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ALKYD-ACRYLIC COMPOSITIONS

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Abstract: Currently, in industrialized countries, due to tightening legislation to limit emissions of organic solvent vapors by enterprises, areas related to the use of paints and varnishes without solvents or with a reduced solvent content are being intensively developed. This led to a significant change in the range of paint and varnish industry, in which water-dispersed paint and varnish materials occupy significant place.

Key words: alkyd emulsions, acrylic dispersions, Water-dispersed paints and varnishes, homogeneous mixtures of alkyd and acrylic polymers

Article Outline

1. Introduction

The rapid progress of water-dispersed paints and varnishes from the water-borne group is due to a number of their advantages compared to other environmentally friendly paints and varnishes. Compared to water-based ones, they provide the possibility of low-temperature drying down to room temperature; allow, in contrast to them, as well as materials with high dry the remainder completely exclude the use of organic solvents; compared to powder coatings do not require radical re-equipment of painting areas.

Water-dispersed paints and varnishes are environmentally friendly, so as they do not emit harmful substances during the application and operation of coatings, they do not have odorless, easy to apply, dry quickly, tools can be washed with water, so it's easier, more convenient and more pleasant to work with water-dispersed paints and varnishes. In addition, the resulting polymer film is permeable to vapors, but not permeable to liquids, so the permeability of coatings allows any the painted surface can "breathe". The decorative properties of coatings based on water-dispersed paints and varnishes also correspond to the highest consumer requirements.

2. Objective

Research into the development of highly effective water-dispersible binders is currently focused on the production of binders consisting of two or more chemically different components. Examples of such water-dispersion systems are mixtures of polymers with low and high glass transition temperatures, polyurethane acrylate, and alkyd-acrylic compositions. Connection of two or more components makes it possible to use the specific properties of each of them and/or reduce the amount of necessary technological additives. Often one of the components provides good film formation and reduces or limits the need for introduction of coalescent additives. Other properties, such as film hardness, are associated with the addition of another component.

3. The Experimental Part

Acrylic dispersions and alkyd emulsions each individually have their own advantages and disadvantages. For example, alkyd emulsions form soft film after the film formation process. Acrylic emulsions, on the other hand, have satisfactory chemical and water resistance properties. In table 1 shows some properties of alkyd resins and acrylic latexes.

Table 1. Some typical properties of alkyd emulsions and acrylic dispersions.

	Alkyd resins	Acrylic latexes
Molecular weight (Mw)	3000-5000	105 - 106
Curing process	Chemical	Physical
(°C)	>0	>0
Drying time	medium/long	Short
Penetration into substrate pores	good/complete	Low
Gloss	Good	quite satisfactory
Color retention	Poor	quite satisfactory
Chemical resistance	quite satisfactory	Good

Creating homogeneous mixtures of alkyd and acrylic polymer makes it possible to reduce negative qualities of each of them. In alkyd-acrylic systems, rapid physical drying of the acrylic dispersion can be combined with oxidative curing alkyd Consequently, such systems dry faster than alkyd emulsions and have better chemical and water resistance compared to acrylic dispersions.

This can be justified by the fact that the polymer/polymer mixture becomes more homogeneous, the chemical properties become less similar to the properties of the original binders. Combining both types of binders leads to a decrease in the negative characteristics of individual polymers.

Ideally, combining alkyd emulsions and acrylic dispersions, will ensure good penetration into the pores of the substrate, rapid drying followed by curing by oxidative polymerization, as well as high gloss and color fastness of coatings.

This work is aimed at obtaining a homogeneous film of an alkyd acrylic system.

The alkyd-acrylic composition is obtained by mixing alkyd and acrylate at room temperature. Various additives are also added to this mixture. The introduction of certain additives leads to a change in the size and charge of particles, which in turn. The turn affects the structure of the cured film. By varying the nature and concentration of these additives, a uniform film structure can be achieved.

4. Experimental Results and Their Discussion

At this stage of the work, the following additives were introduced: NaOH, ethoxylated alkyl sulfone (non-ionic surfactant), sodium alkyl benzene sulfonate (anionic surfactant).

Table 2. Sample recipes.

N	alkyd, %	acrylate %	defoamer, %	NaOH, %	water %	nonionic % ethoxylated alkyl sulfone	ionic %

							Sodium alkylbenzene sulfonate
1	49.85	49.85	0.3	0.9	3.1		
2	47.85	47.85	0.3	1	3		
3	47.85	47.85	0.3	1.3	2.7		
4	47.85	47.85	0.3	0.9	3.1		
5	46.85	46.85	0.3	0.9	3.1	2	
6	45.85	45.85	0.3	0.9	3.1	4	
7	44.85	44.85	0.3	0.9	3.1	6	
8	46.85	46.85	0.3	0.9	3.1		2
9	45.85	45.85	0.3	0.9	3.1		4
10	44.85	44.85	0.3	0.9	3.1		6

References

1. Малкин, А.Я. Реология и макрокинентика отверждения эпоксидного олигомера дициандиамидом/ А.Я.Малкин, С.Г.Куличихин, В.П.Батизат и др. //Высокомолекулярные
соединения. Сер А. 1984. Т.26. №10.

2. Торопцева, А.И. Лабораторный практикум по химии и технологии высокомолекулярных соединений/ А.И.Торопцева, В.М.Белогородская, В.М.Бондаренко.- Л.:Химия. 1972.- 417 с.

3. Выгодский, Я.С. Новые эпоксидные олигомеры на основе эпоксидных олигомеров икардовых полиимидов/ Я.С.Выгодский, Л.И.Комарова, Ю.В.Антипов //Высокомолекулярныесоединения. Сер.А. 1995. Т.37. №2.