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IMPROVING THE PHYSICO-CHEMICAL PROPERTIES OF UREA FURFURAL RESIN

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A B S T R A C T

In article, in the formation of a film from a solution of synthetic resin, mochivena and melamine are synthesized using formaldehyde, epoxide, furfural, acrylate substances. Production of films made from resins obtained from melamine formaldehyde, phenol formaldehyde and mercury and studying their physical and chemical properties is of great importance. Despite the fact that the potential of the chemical industry of the republic has a high position in the world, the demand for the development of high-quality lacquers for furniture and the production of car enamels is increasing every year.In this article, in the formation of a film from a solution of synthetic resin, mochivena and melamine are synthesized using formaldehyde, epoxide, furfural, acrylate substances. Production of films made from resins obtained from melamine formaldehyde, phenol formaldehyde and mercury and studying their physical and chemical properties is of great importance. Despite the fact that the potential of the chemical industry of the republic has a high position in the world, the demand for the development of high-quality lacquers for furniture and the production of car enamels is increasing every year

K E Y W O R D S

furan, furfuryl alcohol, acrylic acid, sodium hydroxide, zinc chloride Synthesized resins are soluble in xylene, dioxane and sulfates and are insoluble in water.

INTRODUCTION

When forming a film from a synthetic resin solution, mercury and melamine are synthesized using formaldehyde, epoxide, furfural, and acrylate. The production of films from resins obtained from melamine formaldehyde, phenol formaldehyde and urea and the study of their physicochemical properties is of great importance. Despite the fact that the potential of the republic's chemical industry is high in the world, the demand for the development of high-quality varnishes for furniture and the production of automotive enamels is increasing every year. [5].

Varnishes and enamels are produced using urea, acrylonitrile, acrylates and some aldehydes, furfural, furyl alcohol, and furans in several countries.

At present, various resins are prepared by taking different amounts of urea, formaldehyde or furfural, various modified alcohols for the production of high-quality lacquers and enamels in technological production. [4].

During chemical reactions, urea is a tautomer of isoureas, which is in the form of groups with two different nitrogen contents: H_2N-COH=NH Carbomid can form inorganic (nitrogen, sulfur salts) or organic (formic and acetic) acid salts:

$$2NH_3+CO_2 \rightarrow NH_2COONH_4+38 \text{ kcal}$$

$$NH_2\text{-}CO\text{-}ONH_4 \rightarrow H_2N\text{-}CO\text{-}NH_2+H_2O\text{-}680 \text{ kcal}$$

In order to obtain high-quality varnish, enamel, glue and paints, it is necessary to clean the resins from various additives. Unreacted urea and furfural can be purified by decantation with an aqueous solution of hydrochloric acid. Urea, furfural and other additives, which were not purified even during the decantation process, are recrystallized in acetone and purified by precipitation. The precipitate is dried at room temperature and in ovens at 30-40^{0}C until its mass does not change. The quantities determining the properties of purified resins are shown in Table 1 below.

Table 1 Sizes that determine the properties of resin

Of resin name	Sizes that determine the properties of resin				
	Iodometric Color change on the scale (cm2).	Viscosity Vz-4 on the scale (sec.)	dry residue-amount of (%).	Acid number (mg). KOH	The resin content is not bound formaldehyde or furfurol (%).
1. Urea-formaldehyde resin	0,5	40-60	50-52	1	3
2. Urea-formaldehyde resin (butanolized)	0,5	55-68	52-56	1,5	3
3. Urea-furfural resin	0,2	60-65	70-74	2,0	10-15
4. Urea-furfural resin (butanolized)	1,5	68-75	74-80	2,5	3-4

As can be seen from the table, all indicators of synthesized resins meet the requirements. They can be used for the production of high-quality varnishes, enamels and glues. Lacquer and glue are mainly used in the development of metals, and enamel is of great importance as the main product in the automotive industry and industrial engineering. Alternative conditions for obtaining tars in laboratory conditions were studied.

Table 2 Alternative conditions for obtaining tars in laboratory conditions

№	The name of the resin	Consumable components amount (mol).			Alternative circumstances	
		Amine or phenol	Aldehyde Solvent-butanol	Aldehyde Solvent-butanol	T^0 C	Time (minute).
1.	Urea-formaldehyde (butanolized).	1	2,2	1,5	55*/92**	50*/80**
2.	Urea - furfural (undercut).	1	2,6	2	85*/95**	90*/120**

* - Polycondensation time and temperature of monomers;

** - Resin etherification time and temperature.

From the obtained results, it can be concluded that the information presented above (in the table) can be used to create a technological sequence for obtaining etherification resins.. [1].

Another major problem in obtaining resins is the selection of good solvents. It is known that composite mixtures of solvents are mainly used in the production of furniture lacquer or car enamel. For example; The main compositional solvent of urea-formaldehyde resin is p-651. When the mixture of solvent P-651 is returned, it was studied to form 90% ethyl alcohol and 10% butyl alcohol. The main composition of PC-2 solvent is 30% xylene and 70% ethyl alcohol.

The brand of the composite mixture of solvents used for urea-furfural resins is 20/200-70; it was studied that its composition consists of 70% butanol, 27% xylene and 3% toluene . [7].

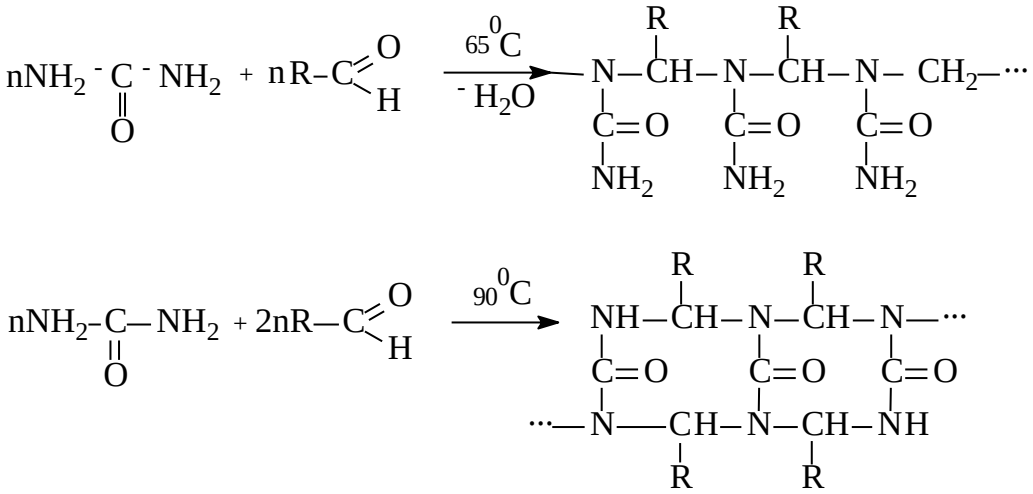
The brand of the solvent system used for urea-formaldehyde resins is Ap-120/220. the composition of the solvent is 34% propyl alcohol, 66% xylene. We know that composite solvents also have several disadvantages: they have insufficient raw materials, the volatility of solvents is not high, it can be seen that the color is light and the smell is bad. In order to darken the color of the solvent, 4-10 mg of iodine is often added.

The solvent component used under the name GK-LKM 120/220 is explained by the name of the hydrocarbon alcohol obtained using the gas condensation method at 120-220^{0}C .

Studying the technological processes of obtaining resins

The technological process consists of the following stages: First, the reactor (with pH = 8) is filled with ammonia solution. Then, mixing with a mixer, urea is added. Add butanol and stir until urea is completely dissolved. After a homogeneous solution is formed, furfurol is added to the solution and mixed. At this time, the process of polycondensation takes place. The reaction is carried out under alkaline conditions (NaOH catalyst). The reaction is carried out in a non-aqueous environment or with the release of released water**.** [6].

Resins can dissolve in water in alkaline environments to form clay. The water released during the preparation of the clay is not removed from the reaction medium. The polycondensation reaction is heated at 65-85^{0}C for 75-90 minutes. The reaction proceeds with the release of water. As a result of the etherification reaction, butyl alcohol is combined with OH groups in the butanolized resin. As a result, the lyophobic colloidal resin becomes lyophilic and the solubility of the resin increases. In addition, resin polymerization stops. The solubility of resins with a low degree of polymerization is high. It is possible to create smooth, even and thin layers of varnishes, enamels and paints made from these resins. The process of polycondensation produces a thermoreactive urea-furfural resin with a water-soluble linear structure and a poorly soluble ladder-like structure based on the following reaction mechanism :



When the reaction is heated at a high temperature of 85-90^{0}C, a difficult-to-dissolve urea-furfural tar with a ladder-like structure is formed.

List of Reference

1. ОгрельЛ.Д. Оценка накопления, сбора и переработки отходов ПЭТФ в России // Экологический вестник России. – 2012. - №4 – с. 34.
2. O'G'Li, Rayimov Zuhriddin Khayriddin, and Jamilova Niginabonu Qobil Qizi. "Analysis of importance and methods of production of block sopolymers based on polyetylenterephtalate." International Journal of Advanced Technology and Natural Sciences 3.1 (2022): 51-55.
3. Жамилова, Н. К. К., Зарипов, М. Х. У., & Мирзаев, С. С. (2017). Изучение процесса регенерации цеолитовой очистки природного газа на УДП" Шуртаннефтгаз". Вопросы науки и образования, (2 (3)), 45-47.Жамилова, Н. 4. К. К., Зарипов, М. Х. У., & Мирзаев, С. С. (2017). Изучение процесса регенерации цеолитовой очистки природного газа на УДП" Шуртаннефтгаз". Вопросы науки и образования, (2 (3)), 45-47.
4. Zuhriddin, R., Niginabonu, J., Aminjon, V., & Temurbek, D. (2022). MECHANISMS OF ETERIFICATION OF TEREFTALIC ACID WITH ETYLENGLYCOL. Universum: технические науки, (5-11 (98)), 63-67.
5. O'G'Li, R. Z. K., & Qizi, J. N. Q. (2022). ANALYSIS OF IMPORTANCE AND METHODS OF PRODUCTION OF BLOCK SOPOLYMERS BASED ON POLYETYLENTEREPHTALATE. International Journal of Advanced Technology and Natural Sciences, 3(1), 51-55.
6. Zuhriddin, R., & Niginabonu, J. (2022). PRODUCTION OF POLYETHYLENE TEREPHTHALATE. Universum: технические науки, (5-11 (98)), 58-62.
7. 8.Абдирахимов. Х.А. Получение и исследование коллоидно-химических свойст водных растворов дифинильних солей полиметиленантраниловой кислоты и её производных. Автореферат диссертации на соискание ученой степени канд. хим. наук. Ташкент 1993. -31 с.
8. 9. Сагдуллаева П.А. Синтез и исследование мочевино-формалъдегид-
9. ных полимеров, модифицированных некоторыми производными фурана. Автореферат, диссертации на соискание ученой степени канд. хим. наук. Ташкент 1987. -103-108 с.
10. Слоним И.Я. Определение строения мочевина формалъдегидных смол циклоцепной структуры методом ЯМР ^{13}С. Журнал ВМС Сер. А. 1988 N10. -2286-2292 с.