

(P)

EXPERIMENT NO. 5

1. Object

Preparation of Urea-formaldehyde/Phenol-Formaldehyde and Aniline-Formaldehyde resins.

2. Introduction

Urea-Formaldehyde is a commercially important thermosetting amino resin. It has a good tensile strength, good electrical insulation, good chemical resistance, great hardness, great light stability and good abrasion resistance.

3. Requirements

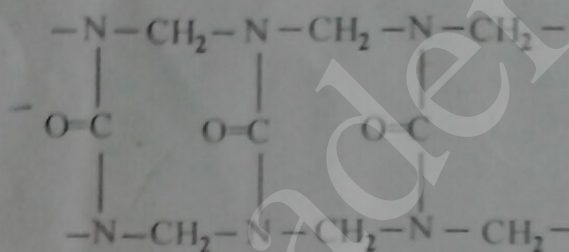
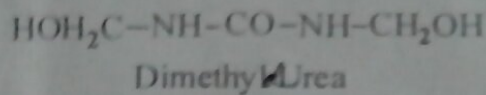
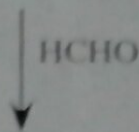
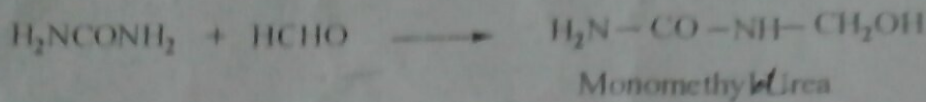
- Aqueous formaldehyde solution 40% (5ml)
- Solid Urea (2g)
- Beaker 250ml
- Glass rod
- Small measuring cylinder (10ml)

4. Procedure

1. Take 2g of solid urea in a 250 ml beaker.
2. Add 5 ml of aqueous formaldehyde to it.
3. Add a few drops of concentrated H_2SO_4 to the clear solution with a glass rod.
4. A white solid polymer is produced (reaction is highly exothermic).
5. Condensation of nitrogen of urea and carbonyl group of formaldehyde produce a white colored branched co-polymer.

5. Reaction

- Condensation between the nucleophilic nitrogen of the urea with electrophilic carbonyl carbon of formaldehyde.
- Reaction is highly exothermic reaction.
- A branched copolymer is formed at the end.



Crosslinked Urea-Formaldehyde Resin

6. Observations

Amount of formaldehyde =ml
 Amount of urea =ml
 Yield of product =ml
 % Yield of product = %
 Color of the compound =

7. Precautions

1. Reaction is sometimes vigorous and it is better to keep your eyes a little away from the beaker while adding HCl/H₂SO₄.
2. Carryout the reaction in a airy place or preferably in fuming cupboard.