

Name of the Subject: ENGINEERING CHEMISTRY LAB

Regulation: R22

S.No	Beyond the syllabus topic
1	Determination of chloride content of water by Argentometry
2	Preparation of formaldehyde resin.

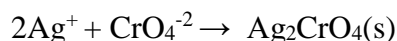
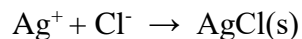
DETERMINATION OF CHLORIDE CONTENT OF WATER BY ARGENTOMETRY

Aim:

To determine the amount of chloride (in the form of Cl^-) present in the given water sample by Mohr's method.

Principle:

If water containing chlorides is titrated with silver nitrate solution, chlorides are precipitated as white silver chloride. Potassium chromate is used as indicator, which supplies chromate ions. As the concentration of chloride ions approaches extinction, silver ion concentration increases to a level at which reddish brown precipitate of silver chromate is formed indicating the end point.



Apparatus:

Burette, Pipettes, Erlenmeyer flasks, Measuring cylinder

Chemicals:

Chloride free distilled water, Standard silver nitrate solution (0.0141N), Potassium chromate indicator, Acid or alkali for adjusting pH.

Procedure:

Take 50mL of sample (V) and dilute to 100mL. If the sample is coloured add 3mL of aluminium hydroxide, shake well; allow to settle, filter, wash and collect filtrate. Sample is brought to pH 7-8 by adding acid or alkali as required. Add 1mL of indicator (Potassium chromate). Titrate the solution against standard silver nitrate solution until a reddish brown precipitate is obtained. Note down the volume (V_1). Repeat the procedure for blank and note down the volume (V_2).

Observation

S. No.	Volume of sample water (ml)	Burette reading(ml)		Volume of Silver nitrate (ml)
		Initial	Final	

$$V =$$

$$V_1 =$$

$$V_2 =$$

$$N =$$

$$\begin{aligned} \text{Chloride in mg/L} &= \frac{(V_1 - V_2) \times N \times 35.46 \times 1000}{V} \\ &= \frac{(V_1 - V_2) \times 500}{V} = \dots\dots\dots \text{mg/L} \end{aligned}$$

Results: Amount of Chloride ion present in water sample is: _____ mg/L

PREPARATION OF UREA FORMALDEHYDE RESIN

Aim: Preparation of urea formaldehyde resin.

Instruments and Apparatus: Glass rod, Beakers, Glass Funnel, Filter paper and Analytical Balance.

Chemicals required: Urea, 40 % Formaldehyde solution and Conc. H_2SO_4 .

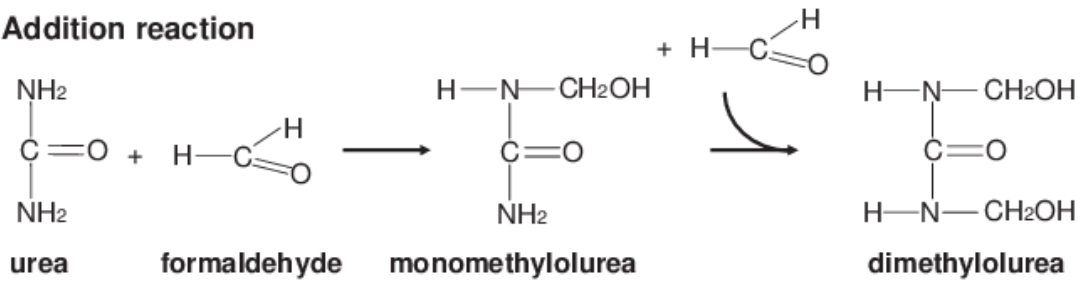
Principle: Amino resins are condensation products are obtained by the reaction of formaldehyde with nitrogen bearing compounds such as aniline, amides for example melamine formaldehyde, urea formaldehyde etc.

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 urea.

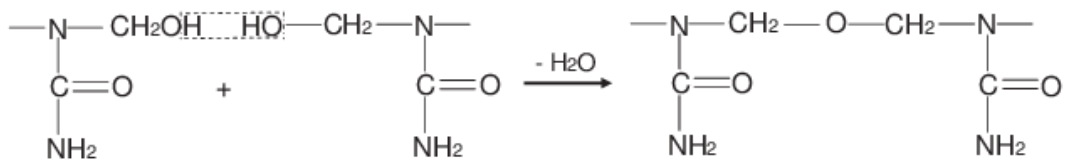
Polymerization can takes place from monomethylol and dimethylol urea or possibly both, with the formation of long chains.

Addition reaction

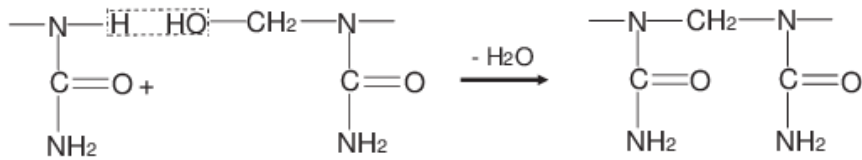


Polycondensation reaction

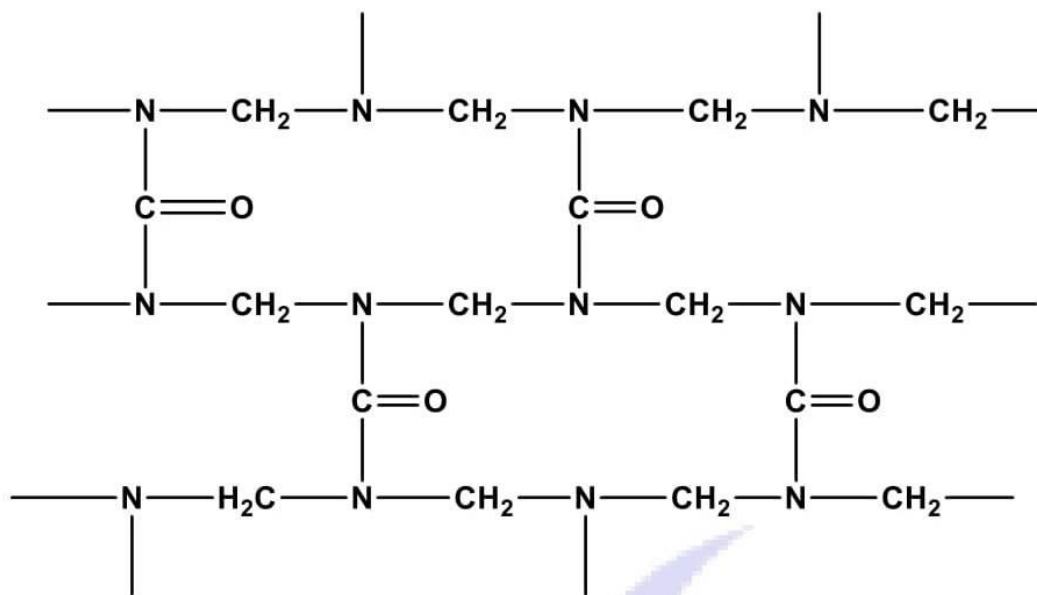
• by ether links



• by methylene links



A fully cross-linked urea formaldehyde resin can be represented as:



Urea Formaldehyde Resin(Cross linked)

Procedure:

Place 5 ml of 40 % formaldehyde solution in a 250 ml beaker and add 2.5 g urea with constant stirring till saturated solution obtained. Add a few drops of Conc. H_2SO_4 with constant stirring. Within 5 mins, a large white solid mass appears in the beaker. The obtained residue is washed several times with distilled water, and filtered product dried and yield is calculated.

Properties:

1. They have good electrical insulating properties.
2. They are resistant to oil, grease and weak acids.
3. They are hard, resist abrasion and scratching.
4. They have good adhesive properties.

Uses:

1. They are used adhesive applications for the production of plywood and laminating.

