

APPLICATION OF UREA-FORMALDEHYDE AND UREA-FURFURAL RESINS IN DIFFERENT SOLVENTS

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ABSTRACT	KEYWORDS
The article presents a study on the production synthesized resins are soluble in xylene, dioxane and sulfides and are insoluble in water. Cleaning resins from various additives to obtain high-quality varnish, enamel, glue and paints.	dioxane, sulfide, varnish, enamel, glue, furan paints, furfuryl alcohol, sodium hydroxide.

INTRODUCTION

Currently, there is very little literature on the physical, colloid-chemical properties of film-forming oligomers. There is almost no information about amino-furfural oligomers. The hydrophobicity and electrostatic effects of this type of oligomers have not been well studied. Synthesized resins are soluble in xylene, dioxane and sulfates and are insoluble in water. In order to obtain high-quality varnish, enamel, glue and paints, it is necessary to clean the resins from various additives.

Reagents and tools for the synthesis of urea furfural resin: Urea (25 g), furfural (55.8 g) or a solution containing 55.8 furfural, sodium hydroxide (1 g), distilled water (10 ml); three-necked 250 ml reflux condenser, a reaction flask equipped with a stopper and a thermometer (1 piece), a porcelain bowl (1 piece).

25 grams of urea and 55.8 grams of furfural or an aqueous solution containing 55.8 grams of furfural are placed in a reaction flask and heated in a water bath at 60-75°C. After 5-10 minutes, 10 g of a 10% solution of sodium hydroxide is added to the flask and heated for another 20-25 minutes at 85°C. After the reaction is over, the viscous, colorless and hardenable polymer - urea-furfural resin formed in the flask is taken into a porcelain cup and dried at room temperature, then at a temperature not higher than 400 until its mass does not change.

Solvents and their requirements In order to choose the best solvent capable of dissolving colloidal particles with dimensions of 10^{-5} - 10^{-7} cm, the following requirements are set.

Solvent requirements:

- Not affected by the component during the polycondensation process.
- The resulting resin should be well diffusible in the solvent.
- Solvent volatility must be good during film formation.
- The solubility of the resin in the solvent should be high.

In the process of polycondensation, the solvent must be such as to ensure the level of viscosity of the resin. In addition, the product of etherification, urea-formaldehyde resin, must be soluble in the solvent.

Quantitative ratios between solvent and resin are also of practical importance.

Table1 Performance of urea-formaldehyde and urea-furfural resins in different solvents

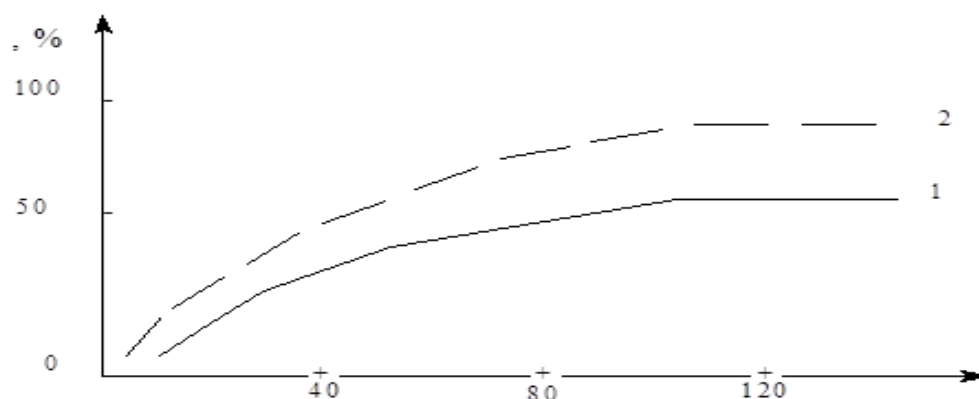
Resins name	Performance of resins in various solvents					
	Isopropyl alcohol		Isobutyl alcohol		Butyl alcohol	
	Resin and isopropyl alcohol 1:2	Resin, isopropyl alcohol and GK husband flag 1:1:1	Resin and isobutyl alcohol 1:2	Resin, isobutyl alcohol and GK husband flag 1:1:2	Resin and butyl alcohol 1:2	Resin, butyl alcohol and GK solution flag 1:1:1
1. Urea-formaldehyde	66,5	57,3	68,6	61,5	93,1	90,2
2. Urea - furfurol	83,6	73,4	86,8	75,9	94,8	91,1

From the obtained results, it can be seen that butanol is the solvent that meets the best requirements.

Furyl alcohol is one of the best solvents for obtaining urea-furfural and urea-formaldehyde resins..

Alternative conditions for obtaining butanolized urea furfural resin in laboratory conditions were studied. When the molar ratio of reacting monomers and solvents (urea, furfural, butanol) is 1:6:2, the duration of the polycondensation reaction of monomers is 90 minutes, and the reaction is carried out at a temperature of 850C, resin is formed with a high yield of 94%..

The etherification reaction of the resulting resin was carried out, alternative conditions of the reaction were studied, the etherification reaction of urea-furfural resin is carried out at a temperature of 950C. It was found that the duration of the reaction is 120 minutes. Mass fraction of resin



T= minutes

The graph of the dependence of resin yield on time and temperature.

T = 600C, 2. T = 850C urea:furfural:butanol in the ratio 1:6:2.

It is known that composite mixtures of solvents are mainly used in the production of furniture varnish or car enamel. For example, the composition of P-651 solvent, the main composite solvent of urea-formaldehyde resin, was found to be 90% ethanol, 10% butanol.

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