Patents

Addition compounds suited as dispersing agents, process for their preparation, their use and solid materials coated with them

Classifications

C08G18/8064 Masked polyisocyanates masked with compounds having only one group containing active hydrogen with monohydroxy compounds

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Organic Chemistry

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EP0154678B2
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Other languages: German, French

Inventor: Karlheinz Haubennestel, Peter Dr. Kramp

Current Assignee : BYK Chemie GmbH

Worldwide applications

1984 ~~EP~~ ~~DE~~ JP ~~US~~ 1986 ~~US~~

Application EP84112971A events

	First worldwide family litigation filed
1984-10-27	Priority to AT84112971T
1984-10-27	Application filed by BYK Chemie GmbH
1985-09-18	Publication of EP0154678A1
1987-08-26	Publication of EP0154678B1
1987-08-26	Application granted
1998-12-09	Publication of EP0154678B2
2004-10-27	Anticipated expiration
Status	Expired - Lifetime

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Info: Patent citations (20), Cited by (111), Legal events, Similar documents, Priority and Related Applications

External links: Espacenet, EPO GPI, EP Register, Global Dossier, Discuss

Claims (13)

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1. Addition compounds and salts thereof which are suitable as dispersing agents, obtainable by the reaction of polyisocyanates, hydroxy compounds, compounds with a pKa value of 5 to 14 which contain Zerewitinoff hydrogen as well as at least one basic group, and optionally compounds which contain amino hydrogen, optionally in the presence of solvents and optionally in the presence of reaction catalysts, characterised in that they are obtainable by the reaction of polyisocyanates having an average functionality of 3 to 6

a) with monohydroxy compounds of formula I Y-OH wherein Y has the following meanings:

i) aliphatic and/or cycloaliphatic hydrocarbon groups containing 8 to 30 carbon atoms, the hydrogen atoms of which can be replaced in part by halogens and/or aryl radicals,

ii) aliphatic, cycloaliphatic and/or aromatic groups which contain at least one -O- and/or -COO- group and which have molecular weights of 350 to 8000, wherein the hydrogen atoms can be replaced in part by halogens,

in an amount such that on average at least 0.8 molecules of formula I are allotted to each molecule of polyisocyanate, but such that on average at least 2 isocyanate groups of each molecule of polyisocyanate remain unreacted, with the proviso that 20 to 50 % of the NCO groups are reacted,

b) the reaction product obtained is reacted with compounds of formula II $G-(E)_n$ wherein E represents -OH, $-NH_2$ and/or -NHR (wherein R represents an alkyl group containing 1 to 4 carbon atoms), n represents 2 or 3, and G represents an aliphatic, cycloaliphatic and/or aromatic group with a molecular weight of 3000 at most, which contains at least 2 carbon atoms, and which can contain -O-, -COO-, -CONH-, -S- and/or SO_2 groups, in an amount such that 0.8n to 1.1n molecules of polyisocyanate are allotted to 1 molecule of formula II, but such that on average at least one isocyanate group of each molecule of polyisocyanate remains unreacted, but that the sum of the degrees of NCO reaction of reactions a) and b) is 75 % as a maximum, with the proviso that a further 22 % - 36 % of the NCO groups of the polyisocyanates originally used are reacted, and the sum of the degrees of reaction of reactions a) and b) is at least 45 %,

c) the reaction product obtained is reacted with a compound from the group comprising N,N-diethyl-1,4-butanediamine, 1-(2-aminoethyl)piperazine, 2-(1-pyrrolidyl)-ethylamine, 4-amino-2-methoxy-pyrirnidine, 2-dimethylaminoethanol, 1-(2-hydroxyethyl)piperazine, 4-(2-hydroxyethyl)morpholine, 2-mercaptopyrimidine, 2-mercaptobenzimidazole, N,N-dimethyl-1,3-propanediamine, 4-(2-aminoethyl)pyridine, 2-amino-6-methoxybenzothiazole, 4-aminomethyl-pyridine, N,N-diallylmelamine, 3-amino-1,2,4-triazole, 1-(3-aminopropyl)imidazole, 4-(2-hydroxyethyl)pyridine, 1-(2-hydroxyethyl)imidazole and 3-mercapto-1,2,4-triazole, in an amount such that the remaining isocyanate groups are reacted.

2. Addition compounds and salts thereof according to claim 1, characterised in that the monohydroxy compounds of formula I are polyesters with average molecular weights M_n of 500 to 5000, which are preferably formed from aliphatic lactones and aliphatic monoalcohols containing 4 to 18 carbon atoms.

3. Addition compounds and salts thereof according to claims 1 or 2, characterised in that the compounds of formula II are polyoxyalkylene glycols, preferably with average molecular weights M_n of 400 to 2000.

4. Addition compounds and salts thereof according to claim 3, characterised in that compounds II have average molecular weights M_n of 600 to 1500.

5. Addition compounds and salts thereof according to claims 3 or 4, characterised in that the polyoxyalkylene glycol is a polyethylene glycol.

6. A method of producing addition compounds and salts thereof which are suitable as dispersing agents, by the reaction of polyisocyanates, hydroxy compounds, compounds with a pKa value of 5 to 14 which contain Zerewitinoff hydrogen as well as at least one basic group, and optionally compounds which contain amino hydrogen, optionally in the presence of solvents and optionally in the presence of reaction catalysts, characterised in that polyisocyanates having an average functionality of 3 to 6 are reacted

a) with monohydroxy compounds of formula I Y-OH wherein Y has the following meanings:

i) aliphatic and/or cycloaliphatic hydrocarbon groups containing 8 to 30 carbon atoms, the hydrogen atoms of which can be replaced in part by halogens and/or aryl radicals,

ii) aliphatic, cycloaliphatic and/or aromatic groups which contain at least one -O- and/or -COO- group and which have molecular weights of 350 to 8000, wherein the hydrogen atoms can be replaced in part by halogens,

in an amount such that on average at least 0.8 molecules of formula I are allotted to each molecule of polyisocyanate, but such that on average at least 2 isocyanate groups of each molecule of polyisocyanate remain unreacted, with the proviso that 20 to 50 % of the NCO groups are reacted,

b) the reaction product obtained is reacted with compounds of formula II $G-(E)_n$ wherein E represents -OH, $-NH_2$ and/or -NHR (wherein R represents an alkyl group containing 1 to 4 carbon atoms), n represents 2 or 3, and G represents an aliphatic, cycloaliphatic and/or aromatic group with a molecular weight of 3000 at most, which contains at least 2 carbon atoms, and which can contain -O-, -COO-, -CONH-, -S- and/or SO_2 groups, in an amount such that 0.8n to 1.1n molecules of polyisocyanate are allotted to 1 molecule of formula II, but such that on average at least one isocyanate group of each molecule of polyisocyanate remains unreacted, but that the sum of the degrees of NCO reaction of reactions a) and b) is 75 % as a maximum, with the proviso that a further 22 % - 36 % of the NCO groups of the polyisocyanates originally used are reacted, and the sum of the degrees of reaction of reactions a) and b) is at least 45 %,

c) the reaction product obtained is reacted with compounds from the group comprising N,N-diethyl-1,4-butanediamine, 1-(2-aminoethyl)piperazine, 2-(1-pyrrolidyl)-ethylamine, 4-amino-2-methoxy-pyrimidine, 2-dimethylaminoethanol, 1-(2-hydroxyethyl)piperazine, 4-(2-hydroxyethyl)morpholine, 2-mercaptopyrimidine, 2-mercaptobenzimidazole, N, N-dimethyl-1,3-propanediamine, 4-(2-aminoethyl)pyridine, 2-amino-6-methoxybenzothiazole, 4-aminomethyl-pyridine, N,N-diallylmelamine, 3-amino-1,2,4-triazole, 1-(3-aminopropyl)imidazole, 4-(2-hydroxyethyl)pyridine, 1-(2-hydroxyethyl)imidazole and 3-mercapto-1,2,4-triazole or salts thereof, in an amount such that the remaining isocyanate groups are reacted.

7. A method according to claim 6, characterised in that the monohydroxy compounds of formula I are polyesters with average molecular weights M_n of 500 to 5000, which are preferably formed from aliphatic lactones and aliphatic monoalcohols containing 4 to 18 carbon atoms.

8. A method according to claims 6 or 7, characterised in that the compounds of formula II are polyoxyalkylene glycols, preferably with average molecular weights M_n of 400 to 2000.

9. A method according to claim 8, characterised in that compounds II have average molecular weights M_n of 600 to 1500.

10. A method according to claims 8 or 9, characterised in that the polyoxyalkylene glycol is a polyethylene glycol.

11. The use of the addition compounds and salts thereof according to claims 1 to 10 as dispersing agents.

12. Pulverulent or fibrous solids which are coated with dispersing agents and which are to be incorporated in liquid systems, characterised in that they are coated with addition compounds or salts thereof according to claims 1 to 5.

13. Pulverulent solids according to claim 12, characterised in that the solids are pigments.

Description

translated from German

The present invention relates to dispersants suitable addition compounds or their Salts obtainable by reacting polyisocyanates, Hydroxy compounds, Zerewitinoff hydrogen as well as at least one basic Group containing compounds with a pKa of 5 to 14 and optionally Compounds containing hydrogen amine contain, optionally in the presence of solvents and optionally in the presence of Implementation catalysts.

The invention further relates to methods of manufacture of these addition compounds, their use as a dispersant and in liquid systems powder or fibrous solids to be incorporated, which are coated with such dispersants are.

In order to introduce solids into liquid media, high mechanical forces are necessary. This depends to a large extent on the wettability of the Solid through the surrounding medium and from affinity for this medium. To these dispersing forces to reduce, it is common to use dispersants apply, which facilitate the familiarization. These are mostly surface-active Substances, also called surfactants, from anion or cation active as well as non-ionogenic Structure. These substances are added in relatively small amounts, either applied directly to the solid or added to the dispersing medium. Such a surfactant reduces the amount of dispersion significantly reduced.

It is also known that these solids after the dispersing process to re-agglomerate tend what the previously spent dispersing effort nullifies and serious problems leads. This phenomenon is explained by London / van der Waal's forces, by which the solids attract each other. Around Adsorption layers must be superimposed on attractive forces to which solids are applied. This is done through the use of such Surfactants.

However, during and after the dispersion occurs an interaction of the surrounding medium with the solid particle, and desorption takes place of the surfactant in exchange for that, in higher Concentration present, surrounding medium. However, this surrounding medium is in the in most cases unable to provide such stable adsorption layers build up, and the whole System breaks down. This is noticeable due to viscosity increase in liquid systems, Loss of gloss and color shifts in paints and coatings, insufficient color development in pigmented plastics, as well as reduction the mechanical strength in reinforced Plastics.

Dispersants are used to solve this problem e.g. in U.S.-A-4,032,698, GB-A-1,393,401 and GB-A-1 393 402. These dispersants however, only lead to partial solutions, in particular with regard to the flocculation-free miscibility of different pigments among themselves, such as organic pigments and inorganic pigments. Also tend to follow

the procedures described prepared pigment pastes e.g. after use in Lacquers to interact with the surrounding Medium. It can be assumed that the adsorption layers built up are not sufficient Have stability against desorption.

FR-A-2 241 597 describes the preparation and use of dispersants which are in the essentially not from those known to the person skilled in the art Differentiate urethane resins. According to FR-A-2 241 597 are isocyanates with at least 2 NCO groups with different NCO-reactive Compounds, preferably diols and monohydroxy compounds implemented so that polyurethanes arise which are not reactive after implementation Groups included more. Using these compounds form as dispersants apparently no stable adsorption layer of the dispersant on the pigment or other to be dispersed Solids. This leads to instability (Flocculation) of the dispersions what through Attempts have been confirmed.

The present invention is based on the object Find dispersants that match the above Disadvantages not or to a much lesser extent have, and in particular to dispersions lead from solids after the dispersing process not or only to a minor extent tend to re-agglomerate.

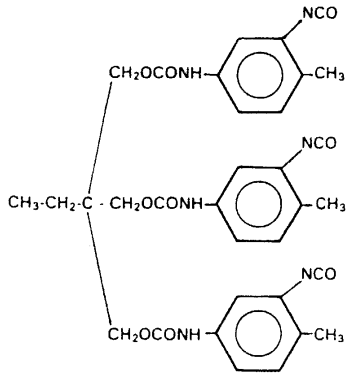
It has now surprisingly been found that this task with the following defined addition products can be solved.

The invention accordingly relates to Addition compounds suitable for dispersing agents or their salts, according to claim 1.

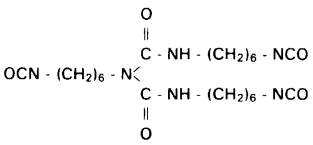
The invention further relates to the method for the preparation of the addition compounds according to claim 6.

The invention furthermore relates to the use of the addition compounds mentioned as a dispersant. Subject of Invention are also to be incorporated into liquid systems powdery or fibrous solids, the with these addition compounds as dispersants are coated. Powder or fibrous solids are those according to the state of the art Technology were coated with dispersants, especially organic and inorganic pigments, those in paints, coatings, molding compounds or other plastics are used, inorganic or organic fillers that for filling or strengthening paints, Coating agents, molding compounds or other Plastics are used. A subset Such fillers make fibers more organic and / or inorganic in nature, also used as fillers or reinforcing materials are used. Such powdery or fibrous solids with a Coating of dispersants according to the Invention are produced in a manner known per se being instead of the prior art known dispersants according to the invention are used. In the area of These dispersants are often called fibrous materials also finishing. For this, the solids can e.g. in a fluidized bed with a solution or emulsion of the Addition compounds coated according to the invention will. The solvent or emulsion can then be removed, but it can also be removed in the Mixture remain so that pastes are obtained. Another possibility is e.g. in that the solids to be coated in a liquid Medium slurried and this slurry the addition compounds according to the invention added will. Here, too, the sludge in done in such a way that a processable paste is obtained being, of course, the liquid medium adapted for slurrying is later Purpose of this paste, e.g. the pigment paste.

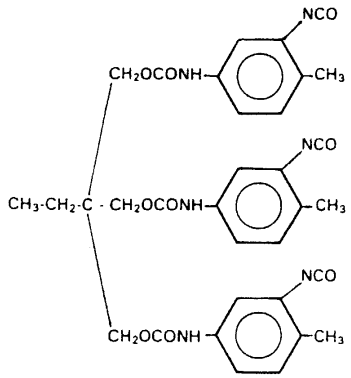
The use of the addition compounds according to the invention as a dispersant also - as according to the prior art for known Dispersant - so that the dispersant any systems, e.g. Lacquer, Plastic mixtures and the like added which are the solids to be incorporated, such as pigments, fillers, fibers, already dispersed contain.



Handelsprodukt: Desmodur L (eingetragenes Warenzeichen)
oder die durch Biuretreaktion aus Diisocyanaten erhalten werden können wie

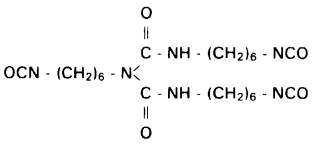


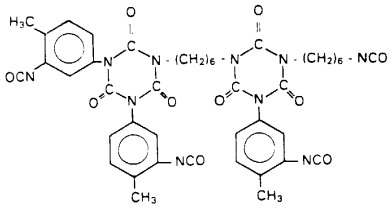
For the preparation of the addition compounds according to the invention, the compounds usable in this technical field according to the prior art are used as polyisocyanates. However, they must have an average functionality of 3 to 6. Examples of such polyisocyanates are those which can be obtained, for example, by adding diisocyanates to polyols, such as



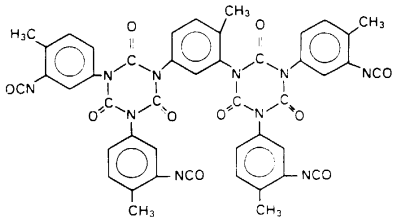
Commercial product: Desmodur L (registered trademark)

or which can be obtained from diisocyanates by a biuret reaction such as

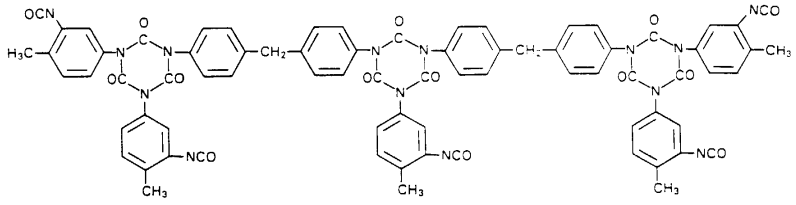




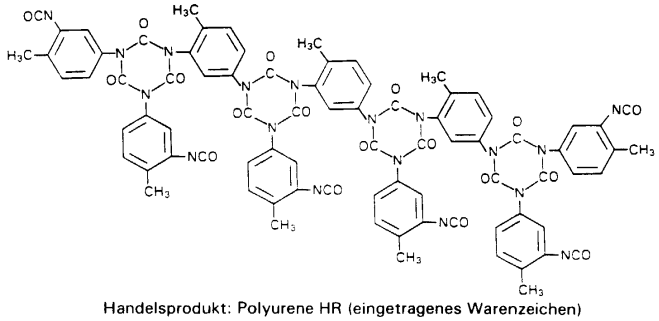
Handelsprodukt: Desmodur HL (eingetragenes Warenzeichen)



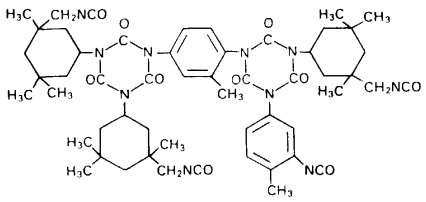
Handelsprodukt: Desmodur IL (eingetragenes Warenzeichen)



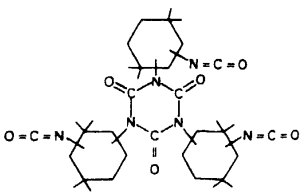
Handelsprodukt: Polyurene KC (eingetragenes Warenzeichen)



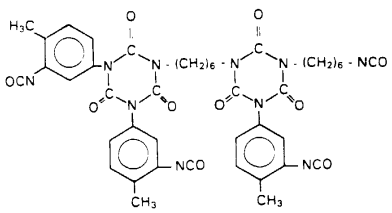
Handelsprodukt: Polyurene HR (eingetragenes Warenzeichen)



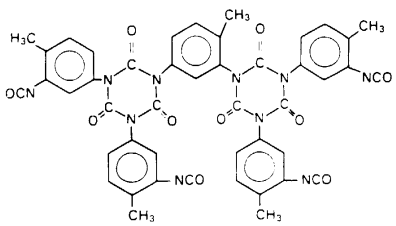
Toluylendiisocyanat-isophorondiisocyanat-isocyanurat (Firma SAPICI)



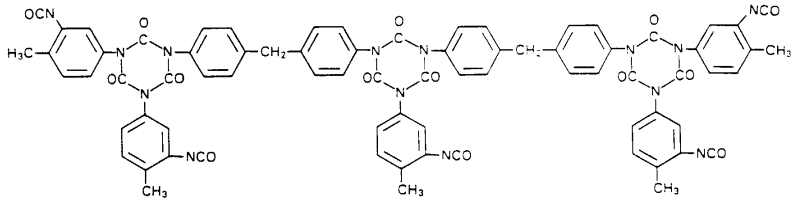
Trimeres Isophorondiisocyanat (Isocyanurat T1890 der Firma Chemische Werke Hüls)Commercial product: Desmodur N (registered trademark)
or the polyisocyanates obtainable by cyclization of diisocyanates with an isocyanurate basic structure



Handelsprodukt: Desmodur HL (eingetragenes Warenzeichen)



Handelsprodukt: Desmodur IL (eingetragenes Warenzeichen)



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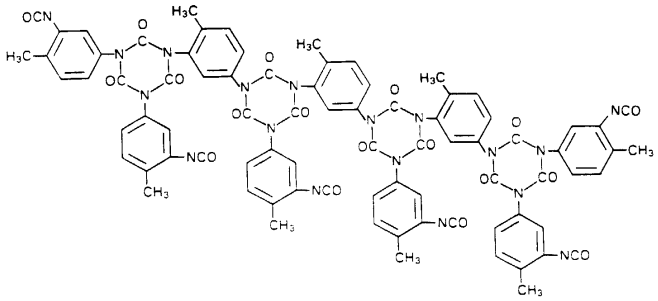
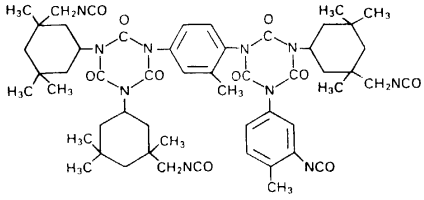
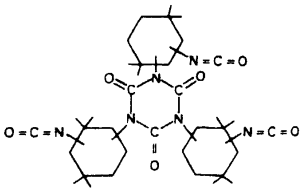


Handelsprodukt: Polyurene HR (eingetragenes Warenzeichen)



Toluylendiisocyanat-isophorondiisocyanat-isocyanurat (Firma SAPICI)



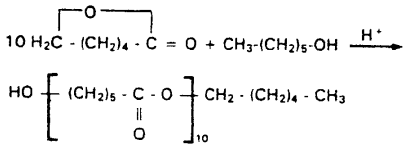
Trimeres isophorone diisocyanate (isocyanurate T1890 from Chemische Werke Hüls)

As already explained above, the relevant compounds are commercial products, which frequently do not have the chemical formulas above in pure form, but rather represent the mixtures of certain compounds with a similar structure. Average functionality is understood to mean that the commercial products have the stated functionality of 3 to 6 with regard to the isocyanate groups. For example, “functionality of 3” means that a molecule contains 3 free isocyanate groups on average. The average functionality can be determined experimentally by determining the average molecular weight Mn certainly. In addition, the NCO number is determined and the NCO equivalent weight is calculated. The average functionality is the quotient of the average molecular weight and the NCO equivalent weight.

As monohydroxy compounds of formula I can aliphatic, cycloaliphatic and / or araliphatic Connections are used with each 8 to 30 carbon atoms. It can also be mixtures such connections are used.

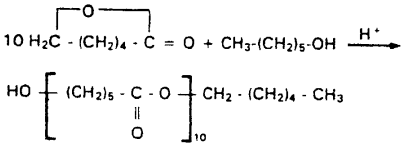
Straight-chain and branched aliphatic or araliphatic compounds can be used. They can be saturated or unsaturated. Saturated compounds are preferred. The hydrogen atoms can be partially replaced by halogens, preferably by fluorine and / or chlorine. If such substituted compounds are used, they are preferably aliphatic monoalcohols. Products of this type are commercially available, and, as is known to the person skilled in the art, the carbon atoms close to the hydroxyl group generally have no halogen atoms. Examples of special fluorinated alcohols are heptadecafluorodecanol or $C_6F_{13}CH_2CH_2OH$. The corresponding products available commercially are often not uniform, but rather mixtures of different fluorinated compounds, as are obtained in industrial synthesis.

As monohydroxy compounds of formula I can also be used at least contain a -O- and / or -COO group. It deals are polyethers, polyesters or blends Polyether polyester. Examples of polyester are those obtained by polymerizing a lactone, such as Propiolactone, valerolactone, caprolactone or their substituted derivatives using a monohydroxy starting component can be obtained. As a starting component become monoalcohols, expedient with 4 to 30, preferably 4 to 14 carbon atoms, such as n-butanol, longer chain, saturated and unsaturated Alcohols, such as propargyl alcohol, oleyl alcohol, linoloyl alcohol, Oxo alcohols, cyclohexanol, phenylethanol, Neopentyl alcohol, but also fluorinated alcohols, as mentioned above. It can also alcohols of the type described above and substituted and unsubstituted phenols Alkoxylation according to known processes with ethylene oxide and / or propylene oxide in polyalkylene monoalkyl, aryl, aralkyl and cycloalkyl ethers transferred be and this monohydroxypolyether in the above Kind as a starter component for the Lactone polymerization can be used. Each can also mixtures of the aforementioned compounds be used.

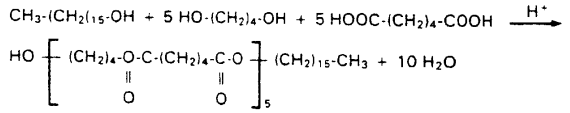


This lactone polymerization is carried out by known processes, initiated by, for example, p-toluenesulfonic acid or dibutyltin dilaurate, at temperatures from about 100 ° C.

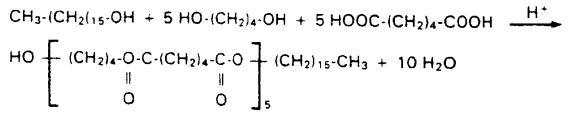
to 180 ° C. and obeys the following mechanism:



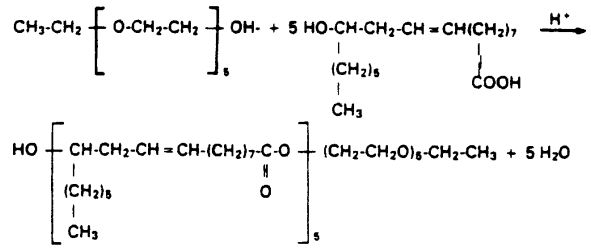
These polyesters suitably have a molecular weight in the range of about 350 to 8000, preferably 500 to 5000, being by lactone polymerization obtained in the manner described above Compounds are preferred. As starter alcohols become saturated monoalcohols with 4 to 18 carbon atoms prefers.



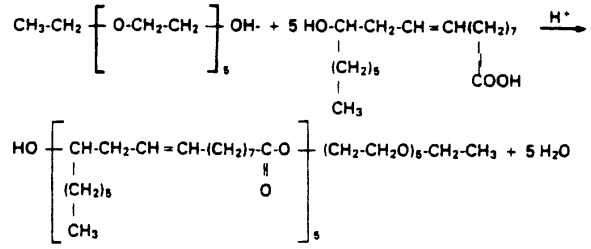
Zweckmässig haben diese Polyester ein mittleres Molekulargewicht von 400 bis 2500, vorzugsweise von 800 bis 1500. Other examples of polyesters are those which can be obtained by condensing a glycol and a dibasic acid in the presence of monohydroxy compounds. The formation of dihydroxy polyesters can be suppressed by using appropriate stoichiometric amounts of monohydroxy compounds, as described above. The reaction proceeds according to the following exemplary mechanism:



Advantageously, these polyesters have an average molecular weight of 400 to 2500, preferably 800 to 1500.



Another example are polyesters which can be obtained by condensing a hydroxycarboxylic acid in the presence of monohydroxy compounds, as described above, to control the molecular weight. The reaction proceeds according to the following exemplary mechanism:



In this case the average molecular weight is the polyester suitably 600 to 3000, preferably 800 to 1500.

Monohydroxypolyethers can also be used as compounds of the formula I. be used as they are Alkoxylation of alkanols, cycloalkanols and Phenols can be obtained. These have polyester conveniently a molecular weight in the range of about 350 to 1500.

By reacting the polyisocyanates with the Compounds of formula I thus become part of the free Isocyanate groups with the hydroxyl groups Compounds of formula I implemented. There is an average of 1 molecule of polyisocyanate at least 0.8, preferably about 1 Implemented molecule of formula I, so that to every Polyisocyanate molecule such as a compound of Formula I is bound. If polyisocyanates with a medium functionality of more than 3 used can also be a large amount of Compounds of formula I are used. Important is that of every molecule polyisocyanate at least 2nd Isocyanate groups not remain implemented, the simplest of which Fall through the further implementations in each case about an isocyanate group for crosslinking with Serves compounds of formula II and about an isocyanate group implemented with compounds according to component c) of claim 1 becomes. Depending on the functionality of the used Polyisocyanates and the compounds of formula II can apply these statements accordingly the individual proportions selected will.

The reaction product thus obtained is then with Compounds of the formula implemented. This implementation can be in the same vessel as the implementation with the compounds of formula I. It is in in some cases also possible, the polyisocyanates with a mixture of compounds of formula I. and II to react. When implementing a) with the compounds of the formula I are therefore 20 up to 50% of the NCO groups of those originally used Implemented polyisocyanates. The upper limit is preferably at 40%, particularly preferably at 35% and in some cases as low as 30%.

When implementing b) with the compounds of Formula II will be another 22 to 36% of the NCO groups of the polyisocyanates originally used implemented. The lower limit is preferably 20%. The upper limit is expediently 40%, preferred at 35% and preferred in some cases at 30%.

Overall, however, reactions a) and b) at least 40% and at most 75% of the NCO groups of the polyisocyanates originally used implemented, with the lower limit preferred is 45%. The upper limit is appropriate at 65%, preferably at 55% and in some Cases preferred at 50%.

The compounds of formula II differ of those of formula I essentially by that they have two or three functional groups contain, which react with the isocyanate groups. These functional groups are preferably hydroxyl groups, because these connections are easily accessible and are commercially available and the ones obtained Reaction products readily soluble in solvents are the later use of the dispersant come to use according to the invention.

Examples of compounds of the formula II are diols and triols or diamonds, dialkanolamines, monoalkanolamines with 2 to 12 carbon atoms, dihydroxydialkyl sulfides and dihydroxy sulfones, such as butanediol, hexanediol, Cyclohexane dimethanol, neopentyl glycol, ethylene glycol, alkyl-substituted dialkanolamines, glycerol, Trimethylolpropane, fatty acid dialkanolamides, Thiodiglycol, di (4-hydroxyphenyl) sulfone. A preferred one Group of compounds of formula II are polyoxyalkylene glycols useful with alkylene parts from 2 to 4, preferably 2 carbon atoms, and preferably with molecular weights in the range of appropriately 400 to 2000, preferably 600 to 1500. Ethoxylates with 3 hydroxyl groups is obtained by using polymerization of trifunctional alcohols as a starter component. Preferred as polyoxyalkylene glycols are polyethylene glycols.

Compounds of the formula II which can also be used are those which can be obtained by polymerizing a lactone, as has already been mentioned above, using di- or trihydroxy starting components. These polyester polyols expediently have an average molecular weight Mn from 800 to 2000. Butanediol or ethylene glycol is preferred as the starting component. However, the diols or triols mentioned above can also be used as starting components.

The compounds of the formula II bring about crosslinking between the reaction products from polyisocyanate and compounds of formula I. In the simplest Traps become the starting products in such Amounts used that the compounds of Formula II represent the center of the molecule, and that to the compounds of formula II via the groups E the polyisocyanates are bound, the remaining ones Isocyanate groups with compounds of Formula I and according to component c) of claim 1 are implemented. Naturally, there can also be a certain degree of over-networking or under-networking. That's why can 0.8 n to 1.1 n (n has the same meaning as in formula II) molecules of polyisocyanate Molecule of the formula II are omitted.

Over-networking can to some extent this prevents it in dilute solutions in strongly polar, aprotic solvents it works like dimethylformamide, dimethylacetamide and N-methylpyrrolidone.

The reaction products thus obtained are with Compounds according to component c) of claim 1 in such an amount implemented that on every remaining one in the stages a) and b) unreacted isocyanate group at least one molecule is omitted. If the compounds according to component c) of claim 1 contain only one group, that react with the isocyanate groups surplus is not necessary; much more is on any unreacted isocyanate group about 1 molecule according to component c) of claim 1 used. If the Compounds according to component c) of claim 1 more than one group contain, which can react with the isocyanates, it is also sufficient if it has not yet been implemented Isocyanate group 1 molecule according to component c) of claim 1 is omitted, however, no deficit should be used to avoid unwanted networking. A slight surplus to avoid from unwanted networking may be appropriate be. In general, an excess is sufficient from about 10, preferably 5 mol%. As compounds according to component c) of claim 1 N, N-diethyl-1,4-butanediamine, 1- (2-aminoethyl) piperazine, 2- (1-pyrrolidyl) ethylamine, 4-amino-2-methoxy-pyrimidine, 2-dimethylaminoethanol, 1- (2-hydroxyethyl) piperazine, 4- (2-hydroxyethyl) morpholine, 2-mercaptopyrimidine, 2-mercaptobenzimidazole used. Are particularly preferred N, N-dimethyl-1,3-propanediamine, 4- (2-aminoethyl) pyridine, 2-amino-6-methoxybenzothiazole, 4-aminomethyl-pyridine, N, N-diallylmelamine, 3-amino-1,2,4-triazole, 1- (3-aminopropyl) imidazole, 4- (2-hydroxyethyl) pyridine, 1- (2-hydroxyethyl) imidazole, 3-mercapto-1,2,4-triazole. Characteristic of these connections is that they have at least 1 per molecule Zerewitinoff hydrogen atom included, which is preferred reacts with the isocyanate groups and that they also a basic group containing nitrogen own, not for urea formation with isocyanate groups is empowered. These basic groups according to the state of the art characterized by their pKa value (see US-A-3 817 944; 4,032,698 and 4,070,388). Be used Connections with basic groups with one pKa value from 5 to 14, and particularly preferably from 5 to 12. The pKa value can be found in tables. Obtain the limit values given above the measurement of the pKa at 25 ° C in one 0.01 molar concentration in water. This basic Groups give the addition compounds according to the invention also a basicity, as is also known in this technical field (see US patents mentioned above). The addition compounds are due to these basic groups capable of salt formation. You can in the sense of the invention as a dispersant also in Form of such salts can be used.

These salts are obtained from the reaction product obtained through neutralization with organic or inorganic acids or by quaternization receive. Salts with organic are preferred Monocarboxylic acids.

All reactions can, as in the state the technology, in the presence of appropriate, the reaction non-interfering solvents e.g. Hydrocarbons such as xylenes, Ethers including dioxane and dimethylformamide etc. Furthermore, the reactions can be carried out in the presence carried out by conventional catalysts are like dibutyltin dilaurate, iron acetylacetonate, Triethylenediamine. In this respect, it is based on the referenced cited patents.

By varying the substituents of formula I and II and / or their proportions can be tolerated the addition compounds according to the invention on a wide variety of polymers Connections are coordinated, which in and molding compositions are present in which the addition compounds according to the invention for use come. If e.g. the binder in a varnish is a polyester, it is appropriate to such Addition compounds according to the invention therefor insert that in their molecule due to the in the starting compounds of the formula I and II contained Groups also polyester groups or the like Contain groups which - as known to the person skilled in the art is - are compatible with polyesters. The same applies analogously to e.g. Polyethylenes or polyamides. Such are particularly compatible with this Addition compounds according to the invention, the contain few polar groups. The same applies accordingly this for the substituents of the compounds of component c) of claim 1, which are particularly Affect the affinity of the addition compounds according to the invention to the used Pigments to be dispersed.

In the following production examples A to G is the preparation of compounds of the formula I explained.

Parts are parts by weight unless otherwise stated. In the case of molecularly non-uniform compounds, such as polymers, the stated molecular weights are average values according to number average (M_n). The molecular weights or average molecular weights M_n can be determined by conventional methods, for example by determining the OH number, the amine number or cryoscopically.

The NCO content of the polyisocyanates used and the course of the addition reaction is determined by methods as described are with Paul Patai “The Chemistry of Cyanates and their Thioderivates », Part 1, Chapter 5, 1977.

Production example A

Under a protective atmosphere, 2.1 parts of a commercial heptadecafluorodecanols with a average molecular weight of 445 with 5.9 Parts 2-ethylhexanol, 92 parts valerolactone 60 ° C homogenized. 0.004 parts of dibutyltin dilaurate are used and heats up within an hour 180 ° C. The mixture is stirred at this temperature until a Solids content of 98% is reached.

The colorless to slightly yellowish product is at Solid at room temperature and melts at 60 to 70 ° C,

Production example B

11.1 parts of phenylethyl alcohol are in the reactor and 88.9 parts of caprolactone are homogenized at room temperature and under nitrogen with 0.002 parts of dibutyltin dilaurate added as a catalyst. Within one hour is heated to 160 ° C and at this Temperature stirred. The reaction is over as soon as a solids content of 99% is reached.

The polyester can be in 100% form with a Melting range of 50 to 60 ° C can be handled or e.g. as a 50% mixture in xylene. The latter Modification is fixed at room temperature, with a Melting range from 40 to 50 ° C.

Production example C

Homogenize under a protective atmosphere 7.2 Parts of n-octanol, 92.8 parts of caprolactone and 0.003 Parts of dibutyltin dilaurate and heated within one Hour at 160 ° C. The addition reaction has ended, as soon as a solids content of over 99% is reached is. At this temperature this is solid reached after 10 to 12 hours. The product is at Room temperature a colorless solid, which at 50 melts up to 60 ° C.

Production example D

2.9 parts of isononanol, 97.1 parts of caprolactone and 0.002 parts of dibutyltin dilaurate homogenized and within one Heated to 170 ° C for one hour. The addition reaction is ended as soon as the solids content exceeded 99.5% increases, which is achieved after 8 to 10 hours. The Product is a colorless solid at room temperature, that melts at 60 to 70 ° C.

Production example E

Excluding oxygen are in 100 parts Xylene 10.5 parts n-octanol, 89.5 parts 12-hydroxystearic acid and 0.04 parts of tetrabutyl titanate are homogenized (12-hydroxystearic acid: OH number 160 mg KOH / g, acid number 182 mg KOH / g). One heats up Normal pressure and distilled the water of reaction formed azeotropic within 7 to 10 hours from. The product can be obtained in the form continue to be implemented. To represent the 100% product is the solvent in a vacuum carefully removed.

Production example F

38 parts of adipic acid, 52.7 parts of dodecanediol, 9.3 Parts of octanol, 0.01 parts of p-toluenesulfonic acid and 30 Parts of toluene are homogenized and heated. The resulting water of reaction is azeotropic Distillation within 5 to 6 hours from the Equilibrium removed, the temperature 140 reached up to 150 ° C. Then the solvent carefully removed under vacuum. At The polyester is solid at room temperature and melts at 70 to 80 ° C.

Production example G

Under a protective atmosphere, 23.4 parts of a alkali-free and dried nonylphenol ethoxylate with an average molecular weight of 445 with 76.6 parts of caprolactone and 0.004 parts of dibutyltin dilaurate homogenized. You warm up 150 ° C and stirred for 20 hours at this temperature. The colorless, waxy product has a solids content of 98%.

Preparation examples for compounds of the formula II
Production Example I

9.6 parts of trimethylolpropane and 90.4 parts of caprolactone are at 170 ° C after adding 0.003 Share dibutyltin dilaurate as catalyst 6 to 8 Hours implemented until a polyester with a average molecular weight of 1400 is obtained.

Preparation example II

9 parts of 1,4-butanediol, 91 parts of caprolactone and 0.002 parts of dibutyltin dilaurate homogenized and within one Heated to 160 ° C for one hour. At this temperature the addition reaction is complete as soon as the solids content Exceeds 99%. The resulting polyester diol has an average molecular weight of 1000.

example 1

Under a protective atmosphere, 7.2 parts of Desmodur N (75% in ethyl glycol acetate / xylene 1: 1) with 10 parts of ethyl glycol acetate and 16.9 parts of one Medium molecular weight caprolactone polyester of 1800 (preparation example C), dissolved in 20 parts of xylene, homogenized, with 0.004 parts of dibutyltin dilaurate added and at 60 ° C until complete Implementation of the OH groups stirred.

For the linkage reaction, dilute with 10 Parts xylene and gives 0.8 parts 1,12-diaminododecane, dissolved in 10 parts of N-methylpyrrolidone, quickly to.

After reaction of 66% of the originally used NCO groups are diluted with 13.2 parts Xylene and added 1.9 parts of N, N-diallylmelamine, dissolved in 10 parts of N-methylpyrrolidone. One warms up to 70 ° C and stirred at this temperature for one hour.

The end product is medium viscosity and colorless clear to slightly cloudy.

Example 2

Under a protective atmosphere, 10.4 parts of Desmodur N (75% in ethylene glycol acetate / xylene 1: 1) diluted with 10 parts of ethyl glycol acetate and with 15 Share a caprolactone polyester with a medium one Molecular weight of 1100 (preparation example B), dissolved in 20 parts of xylene. After encore of 0.004 parts of dibutyltin dilaurate is added Heated to 60 ° C.

After 33% of the NCO groups used have reacted there are 0.6 parts of trimethylolpropane, dissolved in 30 parts of xylene.

Once 66% of the NCO groups are implemented, there are 1.6 parts of 4- (2-hydroxyethyl) pyridine, dissolved in 12.4 parts of ethyl glycol acetate, warmed up 70 ° C and stirred at this temperature for one hour.

The end product is colorless and medium viscosity.

Example 3

Under a protective atmosphere, 10.3 parts of Desmodur N (75% in ethyl glycol acetate / xylene 1: 1) with 20 parts of ethyl glycol acetate and 10.2 parts of one commercially available methoxypolyethylene glycol with average molecular weight of 750, dissolved in 15 Parts of xylene, homogenized, with 0.004 parts of dibutyltin dilaurate added and heated to 50 ° C.

After reaction of a third of the NCO groups 5.4 parts of polyethylene glycol 800, dissolved in 15 Parts of xylene added.

After 66% of the NCO groups used are implemented, is diluted with 12.4 parts of xylene and 1.7 parts of 1- (2-aminoethyl) piperazine dissolved in 10 parts of ethyl glycol acetate were added. You stir 70 ° C for two hours.

The product is yellowish and slightly viscous.

Example 4

Under a protective atmosphere, 9.1 parts of Desmodur N (75% in ethylene glycol acetate / xylene 1: 1), 17.7 parts of ethyl glycol acetate, 0.003 parts of dibutyltin dilaurate and 13 parts of a caprolactone polyester with an average molecular weight of 1100 (preparation example B), dissolved in 10 parts Xylene, homogenized and heated to 50 ° C.

After attachment of the polyester, 3.7 parts of an ethoxylated oleylamine with a medium Molecular weight of 630, dissolved in 30 parts of xylene, added.

As soon as 65% of the NCO groups have reacted, 1.5 parts of 4- (2-aminoethyl) pyridine are dissolved in 15 parts of N-methylpyrrolidone, and stirred to Completion of the reaction one hour.

Example 5

Under a protective atmosphere, 7.6 parts of Desmodur N (75% in ethylene glycol acetate / xylene 1: 1), 18.1 Parts of xylene and 13.8 parts of an adipic acid-dodecanediol, Medium molecular weight octanol polyester of 1400 (preparation example F) in 10 parts of xylene, homogenized, with 0.003 parts of dibutyltin dilaurate added and heated to 40 ° C.

After 30% of the NCO groups have reacted, 4.5 parts of that described in Preparation Example I Trimethylolpropane-caprolactone polyester, dissolved in 30 parts of xylene, added.

After adding the hydroxyl groups, 1 is added Part N, N-dimethyl-1,3-propanediamine, dissolved in 15 Share N-methylpyrrolidone, heated to 60 ° C and stir for an hour.

The product is highly viscous and colorless.

Example 6

Under a protective atmosphere, 12.9 parts of Desmodur L (67% in ethylene glycol acetate / xylene 1: 1) diluted with 20 parts of ethyl glycol acetate / xylene (1: 1). 9 parts of a commercially available methoxypolyethylene glycol with average molecular weight of 750, dissolved in 10 parts of xylene, and 0.003 parts of dibutyltin dilaurate are added.

After 33% of the NCO groups had reacted at 50 ° C are 6 parts of the in manufacturing example II described caprolactone polyester with medium Molecular weight of 1000, dissolved in 20 parts Xylene, added. The reaction is complete as soon as 66% of the NCO groups have reacted.

For addition to the remaining NCO groups 1.4 parts of 1- (2-hydroxyethyl) imidazole are dissolved in 20.7 parts of xylene, and it is at 70 ° C. stirred for two hours.

The colorless, clear product is slightly viscous.

Example 7

Dissolve in a protective atmosphere at 50 ° C 14.3 Parts of an adipic acid dodecanediol octanol polyester with an average molecular weight of 1400 (Production example F) in a mixture of 15 Parts of ethyl glycol acetate and 10 parts of xylene. Man cools to 20 ° C and gives 11.1 parts of Desmodur while stirring L (67% in ethyl glycol acetate / xylene 1: 1) and 0.003 parts of dibutyltin dilaurate. One warms up slowly to 50 ° C and controls the progress of the reaction by NCO determination.

After reaction of a third of the used NCO groups are given 2.1 parts of polyethylene glycol with an average molecular weight of 400, dissolved in 20 parts of xylene, and leaves the second third of the React NCO groups. Then diluted one with 11.4 parts of xylene and 1.1 parts of N, N-dimethyl-1,3-diaminopropane, dissolved in 15 parts of N-methylpyrrolidone, to. The reaction mixture is stirred at 50 ° C for one hour.

Example 8

Under a protective atmosphere, 12.4 parts of ethyl glycol acetate, 11 parts of Desmodir L (67% in ethyl glycol acetate / xylene 1: 1) and 14.2 parts of an adipic acid dodecanediol octanol polyester with a average molecular weight of 1400 (preparation example F), dissolved in 20 parts of xylene, homogenized and mixed with 0.003 parts of dibutyltin dilaurate. The mixture is heated to 50 ° C. and the polyester is added the Desmodur L.

After this reaction step, 2.2 parts are added a commercially available coconut acid diethanolamide, dissolved in 30 parts of ethyl glycol acetate / xylene (1: 1). The Cocossäurediethanolamid has an average molecular weight from 440.

As soon as two thirds of the NCO groups used have reacted, 1.3 parts of 1- (3-aminopropyl) imidazole are rapidly added, dissolved in 10 parts NMP, too, warmed to 70 ° C and stirred for one hour Temperature.

The medium-viscous product is clear to slightly cloudy.

Example 9

Under a protective atmosphere and moisture exclusion 7.9 parts of poly-isophorone diisocyanate (70% in ethyl glycol acetate / xylene 1: 1) in 10 parts Dissolved ethyl glycol acetate and with 15 parts of a valerolactone polyester with an average molecular weight of 2000 (preparation example A), dissolved in 20 parts of xylene, homogenized. There are 0.003 parts Dibutyltin dilaurate and heated to 50 ° C.

After the OH groups have reacted, 3.7 Parts of average molecular weight polypropylene glycol of 1000, dissolved in 20 parts of xylene.

After 66% of the NCO groups used have reacted 7.6 parts of xylene and 0.8 parts are used 3-mercapto-1,2,4-triazole, dissolved in 15 parts of N-methylpyrrolidone and stir for one hour at 60 ° C.

The product solution is low-viscosity and light colored brown.

Example 10

Exclude moisture in 20 parts Ethyl glycol acetate 14.1 parts Desmodur HL (60% in butyl acetate) dissolved with 11.6 parts of one 1100 caprolactone polyester (preparation example B), dissolved in 20 parts of xylene and 0.003 parts of dibutyltin dilaurate, added and slowly warmed to 60 ° C.

As soon as 30% of the NCO groups used reacted the first stage has ended.

For the coupling one sets 3.4 parts commercially available Polytetrahydrofuran diol, with an average molecular weight of 650, dissolved in 14.4 parts of xylene, to.

In the last stage, which occurs after the reaction of Connects 60% of the NCO groups used, 1.5 parts of 3-mercapto-1,2,4-triazole are added and dissolved in 15 parts of N-methylpyrrolidone, warmed up 70 ° C and stirred at this temperature for one hour.

Example 11

The reaction takes place at 50 ° C under a protective atmosphere. 14.4 parts of Desmodur HL (60% in butyl acetate) are dissolved in 15 parts of ethyl glycol acetate and with 9.9 parts of a phenylethyl alcohol started Caprolactone polyester with an average molecular weight of 1100 (preparation example B). The polyester is dissolved in 13 parts by weight of xylene.

After complete polyester addition, what by Decrease in the NCO groups is evident 4.5 parts of polyethylene glycol with a medium Molecular weight of 1000 to. Abreaction of the remaining NCO groups are used to add 2.3 parts of 1- (2-aminoethyl) piperazine and diluted with xylene 30% solids.

The product is a slightly cloudy, viscous solution.

Example 12

10.1 parts of Desmodur HL (60% in butyl acetate) with 30 parts of a mixture diluted from xylene / ethyl glycol acetate (1: 1) and with 12.7 parts of a medium molecular weight polyester from 2000 (preparation example A) added. After adding 0.003 parts of dibutyltin dilaurate becomes the addition reaction at room temperature carried out.

After 25% of the NCO groups have reacted, 4.7 parts of a polyethylene glycol are in the second stage with an average molecular weight of 1500 added.

After half of the NCO groups have reacted are diluted with xylene to a final solid of 25%, 1.5 parts sets 4- (2-aminoethyl) pyridine to, warms to 60 ° C and stirs at this Temperature one hour.

The product is slightly yellow and viscous.

Example 13

The reaction is carried out at 50 ° C under a protective gas atmosphere carried out. 6.3 parts of Desmodur HL (60% in butyl acetate) with a mixture of 15 Diluted parts of ethyl glycol acetate and 36 parts of xylene. 0.7 parts of a polyethylene glycol with one average molecular weight of 400 and 19.6 parts a caprolactone polyester with a

medium Molecular weight of 5000 (production example D) are added in the molten state. To accelerate the reaction, 0.002 parts Dibutyltin dilaurate added.

After all OH groups have reacted, 0.9 is set Add 4- (2-hydroxyethyl) pyridine and use Xylene a solids content of 25%. To complete the reaction is stirred at 60 ° C for one hour.

The product is low-viscosity and colorless.

Example 14

Under a protective atmosphere, 10.7 parts of Desmodur HL (60% in butyl acetate) with 16.2 parts a heptadecafluorodecanol (2-ethylhexanol-started Valerolactone polyester with a medium Molecular weight of 2000 (preparation example A), dissolved in 15.7 parts of xylene, homogenized. 0.001 part of dibutyltin dilaurate is added and added the polyester at 50 ° C.

After this reaction has ended, the mixture is diluted with 20 parts of ethyl glycol acetate and gives 0.3 parts 1,4-butanediamine, dissolved in 20 parts of xylene.

As soon as 55% of the NCO groups used reacted the slightly exothermic reaction is stopped, by adding 2.1 parts of 2-amino-6-methoxybenzothiazole, dissolved in 15 parts of NMP, admits. Man warmed to 70 ° C and stirred for one hour.

The product is slightly viscous and has a yellowish clear solution.

Example 15

Under a protective atmosphere, 20 parts Ethyl glycol acetate / xylene (1: 1) 16.1 parts Desmodur IL (51% in butyl acetate) and 11 parts of a caprolactone polyester 1800 (preparation example C) in 20 parts of xylene, added and after catalysis by 0.002 parts of dibutyltin dilaurate Room temperature added.

After 20% of the NCO groups have been consumed, 3.8 parts of that described in Preparation Example II Polycaprolactone polyester, dissolved in 17.1. Parts of xylene added.

After acceptance of the NCO groups used to 55%, 10 parts of xylene and 2.0 parts of 4- (2-aminoethyl) pyridine, dissolved in 10 parts of diisobutyl ketone, admitted. The mixture is heated to 50 ° C. and stirred Hour.

The colorless to slightly yellowish product is low viscous.

Example 16

Under a protective atmosphere and moisture exclusion 9 parts of Desmodur IL (51% in butyl acetate) with 17 parts of a polyester with medium Molecular weight of 5000 (production example D), dissolved in 25 parts of xylene, homogenized and with 0.003 parts of dibutyltin dilaurate added. The reaction is carried out at 60 ° C.

After the polyester addition, 2.5 parts of polypropylene glycol are used with an average molecular weight of 1000, dissolved in 30 parts of xylene. For acceleration the reaction becomes 0.002 parts of dibutyltin dilaurate added.

After the hydroxy groups had been retracted, 5.6 Dilute parts of xylene and add the remaining NCO groups 0.9 parts of 3-mercapto-1,2,4-triazole, dissolved in 10 parts of N-methylpyrrolidone, added.

The product is medium-viscous and yellowish in color.

Example 17

Under a protective atmosphere, 15.5 parts of Desmodur IL (51% in butyl acetate) with 13.3 parts of one Average molecular weight polyester of 1800 (preparation example C), dissolved in 15 parts Xylene, homogenized, with 0.003 parts of dibutyltin dilaurate added and heated to 50 ° C.

After adding the polyester, what by reducing of the NCO groups can be seen by 25%, one dilutes with 20 parts of xylene and sets 0.7 parts 1.12 -diaminododecane.

After the exothermic addition, 14 parts of xylene and 1.5 parts of N, N-dimethyl-1,3-propanediamine, in 20 Parts of N-methylpyrrolidone dissolved, added. Man stir for another hour at 70 ° C.

The product is medium-viscous and slightly cloudy.

Example 18

Under a protective atmosphere, 15.5 parts of Desmodur IL (51% in butyl acetate) with 30 parts xylene / Butyl acetate (4: 1) and 26.6 parts of a polyester with an average molecular weight of 1800 (Preparation example C) homogenized. You bet 0.003 parts of dibutyltin dilaurate, warmed up 50 ° C, with half of the NCO groups reacting.

0.3 parts of 1,4-butanediol, dissolved in 30 parts of xylene, are added. After so 75% of the NCO groups have reacted, 0.6 part of 3-amino-1,2,4-triazole is added, dissolved in 10 parts of N-methylpyrrolidone, to. With xylene, a solid is made of 30% a.

The medium-viscous, yellowish product becomes 60 ° C stirred for one hour.

Usage example
Regrind

In a tempered (50 ° C) stainless steel mixing vessel 25 parts by weight of a 50% hydroxy acrylate resin with 3 parts by weight of xylene and 1 part by weight Mixed butyl acetate. Then you give X Parts by weight of the addition compound according to the invention or the comparison compound (example 8 of US-A-4 032 698), homogenized and mixed with Y parts by weight of a pigment (Table 1). The parts by weight of the addition compound according to the invention or comparison connection are calculated as a 100% solid.

The mixture is homogenized, 200% by weight of steel beads, based on the grinding batch, are added and the mixture is dispersed for 40 minutes at 50 ° C. by stirring with a polypropylene disc which is adapted to the vessel size at about 12 $ms.s^{-1}$.

Master paint

The regrind, which was prepared from 52 parts by weight of hydroxyacrylate resin (50%), 6 parts by weight of xylene, 2 parts by weight of butyl acetate and 0.1 part by weight of a leveling additive, is added to the ground material. For homogenization, stir for 2 minutes at approx. 2 ms^{-1} . The steel balls are filtered off. This master varnish is left to rest 12 to 15 hours before further processing.

Part of the master varnish so produced then processed as described below, and another part of the base lacquer so produced after 14 days of storage at 50 ° C in the processed the same way described below. The results with the immediately processed Lacquer obtained are in table 2 compiled while the results that with the lacquer processed after 14 days of storage obtained are summarized in Table 3 are.

For hardening, 100 parts by weight are used Master paint 30 parts by weight of a 75% triisocyanate Hardener (Desmodur N) added and stirred in.

The viscosity of the finished lacquer is then set to 16 " DIN 4/23 by means of a dilution consisting of xylene / alkylbenzene (> C_9) butyl acetate (2: 1: 1).

After an hour, the set paint will open poured on a cleaned, 80 ° inclined glass plate.

After curing, the paint film (colored paint) for gloss and transparency as well as under a light microscope on particle size or on flocculation rated.

The rating is based on a number scale of 0 to 10, where 0 = no flocculation, high gloss, good transparency and 10 = total flocculation, no Shine means no transparency.

The results obtained are in Tables 2 and 3 in the line «colored paint».

Another method for determining the pigment size distribution and pigment stabilization the paint is mixed with a white paint and the following rubout test (white mixture): To do this, flash off the poured paint (about 10 minutes) and rubs the finger Sample to color consistency.

For this purpose, the base lacquers of colored pigments I to V according to Table 1 with the white varnish VI according to the table 1 mixed in a ratio of 1: 4, homogenized and set to 16 " DIN 4/23. You pour on one 80 ° inclined glass plate and, after ventilation (about 10 minutes), the rubout test.

0 = gleiche Farbstärke, gleicher Farbton, kein Ausschwimmen, also kein feststellbarer Unterschied zwischen ausgeriebener und nicht-ausgeriebener Probe und
10 = völlig veränderte Farbstärke und Ausschwimmen eines Pigments
bedeutet.After the film has hardened, the color strength of both the rubbed and the non-rubbed sample is measured. For this purpose, a scale from 0 to 10 was chosen again, whereby
0 = same color strength, same color tone, no swimming out, so no discernible difference between rubbed and non-rubbed sample and
10 = completely different color strength and floating of a pigment
means.

The results obtained are shown in Tables 2 and 3 in the "White Mix" line. pigment used Y parts by weight addition compound according to the invention or comparative example X parts by weight I. a Polycyclic thioindigo derivative 4.5 Example 13 0.67 b CI1 Pigment red 88 CI2 17712 e.g. Novoperm red violet MRS 4.5 Comparative example 0.67 II a Polycyclic quinacridone derivative 4.0 Example 13 0.4 b CI1 pigment violet 19 CI2 46500 e.g. Quindo violet RV 6902 4.0 Comparative example 0.4 III a Mono-azo-arylamide derivative CI1 pigment orange 36
CI2 11780 e.g. Novoperm
Orange HL 70 5 Example 13 0.5 b 5 Comparative example 0.5 IV a Polycyclic perylene derivative 5 Example 13 0.5 b CI1 pigment red 178
CI2 71155 e.g. Paliogen
Red L 3910 HD 5 Comparative example 0.5 V a Anthraquinone derivative 5 Example 13 Comparative Example 0.75 b CI1 pigment red 177
CI2 65300 e.g. Cromophthal Red A2B 5 0.75 VI a inorg. White pigment 25th Example 13 0.75 b Titanium dioxide 25th Comparative example 0.75 Pigments I. II III IV V a b a b a b a b a b Colored paint 0 5 0 6 0 5 1 7 1 9 White mix 1 7 0 7 0 6 0 9 1 10th a = addition compound according to the invention
b = comparative example Pigments I. II III IV V a b a b a b a b a b Colored paint 0 6 0 6 0 6 0 7 0 10th White mix 0 8th 0 7 0 6 0 10th 1 10th a = addition compound according to the invention b = comparative example

Those with the addition compounds according to the invention Lacquers produced have a significant effect better stabilization of the pigments.

Patent Citations (20)

Publication number	Priority date	Publication date	Assignee	Title
Family To Family Citations				
GB1053135A *	1963-03-13			
US3970687A *	1968-11-18	1976-07-20	E. I. Du Pont De Nemours And Company	Polyesters with substituted amine end groups
US3988278A *	1970-08-17	1976-10-26	Minnesota Mining And Manufacturing Company	Stable polymer latex and process for making same
US3684771A *	1971-03-03	1972-08-15	Du Pont	Polyesters with substituted amine end groups
GB1393402A *	1972-02-28	1975-05-07	Ici Ltd	Dispersing agents
US4157266A *	1972-02-28	1979-06-05	Imperial Chemical Industries Limited	Dispersion of pigment or dyestuff in organic liquid
GB1393401A *	1972-02-28	1975-05-07	Ici Ltd	Dispersing agents
US4032698A *	1973-02-02	1977-06-28	E. I. Du Pont De Nemours And Company	Polymeric materials with substituted urea end groups
DE2312301C3 *	1973-03-13	1979-03-29	Basf Ag, 6700 Ludwigshafen	Easily distributed pigment preparations
US4129455A *	1973-08-21	1978-12-12	Imperial Chemical Industries Limited	Dispersions
GB1445135A *	1973-08-21	1976-08-04	Ici Ltd	Dispersions
GB1432649A *	1973-09-07	1976-04-22	Ici Ltd	
US4079028A *	1975-10-03	1978-03-14	Rohm And Haas Company	Polyurethane thickeners in latex compositions
US4155892A *	1975-10-03	1979-05-22	Rohm And Haas Company	Polyurethane thickeners for aqueous compositions
DE2651506C2 *	1976-11-11	1986-04-30	Bayer Ag, 5090 Leverkusen	Process for the preparation of water-dispersible polyurethanes

DE2906159C2 *	1979-02-17	1981-12-03	Fa. Carl Freudenberg, 6940 Weinheim	Process for the production of finely divided polyurethane ureas
DE2914984A1 *	1979-04-12	1980-11-13	Consortium Elektrochem Ind	METHOD FOR PRODUCING POLYMERISATS
DE2930410A1 *	1979-07-26	1981-02-12	Bayer Ag	PROCESS FOR THE PRODUCTION OF STABLE Aqueous DISPERSIONS OF OLIGO- OR POLYURETHANES, AND THEIR USE AS A COATING AGENT FOR FLEXIBLE OR NON-FLEXIBLE SUBSTRATES
DE3135327A1 *	1981-09-05	1983-03-24	Hoechst Ag, 6000 Frankfurt	ADDITIONAL CONNECTIONS, METHOD FOR THEIR PRODUCTION AND THEIR USE
DE3210051A1 *	1982-03-19	1983-09-29	Basf Farben + Fasern Ag, 2000 Hamburg	WATER-DISCOVERABLE COATING AGENT FOR PRODUCING THE BASE LAYER OF A MULTI-LAYER COATING

* Cited by examiner, † Cited by third party

Cited By (111)

Publication number	Priority date	Publication date	Assignee	Title
US7118619B2	2003-01-24	2006-10-10	Goldschmidt Gmbh	Use of silicone resins as dispersants
WO2021009351A1	2019-07-18	2021-01-21	Basf Se	Allophanate based dispersing agent
Family To Family Citations				
EP0205604B1 *	1984-12-18	1989-04-19	Hoechst Aktiengesellschaft	Pulverulent azoic pigments having improved rheologic properties, method for the production and utilization thereof
DE3542437A1 *	1984-12-18	1986-06-19	Hoechst Ag, 6230 Frankfurt	POWDER PIGMENT WITH IMPROVED RHEOLOGICAL PROPERTIES, METHOD FOR THE PRODUCTION THEREOF AND THEIR USE WITH A CONTENT OF AT LEAST 5% UNSUBSTITUTED CHINACRIDONE
JPS624730A *	1985-06-29	1987-01-10	Ihara Chem Ind Co Ltd	Coated granular aromatic diamine
US4844742A *	1986-04-08	1989-07-04	Ciba-Geigy Corporation	Surface modified pigment compositions
DE3628123C1 *	1986-08-19	1988-02-11	Herberts Gmbh	Pigment dispersion and its use
DE3641581C3 *	1986-12-05	1996-08-01	Byk Chemie Gmbh	Process for the preparation of dispersants and their salts and their use
DE3724699A1 *	1987-07-25	1989-02-23	Hoechst Ag	HARDENING COMPONENT FOR RESIN, THESE CONTAINABLE MIXTURES AND THEIR USE
US4942213A *	1987-12-04	1990-07-17	Byk-Chemie Gmbh	Addition compounds useful as dispersing agents and dispersion stabilizers, process for producing them, their use and solids coated therewith
US4910243A *	1987-12-23	1990-03-20	King Industries, Inc.	Dinonylnaphthalene sulfonic acid and derivatives thereof as dispersants in high solids coatings
DE3810781A1 *	1988-03-30	1989-10-12	Bayer Ag	NEW POLYISOCYANATE-POLYADDITION COMPOUNDS, METHOD FOR THE PRODUCTION THEREOF AND THEIR USE FOR DISPERSING SOLIDS
US5187229A *	1988-08-26	1993-02-16	Nippon Oil And Fats Company, Ltd.	Pigment dispersing agent
DE68919600T2 *	1988-08-26	1995-05-11	Nippon Oils & Fats Co Ltd	Pigment dispersant.
DE3930687A1 *	1989-09-14	1991-04-11	Byk Chemie Gmbh	Phosphoric acid esters, process for their preparation and their use as dispersing agents
US5151218A *	1989-09-14	1992-09-29	Byk-Chemie Gmbh	Phosphoric acid esters, method of producing them, and use thereof as dispersants
CA2032992C *	1989-12-29	2001-04-10	Peter H. Quednau	Dispersing agents, their use and solids coated therewith
DE4039193A1 *	1990-12-08	1992-06-11	Bayer Ag	WET-DISPERSIBLE, ELECTROLYTE-TABLE POLYETHERESTER-MODIFIED POLYURETHANIONOMERS
US5425900A *	1990-12-27	1995-06-20	Efka-Chemicals B.V.	Dispersing agents, their use and solids coated therewith
JPH04286716A *	1991-03-15	1992-10-12	Teijin Memory Media Kk	Flexible magnetic disk
JPH04356723A *	1991-06-03	1992-12-10	Teijin Memory Media Kk	Flexible magnetic disk
DE59207096D1 *	1991-06-26	1996-10-17	Efka Chemicals Bv	Dispersants, their use and solids coated with them
GB9226772D0 *	1992-12-23	1993-02-17	Coates Brothers Plc	Hot melt ink jet printing
US5817732A *	1993-02-12	1998-10-06	Asahi Kasei Kogyo Kabushiki Kaisha	Blocked polyisocyanate and coating composition
DE4330378A1 *	1993-09-08	1995-03-09	Bayer Ag	Polyisocyanate addition compounds containing cyanamide groups and their use

DE19522476A1 *	1995-06-21	1997-01-02	Bayer Ag	Fluorine-containing dispersing agents for aqueous paints
DE19635065A1 *	1996-08-30	1998-03-05	Bayer Ag	New dispersing agents for aqueous paints
US6228463B1	1997-02-20	2001-05-08	Mannington Mills, Inc.	Contrasting gloss surface coverings optionally containing dispersed wear-resistant particles and methods of making the same
US6291078B1	1997-10-22	2001-09-18	Mannington Mills, Inc.	Surface coverings containing aluminum oxide
US6218001B1	1997-10-22	2001-04-17	Mannington Mills, Inc.	Surface coverings containing dispersed wear-resistant particles and methods of making the same
DE19721728C2 *	1997-05-24	2001-07-12	Byk Chemie Gmbh	Dispersants for pigments or fillers based on acrylic acid alkyl ester polymers, use and process for producing them
IT1298440B1 *	1998-02-23	2000-01-10	Rossetti Vernici & Idee Spa	UNIVERSAL COLORING COMPOSITIONS
GB9809257D0 *	1998-04-30	1998-07-01	Zeneca Ltd	Polyurethane dispersants
US6410634B2	1998-12-23	2002-06-25	Mannington Mills, Inc.	Low gloss polish formulations
DE19924171A1	1999-05-25	2000-11-30	Basf Coatings Ag	Coating material with a mixture of at least one wetting agent and ureas and / or urea derivatives as thixotropic agents
DE19924170A1	1999-05-25	2000-11-30	Basf Coatings Ag	Thixotropic agent
US6506899B1	1999-08-09	2003-01-14	E. I. Du Pont De Nemours And Company	Pigment dispersants formed by reacting an isocyanate with a poly (ethylene glycol) alkyl ether, a polyester or polyester or polyacrylate and a diamine
DE10046024A1 *	1999-09-16	2001-04-19	Yokohama Rubber Co Ltd	Reversibly crosslinkable elastomer, used e.g. in recyclable rubber products such as tires and tubing, uses thermoreversible reactions for crosslinking, e.g. between acid anhydride groups and hydroxyl groups
DE10042152A1 *	2000-08-26	2002-03-28	Basf Coatings Ag	Thixotropic agent that can be activated with actinic radiation, process for its preparation and its use
US6685985B2	2001-02-09	2004-02-03	Basf Corporation	Method of improving the appearance of coated articles having both vertical and horizontal surfaces, and coating compositions for use therein
US6586552B2 *	2001-04-09	2003-07-01	E. I. Du Pont De Nemours And Company	Aminoazole-blocked isocyanate components
DE10122390A1 *	2001-05-09	2002-11-28	Basf Coatings Ag	Carbamate and / or allophanate-containing, thermally curable, thixotropic mixtures
DE10126647A1 *	2001-06-01	2002-12-12	Basf Coatings Ag	Rheology modifier for use in coating materials, adhesives and sealants, e.g. clearcoat compositions, contains a urea derivative obtained by reacting polyisocyanate with polyamine and monoamine and-or water
US20080063844A1 *	2001-06-29	2008-03-13	Mannington Mills, Inc.	Surface coverings containing aluminum oxide
DE10139262C1 *	2001-08-09	2003-01-02	Basf Coatings Ag	A rheological adjuvant, useful for coating materials, adhesives, and sealing compositions, contains a urea derivative obtained by reaction of isocyanate with sterically hindered primary and secondary monoamines
ATE361332T1 *	2001-09-25	2007-05-15	3M Innovative Properties Co	CURBABLE DISPERSANTS
DE10149384A1 *	2001-10-06	2003-04-17	Cognis Deutschland Gmbh	A dispersing agent composition with a carrier medium containing dicarboxylic acid dibutyl ester and polyurethane outstandingly useful for paint compositions
EP1497387A1 *	2002-04-24	2005-01-19	BASF Coatings Aktiengesellschaft	Thermally curable, thixotropic mixtures containing carbamate and/or allophanate groups
US7786242B2	2003-06-09	2010-08-31	Kyoeisha Chemical Co., Ltd.	Ring-containing modified resins and dispersants including it
US8686090B2 *	2003-12-10	2014-04-01	Basf Coatings Gmbh	Use of urea crystals for non-polymeric coatings
DE102004022753B3 *	2004-05-07	2006-02-16	Byk-Chemie Gmbh	Addition dispersions suitable as dispersants and dispersion stabilizers
JP5175098B2	2005-08-03	2013-04-03	株式会社Ｄｎｐファインケミカル	Method for producing polymer composition and polymer composition
US7083674B1	2005-09-06	2006-08-01	Toyo Ink Mfg. Co., Ltd.	Pigment dispersant, and pigment composition, pigment dispersion and printing ink using the same
DE602005006129T2	2005-09-07	2009-01-22	Toyo Ink Mfg. Co., Ltd.	Dispersants for pigments, pigment composition, pigment dispersion and printing ink using them
JP2007131831A *	2005-11-09	2007-05-31	Cheil Industries Inc	Carbon black surface-treated with benzene compound, and carbon black dispersion composition for use in black matrix for color filter utilizing the above carbon black
DE102006012999A1	2006-03-22	2007-09-27	Byk-Chemie Gmbh	Addition compounds as dispersants and dispersion stabilizers
JP5391511B2 *	2006-03-30	2014-01-15	東洋インキＳｃホールディングス株式会社	Branched urethane resin dispersant, process for producing the same, and pigment composition using the same

JP5391512B2 *	2006-04-06	2014-01-15	東洋インキＳｃホールディングス株式会社	Branched urethane resin dispersant, process for producing the same, and pigment composition using the same
KR100725023B1 *	2006-10-16	2007-06-07	제일모직주식회사	Resin composition containing cardo resin, and manufacturing method by pattern, color filter using same
DE102006055106C5 *	2006-11-14	2018-08-23	Byk-Chemie Gmbh	dispersing
TWI432472B *	2006-12-04	2014-04-01	Lubrizol Advanced Mat Inc	Polyurethane dispersants, non-aqueous composition and non-aqueous millbase, paint or ink including the same
DE102006062441A1	2006-12-27	2008-07-03	Byk-Chemie Gmbh	Modified comb copolymers
TW200925214A	2007-09-06	2009-06-16	Fujifilm Corp	Processed pigment, pigment-dispersed composition, colored photosensitive composition, color filter, liquid crystal display element, and solid image pickup element
DE102008010687B4	2008-02-22	2014-05-15	Byk-Chemie Gmbh	Wetting and dispersing agents, their preparation and use
DE102008007713A1	2008-02-04	2009-08-06	Byk-Chemie Gmbh	Wetting and dispersing agent
DE102008010705A1	2008-02-22	2009-08-27	Byk-Chemie Gmbh	Wetting and dispersing agents, their preparation and use
EP2281012B1 *	2008-05-30	2013-09-04	Lubrizol Advanced Materials, Inc.	Dispersants from linear polyurethanes
DE102008045296A1	2008-09-02	2010-03-04	Byk-Chemie Gmbh	Monocarboxylic acid containing dispersing medium for solid preparations
JP5079653B2	2008-09-29	2012-11-21	富士フイルム株式会社	Colored curable composition, color filter, method for producing the same, and solid-state imaging device
DE102009015470A1	2008-12-12	2010-06-17	Byk-Chemie Gmbh	Process for the preparation of metal nanoparticles and metal nanoparticles obtained in this way and their use
AU2009335858B2 *	2008-12-18	2014-10-09	Coatings Foreign Ip Co. Llc	Modified titanium dioxide comprising at least one (meth) acrylic polymer
US8961768B2	2008-12-29	2015-02-24	Basf Corporation	Metal containing integrated electrocoat for better corrosion resistance
US20100167069A1 *	2008-12-29	2010-07-01	Basf Corporation	Pyridine group-containing electrocoat resin
CN102498143B *	2009-09-09	2015-01-28	爱克发印艺公司	Hyperbranched polymeric dispersants and non-aqueous pigment dispersions
CN102753628A	2009-11-11	2012-10-24	比克化学股份有限公司	Coating composition
JP5615600B2	2010-06-09	2014-10-29	富士フイルム株式会社	Ink composition for ink jet recording, ink jet recording method, and ink jet printed matter
CN102436142B	2010-09-29	2013-11-06	第一毛织株式会社	Black photosensitive resin composition and light blocking layer using the same
KR101367253B1	2010-10-13	2014-03-13	제일모직 주식회사	Photosensitive resin composition and black matrix using the same
KR101486560B1	2010-12-10	2015-01-27	제일모직 주식회사	Photosensitive resin composition and black matrix using the same
KR101453769B1	2010-12-24	2014-10-22	제일모직 주식회사	Photosensitive resin composition and color filter using the same
IT1404805B1	2011-02-10	2013-11-29	Lamberti Spa	Dispersing
EP2723484B1	2011-06-22	2015-12-09	BYK-Chemie GmbH	Disperser additives on the basis of phosphoric acid ester derivatives
KR101638708B1	2011-06-22	2016-07-11	비와이케이-케미 게엠베하	Method for producing dispersant additives
EP2771446A1	2011-10-25	2014-09-03	Basf Se	Use of acrylate copolymers as soil antiredeposition agents and soil release agents in laundry processes
KR101344786B1	2011-12-02	2013-12-26	제일모직주식회사	Photosensitive resin composition for color filter comprising the same and color filter using the same
CN102658057B	2012-04-16	2014-09-10	王志军	Novel polyurethane dispersant and preparation method thereof
EP2676974A1	2012-06-21	2013-12-25	BYK-Chemie GmbH	Ionic adhesive groups containing comb copolymers
US9650536B2	2012-07-06	2017-05-16	Akzo Nobel Coatings International B.V.	Method for producing a nanocomposite dispersion comprising composite particles of inorganic nanoparticles and organic polymers
WO2014048776A2 *	2012-09-28	2014-04-03	Basf Se	Water-emulsible isocyanates having improved gloss
EP2719270A1	2012-10-11	2014-04-16	BYK-Chemie GmbH	Coating compound and use
KR20140076320A	2012-12-12	2014-06-20	제일모직주식회사	Photosensitive resin composition and black spacer using the same
WO2015065829A1	2013-11-01	2015-05-07	Lubrizol Advanced Materials, Inc.	Dispersants with multiple aromatic imide anchor groups
WO2015197648A1	2014-06-24	2015-12-30	Byk-Chemie Gmbh	Acrylate systems having a latent thickening tendency

KR20170026512A	2014-06-24	2017-03-08	비와이케이-케미 게엠베하	Unsaturated polyester resin systems with latent thickening tendencies
EP3161036B1	2014-06-24	2018-01-24	BYK-Chemie GmbH	Epoxy resin epoxy hardener systems with latent thickening tendency
US20170158838A1	2014-06-24	2017-06-08	Byk-Chemie, Gmbh	Polyurethane two-component or multi-component systems having a latent thickening tendency
US10392494B2	2014-06-24	2019-08-27	Byk-Chemie Gmbh	Latent thickeners, rheology control kit and multi-component systems
EP2998017B1	2014-09-18	2019-11-13	Evonik Degussa GmbH	Addition compounds suitable as dispersants or anti-sedimentation agents
EP3046661A4 *	2014-11-25	2016-10-12	Deuchem Shanghai Chemical Co Ltd	Urethane dispersants
US10544091B2	2015-06-03	2020-01-28	Byk-Chemie, Gmbh	Reaction products containing amidoamine groups
CN107667130B	2015-06-03	2021-01-26	毕克化学有限公司	Reaction products containing urethane groups
EP3320011B1	2015-07-08	2019-09-25	BYK-Chemie GmbH	Polyurethane-polyurea
JP7064579B2	2017-09-05	2022-05-10	ベーイプシロンカー ヘミー ゲゼルシャフト ミット ベシュレンクター ハフトゥング	Multi-component dispersant
WO2019175344A1	2018-03-15	2019-09-19	Covestro Deutschland Ag	Storage-stable pigmented formulations containing isocyanate groups and use thereof
WO2020173846A1	2019-02-28	2020-09-03	Covestro Intellectual Property Gmbh & Co. Kg	Storage-stable pigmented isocyanate group-containing formulations with isocyanate group-containing grinding resin and use thereof
JP2021162854A	2020-03-31	2021-10-11	住友化学株式会社	Negative resist composition
EP4127080A4 *	2020-03-31	2023-12-13	Clariant International Ltd	Hydrophobically modified polyurethane thickener and process for its preparation
US20230337664A1 *	2020-05-05	2023-10-26	Macquarie University	Fruit fly control
EP4183842A1	2021-11-23	2023-05-24	Ewald Dörken Ag	Pigment paste and its use
EP4484503A1	2023-06-27	2025-01-01	Ewald Dörken Ag	Aqueous stabilizer composition and its use
EP4545612A1	2023-10-26	2025-04-30	Ewald Dörken Ag	Pigment paste and its use

* Cited by examiner, † Cited by third party, ‡ Family to family citation

Similar Documents

Publication	Publication Date	Title
EP0154678B2	1998-12-09	Addition compounds suited as dispersing agents, process for their preparation, their use and solid materials coated with them
DE3641581C3	1996-08-01	Process for the preparation of dispersants and their salts and their use
EP0318999B1	1994-03-02	Addition compounds useful as dispersing agents and dispersion stabilizers, process for their preparation, use of them and solids coated therewith
EP0438836B1	1995-09-20	Dispersants, use thereof and solids coated therewith
DE102004022753B3	2006-02-16	Addition dispersions suitable as dispersants and dispersion stabilizers
DE3885401T2	1994-04-21	Water-dispersible thickener made of modified polyurethane with improved viscosity behavior in high-shear forces in aqueous systems.
DE3151802C2	1993-08-12	
DE69933673T3	2015-06-03	Polyurethandispergiermittel
EP2254926B1	2012-07-11	Humectant and dispersant, production and use thereof
EP2254927B1	2014-07-02	Humectant and dispersant, production and use thereof
EP2361939B1	2012-08-22	Polyurethane thickener
DE4137247A1	1993-05-19	THICKENERS ON POLYURETHANE BASE
DE2843790A1	1980-04-17	METHOD FOR THE PRODUCTION OF AQUEOUS DISPERSIONS OR SOLUTIONS OF POLYURETHANE-POLYHURANE, THE DISPERSIONS OR SOLUTIONS AVAILABLE BY THIS METHOD, AND THEIR USE
EP0554745B1	1997-03-05	Process for the production of coatings
WO2012175157A1	2012-12-27	Dispersing additives based on phosphoric acid ester derivatives
DE2642073C2	1984-08-16	Process for the production of a crosslinked sheet-like structure

DE10207891A1	2003-09-04	Branched polyurethanes, formulations containing them and their use for thickening aqueous systems
EP3026071A1	2016-06-01	Stabilised polyurethane dispersions
DE3527038C2	1992-05-21	
EP0628580B1	1997-04-16	Process for the preparation of polymers containing polyurethane and/or polyurea groups
EP0829496A1	1998-03-18	Pigment preparations
JPH06192B2	1994-01-05	Solid coated with dispersant and liquid system in which the solid is dispersed
EP0520586B1	1996-09-11	Dispersants, use thereof, and solids coated therewith
DE2926002C2	1988-03-31	
WO2016193474A1	2016-12-08	Reaction products containing amidoamine groups

Priority And Related Applications

Priority Applications (6)

Application	Priority date	Filing date	Title
AT84112971T	1984-01-27	1984-10-27	ADDITIONAL COMPOUNDS SUITABLE AS DISPERSING AGENT, PROCESS FOR THEIR PRODUCTION, THEIR USE AND SOLIDS COATED WITH THEM.
ES538040A	1984-01-27	1984-11-28	Addition compound
CA000470913A	1984-01-27	1984-12-21	Addition compounds suitable as dispersing agents, process for their preparation, their use and solids coated therewith
JP63225530A	1984-01-27	1988-09-07	Solid coated with dispersant and liquid system in which the solid is dispersed
JP63225529A	1984-01-27	1988-09-07	Dispersant and liquid system having solid dispersed therein using the same
JP1146536A	1984-01-27	1989-06-08	Addition compound

Applications Claiming Priority (2)

Application	Filing date	Title
DE3402774	1984-01-27	
DE3402774	1984-01-27	

Legal Events

Date	Code	Title	Description
1985-07-20	PUAI	Public reference made under article 153(3) epc to a published international application that has entered the european phase	**Free format text**: ORIGINAL CODE: 0009012
1985-09-18	17P	Request for examination filed	**Effective date**: 19841127
1985-09-18	AK	Designated contracting states	**Designated state(s)**: AT BE CH DE FR GB IT LI LU NL SE
1986-07-30	17Q	First examination report despatched	**Effective date**: 19860616
1987-07-10	GRAA	(expected) grant	**Free format text**: ORIGINAL CODE: 0009210
1987-08-26	AK	Designated contracting states	**Kind code of ref document**: B1 **Designated state(s)**: AT BE CH DE FR GB IT LI LU NL SE
1987-08-26	REF	Corresponds to:	**Ref document number**: 29138 **Country of ref document**: AT

			Date of ref document: 19870915 **Kind code of ref document**: T
1987-09-04	ITF	It: translation for a ep patent filed	
1987-09-09	PLBI	Opposition filed	**Free format text**: ORIGINAL CODE: 0009260
1987-10-01	REF	Corresponds to:	**Ref document number**: 3465599 **Country of ref document**: DE **Date of ref document**: 19871001
1987-10-28	26	Opposition filed	**Opponent name**: EFKA CHEMICALS B.V. **Effective date**: 19870826
1987-11-13	ET	Fr: translation filed	
1987-11-16	NLR1	Nl: opposition has been filed with the epo	**Opponent name**: EFKA CHEMICALS B.V.
1990-11-30	PLBI	Opposition filed	**Free format text**: ORIGINAL CODE: 0009260
1991-01-16	26	Opposition filed	**Opponent name**: THORSON CHEMICALS GMBH **Effective date**: 19901115 **Opponent name**: EFKA CHEMICALS B.V. **Effective date**: 19870826
1991-03-18	NLR1	Nl: opposition has been filed with the epo	**Opponent name**: THORSON CHEMICALS GMBH
1991-10-31	ITTA	It: last paid annual fee	
1993-12-16	EPTA	Lu: last paid annual fee	
1995-01-31	EAL	Se: european patent in force in sweden	**Ref document number**: 84112971.1
1996-12-05	APAC	Appeal dossier modified	**Free format text**: ORIGINAL CODE: EPIDOS NOAPO
1996-12-09	APAC	Appeal dossier modified	**Free format text**: ORIGINAL CODE: EPIDOS NOAPO
1997-10-01	APAC	Appeal dossier modified	**Free format text**: ORIGINAL CODE: EPIDOS NOAPO
1997-10-03	PLAW	Interlocutory decision in opposition	**Free format text**: ORIGINAL CODE: EPIDOS IDOP
1998-01-09	PLAW	Interlocutory decision in opposition	**Free format text**: ORIGINAL CODE: EPIDOS IDOP
1998-03-05	PLAW	Interlocutory decision in opposition	**Free format text**: ORIGINAL CODE: EPIDOS IDOP

1998-06-16	PLAW	Interlocutory decision in opposition	**Free format text**: ORIGINAL CODE: EPIDOS IDOP
1998-10-23	PUAH	Patent maintained in amended form	**Free format text**: ORIGINAL CODE: 0009272
1998-10-23	STAA	Information on the status of an ep patent application or granted ep patent	**Free format text**: STATUS: PATENT MAINTAINED AS AMENDED
1998-12-09	27A	Patent maintained in amended form	**Effective date**: 19981209
1998-12-09	AK	Designated contracting states	**Kind code of ref document**: B2 **Designated state(s)**: AT BE CH DE FR GB IT LI LU NL SE
1998-12-31	REG	Reference to a national code	**Ref country code**: CH **Ref legal event code**: AEN **Free format text**: AUFRECHTERHALTUNG DES PATENTES IN GEAENDERTER FORM
1999-02-01	NLR2	Nl: decision of opposition	
1999-02-01	NLR3	Nl: receipt of modified translations in the netherlands language after an opposition procedure	
1999-02-12	ET3	Fr: translation filed ** decision concerning opposition	
1999-03-05	ITF	It: translation for a ep patent filed	
2001-10-23	PGFP	Annual fee paid to national office [announced via postgrant information from national office to epo]	**Ref country code**: LU **Payment date**: 20011023 **Year of fee payment**: 18
2002-01-01	REG	Reference to a national code	**Ref country code**: GB **Ref legal event code**: IF02
2002-10-27	PG25	Lapsed in a contracting state [announced via postgrant information from national office to epo]	**Ref country code**: LU **Free format text**: LAPSE BECAUSE OF NON-PAYMENT OF DUE FEES **Effective date**: 20021027
2003-10-06	PGFP	Annual fee paid to national office [announced via postgrant information from national office to epo]	**Ref country code**: GB **Payment date**: 20031006 **Year of fee payment**: 20
2003-10-21	PGFP	Annual fee paid to national office [announced via postgrant information from national office to epo]	**Ref country code**: FR **Payment date**: 20031021 **Year of fee payment**: 20
2003-10-24	PGFP	Annual fee paid to national office [announced via postgrant information from national office to epo]	**Ref country code**: BE **Payment date**: 20031024 **Year of fee payment**: 20 **Ref country code**: AT **Payment date**: 20031024 **Year of fee payment**: 20

2003-10-27	PGFP	Annual fee paid to national office [announced via postgrant information from national office to epo]	**Ref country code**: SE **Payment date**: 20031027 **Year of fee payment**: 20 **Ref country code**: CH **Payment date**: 20031027 **Year of fee payment**: 20
2003-10-30	PGFP	Annual fee paid to national office [announced via postgrant information from national office to epo]	**Ref country code**: DE **Payment date**: 20031030 **Year of fee payment**: 20
2003-10-31	PGFP	Annual fee paid to national office [announced via postgrant information from national office to epo]	**Ref country code**: NL **Payment date**: 20031031 **Year of fee payment**: 20
2004-10-26	PG25	Lapsed in a contracting state [announced via postgrant information from national office to epo]	**Ref country code**: LI **Free format text**: LAPSE BECAUSE OF EXPIRATION OF PROTECTION **Effective date**: 20041026 **Ref country code**: GB **Free format text**: LAPSE BECAUSE OF EXPIRATION OF PROTECTION **Effective date**: 20041026 **Ref country code**: CH **Free format text**: LAPSE BECAUSE OF EXPIRATION OF PROTECTION **Effective date**: 20041026
2004-10-27	PG25	Lapsed in a contracting state [announced via postgrant information from national office to epo]	**Ref country code**: NL **Free format text**: LAPSE BECAUSE OF EXPIRATION OF PROTECTION **Effective date**: 20041027 **Ref country code**: AT **Free format text**: LAPSE BECAUSE OF EXPIRATION OF PROTECTION **Effective date**: 20041027
2004-10-31	BE20	Be: patent expired	**Owner name**: *BYK-CHEMIE G.M.B.H. **Effective date**: 20041027
2004-11-30	EUG	Se: european patent has lapsed	
2004-11-30	REG	Reference to a national code	**Ref country code**: CH **Ref legal event code**: PL
2004-12-08	REG	Reference to a national code	**Ref country code**: GB **Ref legal event code**: PE20

2005-01-03	NLV7	NI: ceased due to reaching the maximum lifetime of a patent	**Effective date**: 20041027
2005-10-05	APAH	Appeal reference modified	**Free format text**: ORIGINAL CODE: EPIDOSCREFNO

Concepts

machine-extracted

Download Filter table

Name				Image	Sections	Count	Query match
compounds	title,claims,description	99	0.000				
dispersing agent	title,claims,description	27	0.000				
method	title,claims,description	15	0.000				
preparation method	title,description	22	0.000				
process	title,description	5	0.000				
solid material	title	1	0.000				
polyester	claims,description	45	0.000				
chemical reaction	claims,description	38	0.000				
solid	claims,description	35	0.000				
polyisocyanate	claims,description	32	0.000				
polyisocyanate	claims,description	32	0.000				
pigment	claims,description	22	0.000				
isocyanate group	claims,description	20	0.000				
Ethylene glycol	claims,description	16	0.000				
salts	claims,description	15	0.000				
carbon atom	claims,description	14	0.000				
amino hydrogen	claims,description	13	0.000				
aliphatic group	claims,description	11	0.000				
chemical reaction product	claims,description	11	0.000				
solvent	claims,description	8	0.000				
liquid	claims,description	7	0.000				
polyethylene glycol	claims,description	7	0.000				
1h-1,2,4-triazol-1-ium-3-thiolate	claims,description	6	0.000				
2-pyridin-4-ylethanamine	claims,description	6	0.000				
Polyethylene glycol	claims,description	6	0.000				
dimethylaminopropylamine	claims,description	6	0.000				
hydrogen	claims,description	6	0.000				
hydrogen	claims,description	6	0.000				
hydrogen atom	claims,description	6	0.000				
2-pyridin-4-ylethanol	claims,description	5	0.000				
aminoethylpiperazine	claims,description	5	0.000				
aryl group	claims,description	5	0.000				
halogen	claims,description	5	0.000				
halogens	claims,description	5	0.000				
hydroxyacetaldehyde	claims,description	5	0.000				

2-imidazol-1-ylethanol	claims,description	4	0.000
2-n,2-n-bis(prop-2-enyl)-1,3,5-triazine-2,4,6-triamine	claims,description	4	0.000
3-imidazol-1-ylpropan-1-amine	claims,description	4	0.000
6-methoxy-1,3-benzothiazol-2-amine	claims,description	4	0.000
Amitrole	claims,description	4	0.000
glycols	claims,description	4	0.000
1,3-dihydrobenzimidazole-2-thione	claims,description	3	0.000
2-(morpholin-4-yl)ethanol	claims,description	3	0.000
2-piperazin-1-ylethanol	claims,description	3	0.000
2-pyrrolidin-1-ylethanamine	claims,description	3	0.000
Hydrogen	claims,description	3	0.000
N-dimethylaminoethanol	claims,description	3	0.000
hydroxy compounds	claims,description	3	0.000
n',n'-diethylbutane-1,4-diamine	claims,description	3	0.000
pyridin-4-ylmethanamine	claims,description	3	0.000
pyrimidine-2-thiol	claims,description	3	0.000
2-O-methylcytosine	claims,description	2	0.000
alkyl group	claims	2	0.000
aryl radicals	claims	2	0.000
chemical reaction catalyst	claims	2	0.000
hydrocarbyl group	claims	2	0.000

Show all concepts from the description section