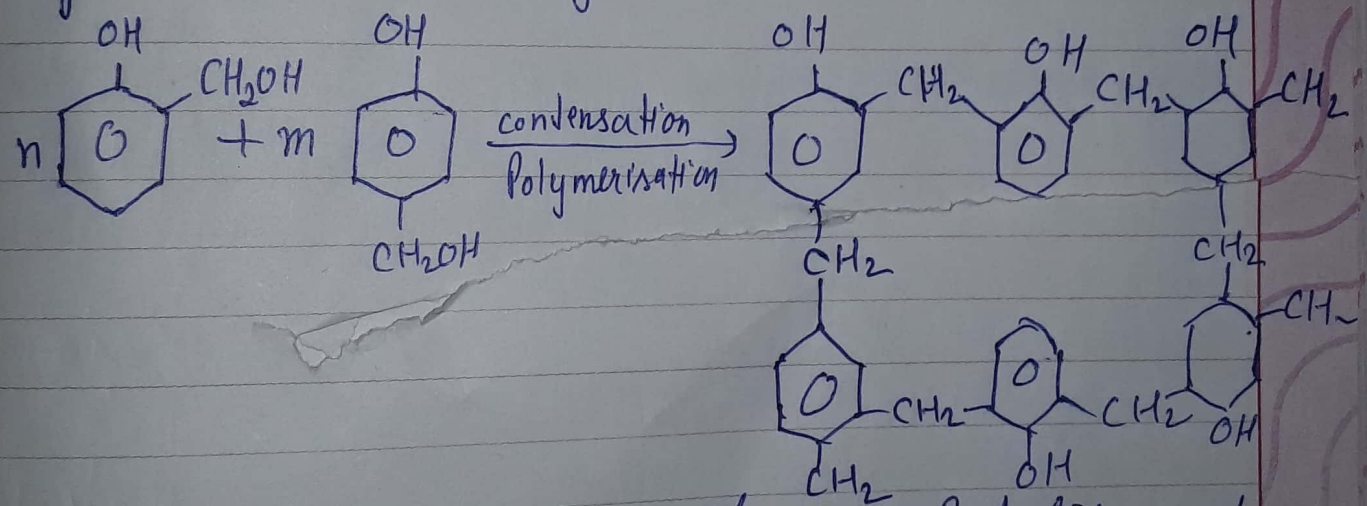
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linear polymer or a highly cross linked polymer

a) Linear Polymer (Novolac)



b) Cross linked Polymer (Bakelite) - A highly cross linked thermosetting polymer called bakelite may be formed by further condensation of novolac or methylol derivatives.



It was first prepared by Bakelite and it is easily formed if curing agent hexamethylene tetra amide is added during synthesis which acts as a source of formaldehyde.

Procedure → Place 5ml of glacial acetic acid and 25ml of 40% of aqueous formaldehyde solⁿ in a 100ml beaker with a wet cloth over

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Result - The weight of urea formaldehyde

Resin = 29.3g



Add 2 gm phenol to it safely. wrap the beaker with a wet cloth or place it in 250 ml beaker having small amount of water to it. Add conc. HCl dropwise with vigorous stirring by a glass rod till the a pink coloured gummy mass appears. Wash the pink residue several times with water to make it free from acid. Filter the product and weight after drying in the folds of a filter paper or in an oven. Report the yield of polymer formed.

Result \Rightarrow The weight of urea formaldehyde Resin = 29.3 g

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