**EXPERIMENT NO. 04**

**Preparation of urea formaldehyde resins.**

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| **CO – 3** | Apply the knowledge of polymers, fabrication methods, conducting polymers in various industrial fields. |

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| **AIM** | **:** | To prepare urea formaldehyde resin. |
| **REAGENTS**  **REQUIRED** | **:** | 1. Urea 2. Formaldehyde solution 3. Conc. H2SO4 |
| **APPARATUS REQUIRED** | **:** | Weighing balance, beaker, glass rod, funnel and filter paper |
| **THEORY** | **:** | Amino resins are condensation products obtained by the reaction of formaldehyde with nitrogen bearing compounds such as aniline, amides for Ex.: - melamine formaldehyde, urea formaldehyde etc.  Urea formaldehyde is prepared by condensation reaction between urea and formaldehyde in acidic or alkaline medium.  The first product formed during the formation of resin is monomethylol and dimethylol ureas.    Polymerization can take place from mono or dimethylol urea or possibly through both, with the formation of long chains.  A fully cross-linked urea formaldehyde resin can be represented as:-    Urea formaldehyde resin (cross-linked polymer) |
| **PROCEDURE** | **:** | 1. Add 1.5 g urea in a pre-weight 100ml beaker 2. Place about 3ml of 40% formaldehyde solution in it. 3. Stir it constantly till saturated solution is obtained. 4. Add Conc. H2SO4 dropwise , with constant stirring. 5. A voluminous white solid mass appears in the beaker. 6. Keep stirring till it turns into powder. 7. Wash the white solid with water and dry it in the folds of filter paper. 8. Keep it in oven for half an hour. 9. Put it in a desiccator for 10 minutes and weigh the yield of the product. |
| **PRECAUTIONS** | **:** | 1. While adding concentrated H2SO4, it is better to stay little away from the beaker since the reaction sometimes becomes vigorous. 2. The reaction mixture should be stirred continuously. |
| **OBSERVATIONS** | **:** | Weight of Watch glass + filter paper (W1) = \_\_\_\_\_\_\_\_g  Weight of Watch glass + filter paper + urea formaldehyde (W2) = \_\_\_\_\_g  Therefore weight of urea formaldehyde (W2 - W1) = \_\_\_\_\_\_\_\_g |
| **RESULT** |  | The weight of urea formaldehyde = \_\_\_\_\_\_\_\_g |



**EXPERIMENT NO. :**  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **DATE :**  \_\_\_\_\_\_\_\_\_\_\_\_\_

**DIVISION/ BATCH :**  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **SAP ID :** \_\_\_\_\_\_\_\_\_\_\_\_

**COURSE :\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ COURSE CODE :\_\_\_\_\_\_\_\_\_\_**

**NAME :** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**COURSE OUTCOME : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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**AIM :** To prepare urea formaldehyde resin.

**REAGENTS :** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**APPARATUS :** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**CHEMICAL :** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**REACTIONS**

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**PROCEDURE :** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**OBSERVATIONS :** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**RESULT : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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| **D.J.S.C.E. (Chemistry)** | | |
| **Journal** | | |
| **(Lab Ethics)** | **5** |  |
| **(Performance)** | **5** |  |
| **(Documentation)** | **5** |  |
| **(Knowledge)** | **5** |  |
| **(Punctuality)** | **5** |  |
| **Total** | **25** |  |

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| **DATE** | **SIGNATURE OF FACULTY** |