

ALIEN PROPERTY CUSTODIAN

PROCESS FOR THE PRODUCTION OF DI-AMIDE AND POLYAMIDE RESINS

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This invention relates to a process for the production of di-amide or polyamide resins. Di-amide and polyamide resins are known. They are usually produced by condensation of di-amides or polyamides with aldehydes, especially formaldehyde, the condensation being either acid, alkaline or neutral. The invention is based on the knowledge, that di-amide or polyamide resins with new properties can be obtained by converting aromatic disulfamides or polysulfamides or aromatic dicarbamides or polycarbamides and also those di-amides or polyamides which contain at least one sulfamide group and one carbamide group, into methylol compounds while avoiding polymerisation and that the methylol compounds thus formed can be treated with substances which can separate formaldehyde from the methylol compound, preferably in at least such quantity, that from every two molecules of the methylol compound while separating at least one mol formaldehyde a new compound is formed, preferably a compound with at least one methylol group, preferably with two methylol groups, but if the separation of formaldehyde is continued, or allowed to go too far, the product obtained by the separation is condensed with formaldehyde with the result that one or several methylol groups can again be introduced into the compound, so that the required compound is formed. In the process according to the invention the separation of formaldehyde can be carried so far that the compound of the desired composition is only obtained by a condensation with formaldehyde following the separation of formaldehyde.

If for example disulfamides are to be produced, it is preferable to use a dilution which is obtained by using a ½% formaldehyde solution.

The process according to the invention leads to resins which are absolutely insoluble in water.

Therefore, in the process for the production of resins according to the invention, di-amides or polyamides are first converted into methylol compounds, for example in a known manner by condensation of the di-amides or polyamides with aldehydes, particularly formaldehyde, a polymerisation of this methylol compound being, however, prevented at the same time, so that substantially monomeric methylol compounds are formed.

The methylol compounds thus produced are, according to the invention, treated with substances which are capable of separating formaldehyde from the methylol compound, that is with such substances in at least such quantity that from two molecules of the methylol compound one molecule of a new compound is formed, with

separation of at least one mol of formaldehyde, particularly a compound with at least one methylol group but preferably a compound with two methylol groups.

However, the separation can be carried farther and the product thus obtained can be condensed with formaldehyde in such a manner that the compound of the desired composition is produced.

The methylol compound is preferably treated with ammonia or a substance giving off ammonia for the separation of the formaldehyde, it being possible to use ammonia in aqueous solution or in gaseous form.

Thus, for example, to two molecules of a dimethylol compound the equivalent in ammonia for one mol formaldehyde that is ⅔rd mol ammonia to two mols of the dimethylol compound, is added. If started, for example, from a toluol disulfamide dimethylol, about 11 kilogrammes of 100% ammonia (NH₃) are added to 600 kilogrammes of this compound. An increase in the ammonia addition is detrimental on account of a saponification.

The resins produced according to the present invention are also suitable for the production of compositions for pressing but also as lacquers, spraying substances, protecting layers. The resins offer particular advantages in combination with other resins. In such a combination the resins according to the invention cause an increase in the flowing capacity and an increase in the resistance to water. Thus, these resins offer advantages in combination with carbamide resins, not only in rendering unnecessary the use of thiocarbamide, but they are superior to thiocarbamide as addition to carbamide. Thus, an addition of about 10% of the quantity of thiocarbamide hitherto used for the production of carbamide-thiocarbamide-formaldehyde resins is sufficient to obtain resins which are equivalent to the carbamide-thiocarbamides.

In the production of such mixed resins, for example from carbamide formaldehyde resins and resins according to the invention, the effect of the ammonia or the like can be carried out in the sense of the invention also in any stage of the condensation process of the mixture.

Examples

1. Dissolve 4.5 kilogrammes of toluol sulfamide in 180 litres of water at about 70° C, and add about 100 grammes of soda and about 3 kilogrammes of 40% formaldehyde solution. After several hours the dimethylol compound separates out in the form of a chalky powder.

Triturate 6 kilogrammes of toluol disulfamide-dimethylol in about 30 litres of warm water and add slowly, while stirring 550 grammes concentrated ammonia solution, in stirring the while. A white fused mass separates out which mass is washed and dried. This condensation compound is dissolved in alcohol, if necessary with addition of suitable softeners.

The product thus obtained is very suitable as coating varnish, as protective coating for different photographic or graphic purposes and the like. The films are glass-clear and in every respect very resistant.

2. For the production of a carbamide mixed resin 18 kilogrammes of carbamide are dissolved in 18 kilogrammes of water. 1.8 kilogrammes of the condensation compound obtained for example according to Example 1, are dissolved in this solution under heating. This mixture is then condensed, formaldehyde, and if necessary condensing agents being added. The mixed resin obtained in this manner is converted in known

manner into a composition for pressing. This composition possesses, besides excellent flowing properties, a particularly great resistance against boiling water.

3. For the production of a carbamide mixed resin 18 kilogrammes of carbamide are dissolved in 18 kilogrammes of water. 1.8 kilogrammes of the toluol disulfamide-dimethylol obtained according to Example 1 are dissolved in this solution, under heating whereupon 150 grammes of concentrated ammonia solution are added and the whole is heated until the ammonia has disappeared. Then, after adding formaldehyde and, if necessary, condensing agents, the mixed resin is produced which in known manner is converted into plastic composition. This composition has the same excellent flowing properties and the same high water resistance as the composition obtained according to Example 2.

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