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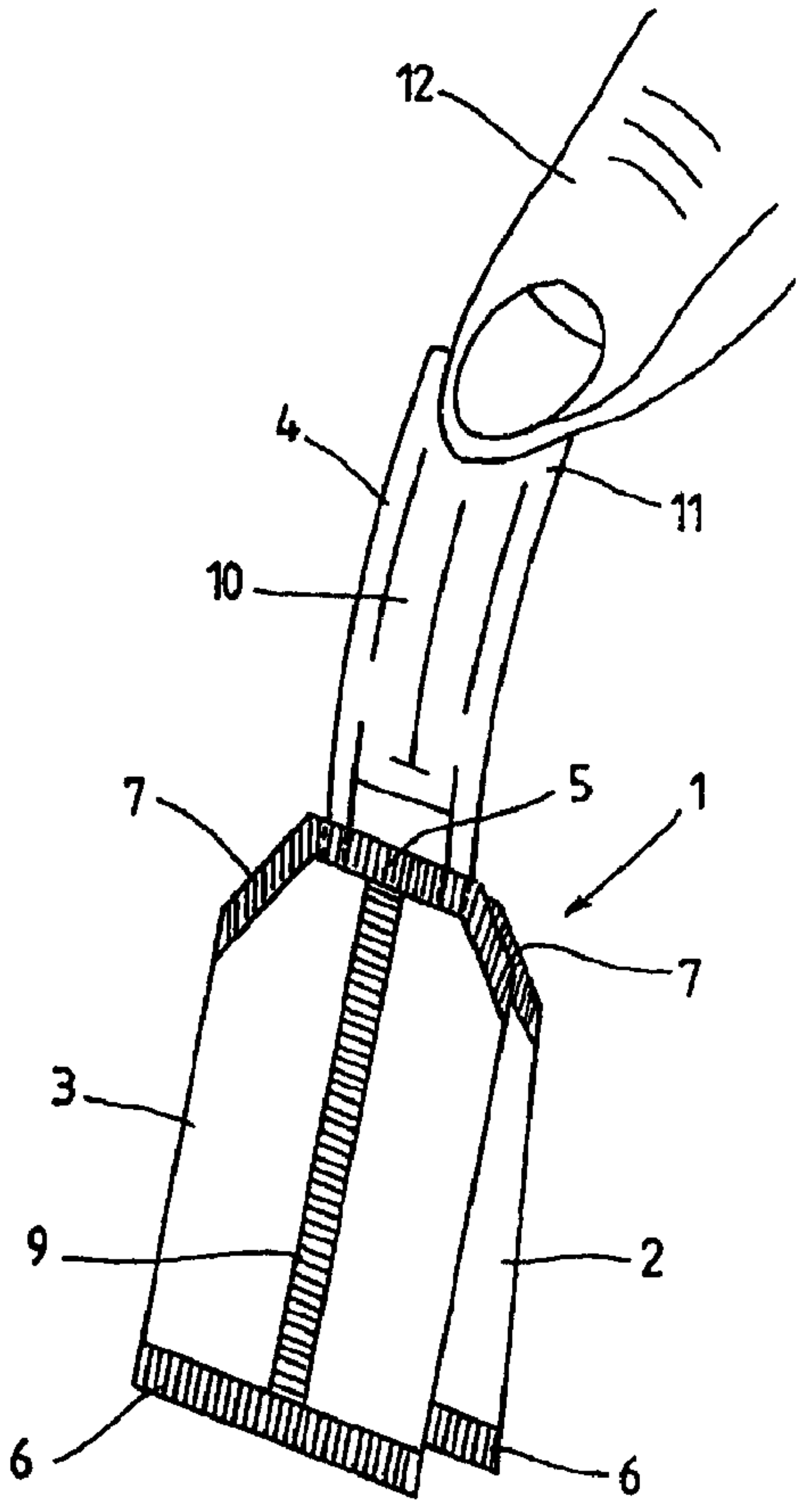
(54) Titre : COMPOSITIONS DE CONDITIONNEMENT DE TISSU
(54) Title: FABRIC CONDITIONING COMPOSITIONS



(57) Abrégé/Abstract:
A fabric conditioning composition comprising a substantially water insoluble cationic fabric softening agent and a copolymer characterised in that the copolymer comprises the following monomers: a) a negatively charged monomer having at least one

(57) **Abrégé(suite)/Abstract(continued):**
carboxylate group and having the formula: $R_1R_3C{=}CR_2R_4$ wherein R_1, R_2, R_3, and R_4 are independently selected from H, or a C_1-C_4 alkyl group or a $(CH_2)_nCOOR_5$ in which n is an integer between 1 and 6 or is 0 and R_5 is H or a C_1-C_4 alkyl group, and at least one of R_1, R_2, R_3 and R_4 is a $(CH_2)_nCOOR_5$ group, and b) a vinyl substituted heterocyclic monomer containing at least one nitrogen atom, and wherein the mole ratio of a):b) is in the range 20:80 to 50:50. Examples include, 70:30 Polyvinylimidazole/Acrylic acid copolymer. The fabric conditioning composition gives reduced dye transfer benefits. Use of the copolymer in a fabric conditioning composition as a dye transfer inhibiting copolymer in a fabric conditioning composition, wherein the copolymer does not cause de-stabilisation is also provided.

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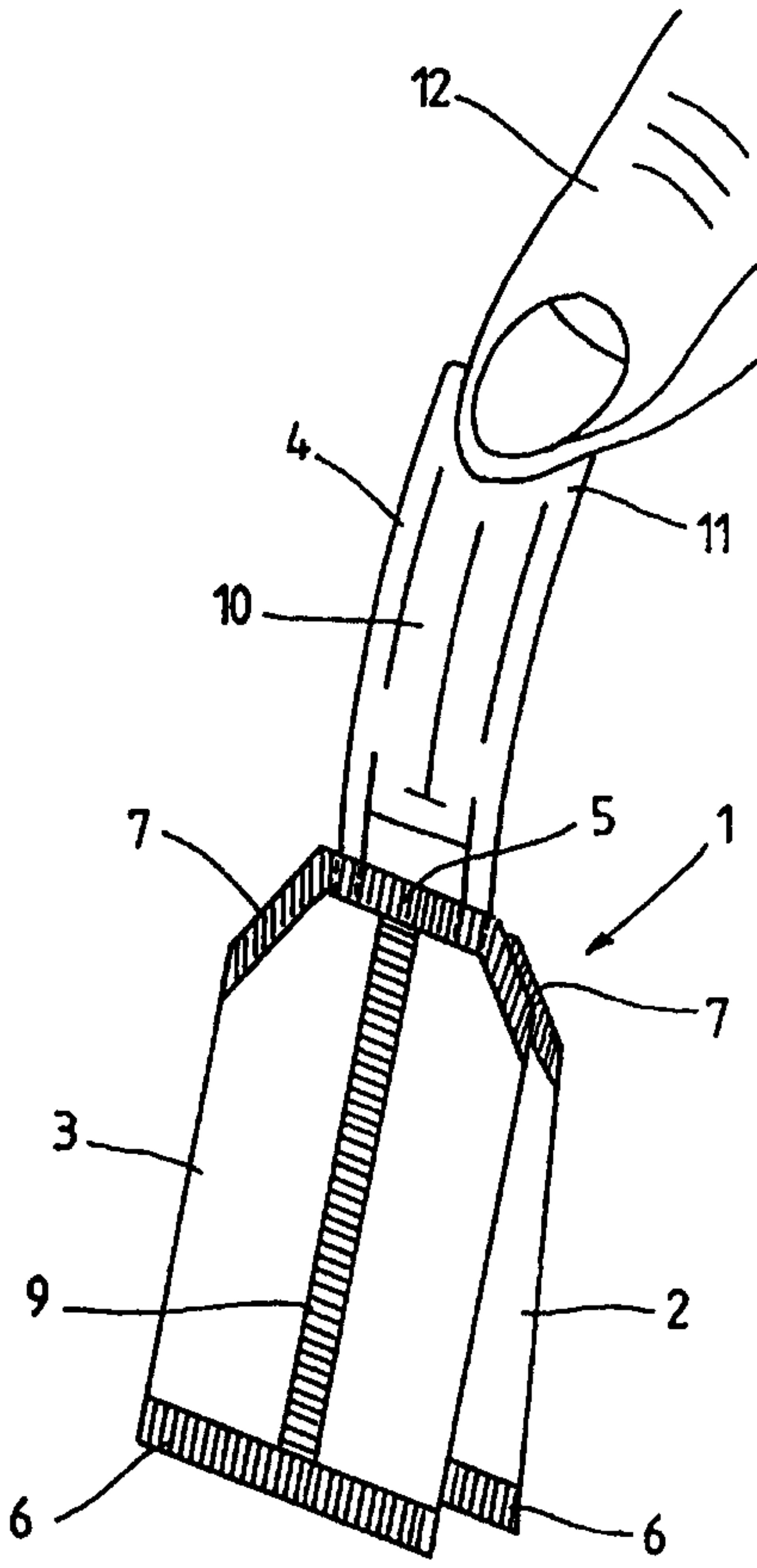
(54) Title: FABRIC CONDITIONING COMPOSITIONS

(57) Abstract

A fabric conditioning composition comprising a substantially water insoluble cationic fabric softening agent and a copolymer characterised in that the copolymer comprises the following monomers: a) a negatively charged monomer having at least one carboxylate group and having the formula: $R_1R_3C{=}CR_2R_4$ wherein R_1, R_2, R_3, and R_4 are independently selected from H, or a C_1–C_4 alkyl group or a $(CH_2)_nCOOR_5$ in which n is an integer between 1 and 6 or is 0 and R_5 is H or a C_1–C_4 alkyl group, and at least one of R_1, R_2, R_3 and R_4 is a $(CH_2)_nCOOR_5$ group, and b) a vinyl substituted heterocyclic monomer containing at least one nitrogen atom, and wherein the mole ratio of a):b) is in the range 20:80 to 50:50. Examples include, 70:30 Polyvinylimidazole/Acrylic acid copolymer. The fabric conditioning composition gives reduced dye transfer benefits. Use of the copolymer in a fabric conditioning composition as a dye transfer inhibiting copolymer in a fabric conditioning composition, wherein the copolymer does not cause de-stabilisation is also provided.



FABRIC CONDITIONING COMPOSITIONS

FIELD OF THE INVENTION

The invention relates to fabric conditioning compositions containing a cationic softening active and a dye transfer inhibiting polymer, which are intended for use in the rinse cycle of a laundering operation. Specifically the invention defines a category of polymers which deliver a dye transfer benefit whilst maintaining the stability of such fabric conditioning compositions.

BACKGROUND OF THE INVENTION

Liquid rinse cycle fabric conditioners have been used for many years to provide a softened feel to garments that have become harsh during the washing process. Most commercially available fabric conditioners use tallow based cationic actives, optionally in combination with nonionic actives, to deposit onto the garments to provide a soft tactile feel. In addition, fabric conditioners are well known to provide substantial fragrance benefits thus increasing their overall appeal to consumers.

Rinse added fabric softener compositions are well known. Typically such compositions contain a water insoluble quaternary ammonium fabric softening agent dispersed in water at a level of softening agent up to 7% by weight (in which case the compositions are considered dilute), or, at levels from 7% to 50% (in which case the compositions are considered concentrates).

Well known methods of providing both softening and fragrance benefits are described in the art. However, as consumer use habits and needs have changed over the years, the need to provide further benefits, particularly in the areas of colour care and fabric care have increased substantially. One highly desirable aspect of colour care is the prevention of vagrant dyestuffs transferring from one garment to another during the course of the current or subsequent laundering process. Various compositions which provide this benefit during the wash cycle are described in the prior art and available commercially in, or as, laundry detergent products.

US 5,458,809 (Fredj et al) describes the use of a specific polymer type, PVP-N-Oxide, for use as a dye transfer inhibitor in the wash cycle. It is provided in a detergent mixture that contains anionic and nonionic surfactants and which can include mono long chain cationic surfactants.

US 4,954,292 (Hull et al) describes the use of polyvinyl pyrrolidone to prevent redeposition of soils or dyestuffs when used in a laundry detergent in combination with an anionic surfactant, and, a specific nonionic with an HLB of 10.5 or less.

US 5,259,994 (Welch et al) describes the use of polyvinyl pyrrolidone (PVP) in a particulate laundry detergent. The PVP is used in combination with hydrating salts and binding agents to form a separate particle which is then added to the remainder of the detergent which contains anionic and/or nonionic surfactants.

GB 1 604 030 (Procter & Gamble Limited) discloses textile treatment compositions comprising a substantially water insoluble cationic textile softening agent and one or more polymeric cationic salts which may be quaternised salts.

WO 98/30664 (Unilever) discloses a fabric conditioning composition comprising a methyl vinyl imidazole/vinyl pyrollidone/acrylic acid copolymer, where the acrylic acid is present in an amount of 3% based on the weight of the copolymer.

None of these cited publications specify the use of a dye transfer inhibitor in a rinse cycle product combined with the use of water insoluble cationic surfactants to provide fabric conditioning benefits.

Less well known in the art is the use of materials to prevent dye transfer in the rinse. However WO 95/05442 (Siklosi et al) describes the use of a specific molecule, PVP-N-Oxide, for use in a rinse conditioner application as an optional component for use in stabilising cellulase enzymes. While this reference does cite the use of long chain cationic actives, it requires the presence of cellulase enzymes since the PVP-N-Oxide is utilised as an enzyme stabiliser.

US 5,964,939 describes the use of a dye transfer inhibitor such as PVP in combination with long chain cationic surfactants for use in providing softening and other benefits in the rinse cycle.

WO 94/14861 discloses copolymerisates of vinyl pyrrolidone and vinyl imidazole, a process for producing them and their use in detergents.

All of the cited publications fail to suggest the use of a dye transfer inhibitor such as a copolymer of the type described hereinafter, for use in providing a fabric conditioning composition which is stable and also gives reduced dye transfer benefits both in the rinse and in the subsequent wash.

We have found that whilst the compositions of the prior art can be effective in inhibiting dye transfer to a certain extent, none address the problems of maintaining a stable fabric conditioning composition as well as providing improved dye transfer benefits.

Physical instability of a fabric conditioning composition manifests itself as a thickening on storage of the composition, often to a level where the composition is no longer pourable and may even lead to the formation of an irreversible gel. An alternative manifestation of instability is that the composition may phase separate leading to an unacceptable product which can no longer be conveniently used, (such phase separation being altogether different to the normal dispersed continuous phases of these products).

In the case of the present invention, instability may manifest itself as a relatively small degree of phase separation. The phase separation may not manifest itself by the appearance of a distinct layer of continuous phase but may appear as 'cracks' distributed throughout the product. The onset of these cracks appearing, and, the volume of the material they contain are almost impossible to measure to a high degree of accuracy. However, those skilled in the art will be able to ascertain instability because the presence of a distributed separate phase at a volume of greater than approximately 2% by volume of the total composition will readily be visually identifiable by such persons.

It is therefore an object of this invention to provide the benefit of fabric softening along with that of colour care. This is achieved through the use of a dye transfer inhibition copolymer and a fabric softening agent in a convenient single product form, which maintains acceptable stability on storage over a range of temperatures.

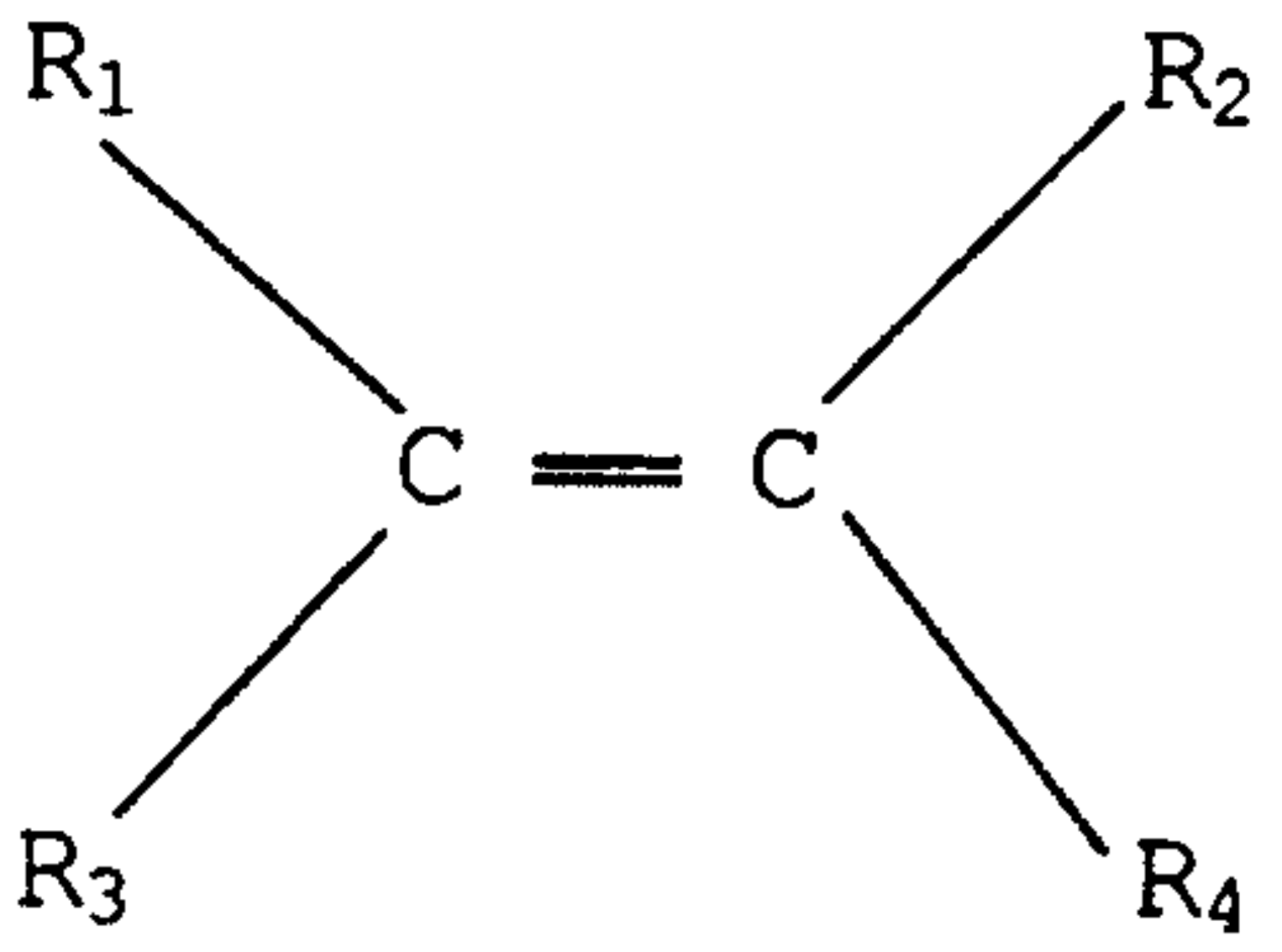
SUMMARY OF THE INVENTION

The present invention provides a fabric conditioning composition comprising a fabric softening active and dye transfer inhibiting agent, in which the dye transfer inhibiting agent also allows the stability of the conditioning composition at various temperatures to be maintained.

The invention thus provides a fabric conditioning composition comprising at least one substantially water insoluble cationic fabric softening agent and a copolymer characterised in that the copolymer comprises both monomers a) and b):-

a) a negatively charged monomer of formula (I) having at least one carboxylate group:

(I)



wherein R_1, R_2, R_3, and R_4 are independently selected from H or a C_1-C_4 alkyl group or a $(CH_2)_nCOOR_5$, in which n is an integer between 1 and 6 or is 0 and R_5 is H or a C_1-C_4 alkyl group; and wherein at least one of R_1, R_2, R_3 and R_4 is a $(CH_2)_nCOOR_5$, and

b) a vinyl substituted heterocyclic monomer containing at least one nitrogen atom

and wherein the mole ratio of a):b) is in the range 20:80 to 50:50.

The present invention also provides the use of a copolymer as herein defined as a dye transfer inhibiting copolymer in a fabric conditioning composition, wherein the copolymer does not cause de-stabilisation.

CATIONIC FABRIC SOFTENING AGENT

The compositions of the invention comprise at lest one substantially water insoluble cationic fabric softening agent.

The compositions preferably comprise quaternary ammonium salts as the substantially water insoluble cationic fabric softening agent. The quaternary ammonium salts preferably have at least one higher molecular weight group and two or three lower molecular weight groups linked to a common nitrogen atom to produce a cation and an electrically balancing anion which is a halide such as chloride, or an acetate or lower alkosulphate ion, or methosulphate.

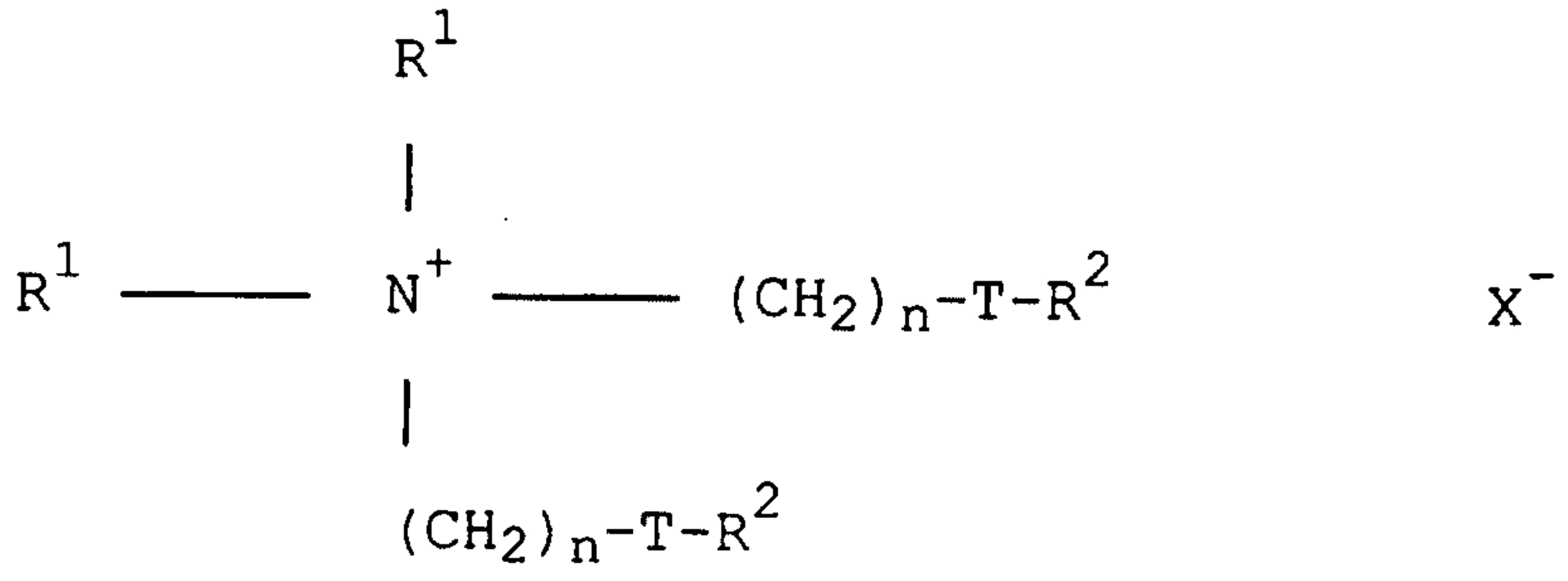
The higher molecular weight substituent on the nitrogen is preferably a higher alkyl group, containing between 12 to 20 carbon atoms, such as coco-alkyl, tallowalkyl, hydrogenated tallowalkyl and their substituted equivalents. The lower molecular weight substituents are preferably lower alkyl of 1 to 4 carbon atoms, such as methyl or ethyl, or their substituted equivalents. One or more of the said lower molecular weight substituents may include an aryl moiety or may be replaced by an aryl, such as benzyl, phenyl or other suitable substituents.

Preferred quaternary ammonium salts include di-higher alkyl, di-lower alkyl ammonium halides, such as di- tallowalkyl dimethyl ammonium chloride or di-(hydrogenated tallowalkyl) dimethyl ammonium chloride.

Other types of quaternary ammonium salts that may be used in the compositions include those having two C_{12}-C_{22} alkyl or alkenyl groups connected to a quaternary ammonium head group via at least one ester link, or, a compound comprising a single long alkyl or alkenyl chain with an average chain length equal to or greater than C_{20}.

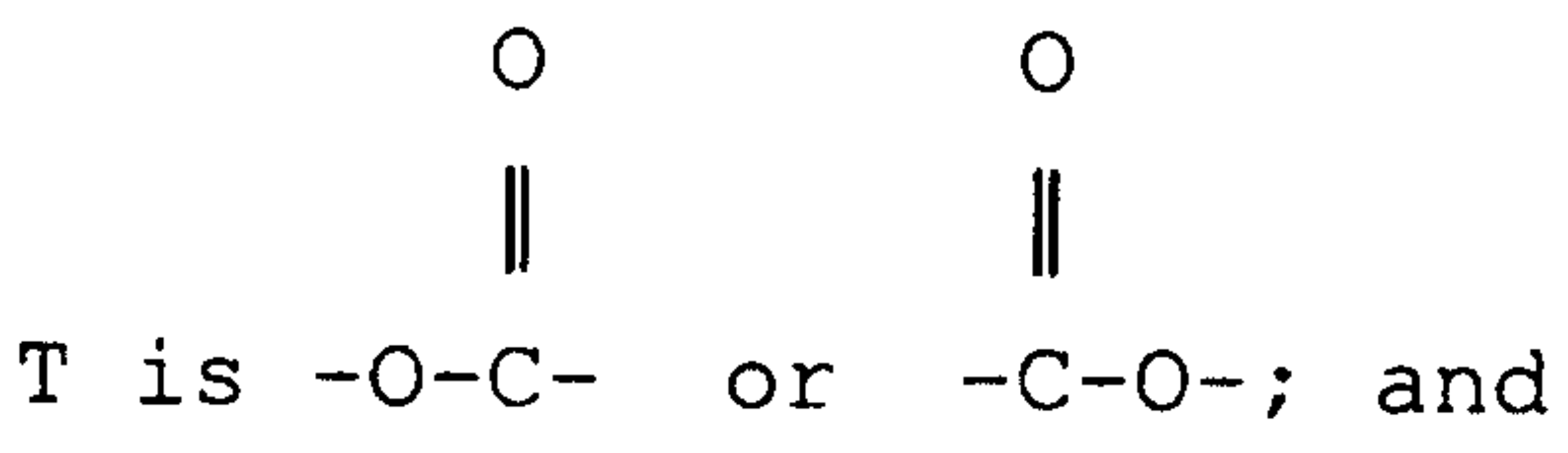
More preferably the quaternary ammonium salt comprises a compound having two long chain alkyl or alkenyl chains with an average chain length equal to or greater than C_{12}. Even more preferably both chains have an average chain length equal to or greater than C_{16}. Most preferably at least 50% of each long chain alkyl or alkenyl group has a chain length of C_{18}. It is preferred if the long chain alkyl or alkenyl groups are predominantly linear.

An especially preferred ester-linked quaternary ammonium material for use in the compositions is represented by the formula:



$$\begin{array}{ccc} & R^1 & \\ & | & \\ R^1 - & N^+ & - (CH_2)_n-T-R^2 \qquad X^- \\ & | & \\ & (CH_2)_n-T-R^2 & \end{array}$$

wherein each R^1 group is independently selected from C_{1-4} alkyl, hydroxyalkyl or C_{2-4} alkenyl groups; and wherein each R^2 group is independently selected from C_{8-28} alkyl or alkenyl groups; X^- is any suitable counterion, i.e. a halide such as chloride, or acetate or lower alkosulphate ion, or methosulphate,

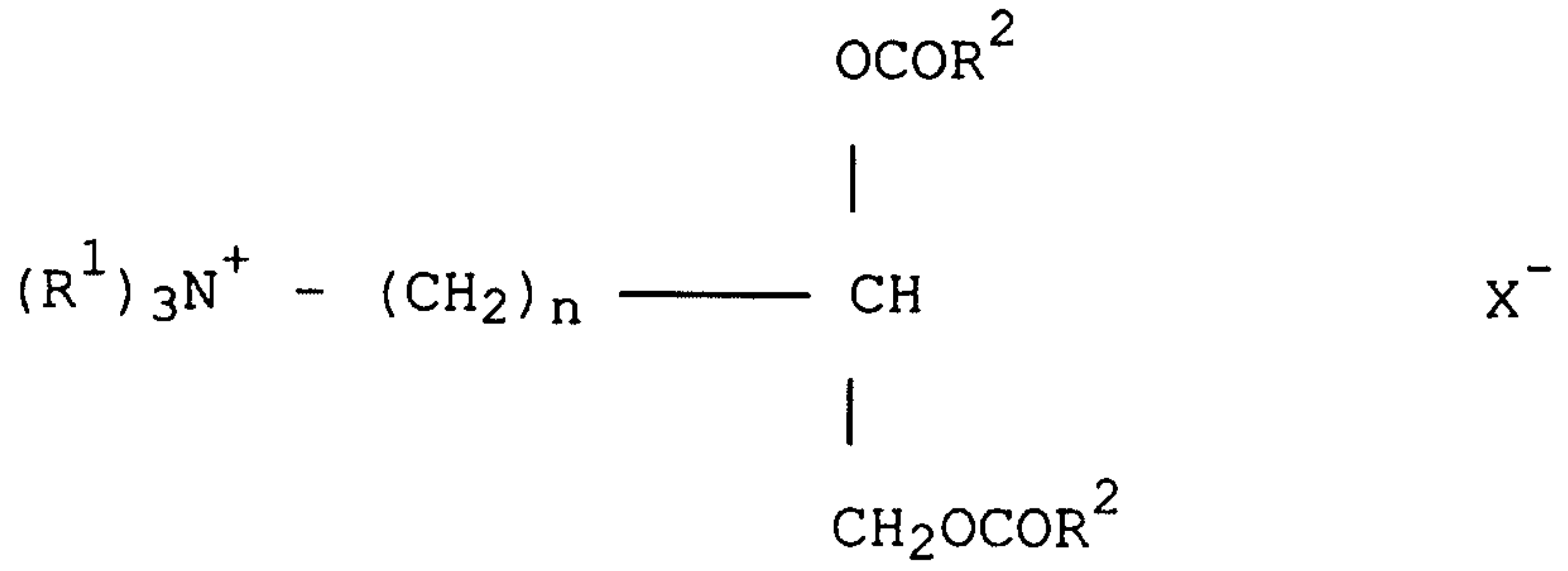


T is $-O-\overset{\overset{O}{\|}}{C}-$ or $-\overset{\overset{O}{\|}}{C}-O-$; and

n is an integer from 0-5

Di (tallowyloxyethyl) dimethyl ammonium chloride and Di(hardened tallowyloxyethyl) dimethyl ammonium chloride, both ex Hoechst are both preferred fabric softening agents.

Another preferred type of quaternary ammonium material is represented by the formula:



$$(R^1)_3N^+ - (CH_2)_n - \underset{\underset{CH_2OCOR^2}{|}}{\overset{\overset{OCOR^2}{|}}{CH}} \qquad X^-$$

wherein R^1, n, R^2 and X^- are as defined above.

It is advantageous for environmental reasons if the quaternary ammonium material is biologically degradable.

Preferred materials of this class such as 1,2 bis[hardened tallowoyloxy]-3- trimethylammonium propane chloride and their method of preparation are, for example, described in US 4 137 180 (Lever Brothers). Preferably these materials comprise small amounts of the corresponding monoester as described in US 4 137 180, for example, 1-hardened tallow-oyloxy-2-hydroxy -3-trimethylammonium propane chloride.

The commercial grade quaternary ammonium material as supplied may contain optional conventional additional components, in particular, low molecular weight solvents (e.g. isopropanol and/or ethanol), and co-actives such as nonionic softeners (e.g. fatty acid or sorbitan esters).

Substantially water insoluble fabric softening compounds in the context of this invention are defined as fabric softening compounds having a solubility less than 1×10^{-3} wt% in demineralised water at 20°C. Preferably, the fabric softening compounds have a solubility less than 1×10^{-4}. Most preferably, the fabric softening compounds have a solubility at 20°C in demineralised water from 1×10^{-8} to 1×10^{-6}.

The compositions preferably comprise 1-30% by weight fabric softener, more preferably 3.5-27%, most preferably 5.5-20%.

COPOLYMER

The copolymer performs the dye transfer inhibition effect, but without causing destabilisation of the rinse conditioner, and is an essential ingredient of the compositions of the present invention. The copolymer is referred to hereinbelow as a dye transfer inhibition copolymer.

The copolymer is of the type as defined herein above.

The negatively charged monomer a) is of the type defined herein. It is preferred that R_1, R_2, R_3 and R_4, and chosen from H or a C_1-C_2 alkyl group, or a $(CH_2)_nCOOR_5$ in which n is an integer between 1 and 4 or is 0 and R_5 is H or a C_1-C_2 alkyl group.

The copolymers may contain two or more types of monomers of type a).

It is preferred if the negatively charged monomer a) as defined above is selected from the following acids and their salts: methacrylic acid, acrylic acid, maleic acid, itaconic acid and fumaric acid. Especially preferred as the negatively charged monomer are acids and salts of acrylic acid and methacrylic acid. Sodium salts are especially preferred. The above acids containing substituent groups are also suitable.

The vinyl-substituted heterocyclic monomer containing at least one nitrogen atom (monomer b) may be any suitable monomer falling within the definition.

Suitable b) monomers include vinyl imidazole and vinyl pyridine. Their substituted equivalents may also be used, for example methyl vinyl imidazole.

This second monomer is preferably N-vinyl-imidazole.

Preferably, the copolymer is polymerised from the monomers N-vinyl imidazole and acrylic acid or methacrylic acid.

Preferably less than 50% (number average) of the heterocyclic monomers in the copolymer contain quaternised nitrogen atoms. Preferably less than 35% are quaternised, more preferably less than 25% are quaternised. It is highly preferred that the nitrogen atoms are not quaternised.

The mole ratio of monomer a) to monomer b) in the copolymer is preferably within the range 25:75 to 45:55, more preferably 25:75 to 40:60. A particularly good ratio has been found to be about 30:70.

The copolymers are not produced as a single individual compound, but, are obtained as a mixture of copolymers having varying degrees of polymerisation.

The degree of polymerisation is most easily expressed in terms of an average molecular weight, which is conveniently expressed in terms of the K-value. An average K-value of from about 1,000 to 200,000 typically provides the desired dye transfer inhibiting and stabilising properties.

K values are derived from viscosity measurements and are calculated according to the formula:

$$\log (\eta_{rel} / c) = (75K_o^2/[1+1.5K_oc]) + K_o$$

Where c = concentration in g/100ml solution

η_{rel} = viscosity of the solution compared with solvent

K = $1000K_o$

The copolymer as defined above may further comprise neutral monomer units. It is preferred that the neutral monomer has a molecular weight no greater than the total molecular weight of the negativity charged unit and the heterocycle containing monomer.

Optionally a non-charged (nonionic) vinylic monomer may also be included in addition to the above monomers.

Suitable neutral monomers include esters of the negatively charged monomer unit (a) defined above. The neutral monomer unit preferably comprises an (alkyl) acrylate or (alkyl) methacrylate, preferably C_1 to C_4 (meth)acrylate. In these cases the carboxyl group is present in the neutral unit as a carboxyl ester. The alkyl moiety optionally has a hydroxyl substituent. Examples include hydroxy propyl acrylate derivatives.

The neutral monomer, when present, preferably is included in an amount of 10 mol % or less, of the copolymer, more preferably 5 mol % or less.

Typically the copolymer has an overall net positive charge.

Preferred compounds have average molecular weights expressed by K-value from about 50,000 to about 150 000.

Preferably the copolymers and are used at levels from about 0.025wt% to about 5wt%, more preferably from about 0.01wt% to about 3wt%, preferably 0.05wt% - 2wt%, based upon the total weight of the composition.

The copolymers of the invention also have a stabilising effect upon the composition in which they are included. They are referred to herein as dye transfer inhibition copolymers although they may also be referred to as stabilising agents. The copolymers may be used as a combined dye transfer inhibiting copolymer and stabilising agent.

The copolymers may be produced by the copolymerisation methods disclosed in WO 98/30664. For example, the two monomers may undergo radical polymerisation under nitrogen as follows: after degassing for approximately thirty minutes, the reaction mixture is heated to 70°C and 4,4-Azobis (4-cyanovaleric) acid (ACVA) is added in a suitable amount. The reaction mixture is stirred overnight under a nitrogen atmosphere until the mixture turns cloudy. The majority of the dioxane is removed and NaOH solution is added to neutralise the acrylic acid. The remaining dioxane/water is removed and the sample redissolved in water and freeze dried.

ADDITIONAL OPTIONAL DYE TRANSFER INHIBITORS

Additional dye transfer inhibiting compounds (especially polymers including copolymers) may be used in addition to the copolymers of the present invention. Suitable additional dye transfer inhibiting compounds which may be used include polymers such as polyvinylimidazole, polyvinyl pyrrolidone, and copolymers of N-vinyl imidazole with N-vinyl pyrrolidone, especially those having an average molecular weight of between about 5000 to about 50,000. Other suitable compounds include amine ethoxylates (such as cocoamine 5 mole ethoxylate available from Witco Chemical). Any other suitable compounds that provide dye transfer inhibiting properties and which are compatible with the cationic fabric softening agent may be included in the compositions of the invention.

ADDITIONAL OPTIONAL STABILIZING AGENTS

The compositions may also suitably contain a stabilising agent which is preferably a nonionic stabilising agent. Suitable nonionic stabilising agents include linear C8 to C22 alcohols alkoxylated with 10 to 20 moles of alkylene oxide, C10 to C20 alcohols, or mixtures thereof. Advantageously the nonionic stabilising agent is a linear C8 to C22 alcohol alkoxylated with 5 to 40 moles of alkylene oxide, preferably 10 to 20 moles of alkylene oxide.

When present, the level of the nonionic stabiliser is preferably within the range of from 0.1 to 10% by weight, more preferably from 0.5 to 5% by weight.

OTHER OPTIONAL INGREDIENTS

The composition of the invention can also contain fatty acids, for example C8 to C24 alkyl or alkenyl monocarboxylic acids or polymers thereof. Preferably saturated fatty acids are used, in particular, hardened tallow C16 to C18 fatty acids. Preferably the fatty acid is non-saponified, more preferably the fatty acid is free, for example oleic acid, lauric acid or tallow fatty acid. Preferably the molar ratio of fatty acid to cationic fabric softening agent is less than 1:1.

The compositions may include silicones, such as predominately linear polydialkylsiloxanes, e.g. polydimethylsiloxanes; soil release polymers such as block copolymers of polyethylene oxide and terephthalate; amphoteric surfactants; smectite type inorganic clays; zwitterionic quaternary ammonium compounds; sunscreens, enzymes, antioxidants and metal chelators.

The compositions may also include an agent which produces a pearlescent appearance, e.g. an organic pearlising compound such as ethylene glycol distearate, or inorganic pearlising pigments such as microfine mica or titanium dioxide ($TiO2$) coated mica.

Other optional ingredients include emulsifiers, electrolytes (for example, sodium chloride or calcium chloride) preferably in the range from 0.01 to 5% by weight, pH buffering agents, perfumes (preferably from 0.1 to 5% by weight, and germicides.

EXAMPLES

The invention will now be illustrated by the following non-limiting examples. In the examples all percentages are expressed by weight. Further modifications within the scope of the present invention will be apparent to the person skilled in the art.

(i) Dye Transfer Performance

Method: Pieces of fabric were washed and rinsed twice in a Terg-O-Tometer™. A main wash powder without bleach, enzymes or perfume was used for the washes, and a liquid rinse conditioner used for the rinses. This rinse conditioner was either without polymer (control), or with the addition of 0.5% by weight of Dye Transfer Inhibition polymer.

The fabric loads used in the wash/rinse cycles were as follows:

Wash/rinse (1): 3 squares (10 cm x 10 cm) of woven cotton fabric dyed with 1% by weight of fabric of Direct Red 80 dye, 3 squares (10 cm x 10 cm) of white cotton sheeting.

Wash/rinse (2) 2: The load from wash/rinse (1) plus a further 3 (10 cm x 10 cm) squares of white cotton sheeting.

The wash cycle was carried out at 40°C, with 500 cm^3 water and 2.5 g of detergent powder, for 20 minutes. After washing, the fabric was wrung out then transferred to a rinse of 500 cm^3 water plus an amount of rinse treatment as specified below, at 22°C for 15 minutes.

After each wash/rinse cycle, the fabric squares were dried then the reflectance spectra of the white squares were measured using a reflectometer. The results are expressed as ΔE values relative to the original unwashed fabric, determined using the CIELAB™ system. These show the change in colour of the white squares caused by dye transferring from the red to the white fabric. The white squares that were present in both cycles show (on their first reading) the amount of dye that was transferred during the first wash cycle, and (on their second reading) the amount of dye transferred during the combined cycles, taking account of the fact that some dye will have been lost during the second wash. The white squares that were present only in the second cycle show the amount of dye transferred during the second wash/rinse cycle alone.

This method was used with the two following rinse conditioner compositions, in which the numbers denote percent of composition by weight:

	EXAMPLE 1	EXAMPLE 2
HEQ[1]	3.94	-
DEEDMAC[2]	-	3.65
IPA[3]	1.26	0.66
Tallow Fatty Acid	0.66	0.09
Coco 20EO nonionic	-	0.1
Rhodorsil™ Antifoam[4]	-	0.05
Perfume		0.32
Water	94.14	95.13
TOTAL	100.00	100.00
Dose used per rinse (cm^3)	1.3	1.36

[1] HEQ is 1,2 bis[hardened tallowyloxyl]-3-trimethyl ammonium propane chloride, (ex Hoechst).

[2] DEEDMAC is Di[2-(hardened tallowoyloxy)ethyl] dimethyl ammonium chloride, (ex Kao).

[3] IPA is Isopropanol.

[4] Rhodorsil Antifoam, (ex Rhone Poulenc).

Results

		Composition Example 1		Composition Example 2	
		Control (no copolymer)	With 0.5% copolymer[5]	Control (no copolymer)	With 0.5% copolymer[5]
White cloths present in both cycles	ΔE after first cycle	22.19	20.53	24.06	22.0
	ΔE after second cycle	20.89	18.99	21.43	19.85
White cloths present in second cycle only	ΔE after second cycle	15.79	12.96	16.49	12.61

[5] Copolymer is PVI:acrylic acid (AA); VI:AA mole ratio 70:30, K value 38.6.

(ii) Stability Data

Method:

100 ml of the rinse conditioner liquid was poured into a 100 ml measuring cylinder and stability measured according to whether the liquid remains homogeneous for the total height of the cylinder. If unstable, the liquid phase separates so that a clear layer is seen at the top or bottom of the measuring cylinder.

This method was used with the following rinse conditioner formulations:

	Ex 3	3a	3b	4	5	5a
Arquad™ 2HT[7]	5.9%	5.9%	5.9%	6.5%		
Deedmac					14%	14%
Accosoft™ 460[6]				18%		
HTFA	0.39	0.39	0.39			
COCO 20EO				1.0%	3.0%	3.0%
PVI/AA[5]	0.4%	0.2%	0.1%	0.5%	0.5%	0.9%
Water+minors	up to 100%					

[6] Accosoft 460 is methyl bis(tallowamidoethyl)2-hydroxyethyl ammonium methyl sulphate, in which tallow is 60% saturated, 40% unsaturated (ex Stepan).

[7] Arquad 2HT is dihardened tallow dimethyl ammonium chloride (ex Akzo).

HTFA = hardened tallow fatty acid.

Examples 3, 3a and 3b were stable after 7 days storage at ambient temperature and a further 7 days at 4°C and 45°C.

Example 4 was stable and did not show any visible phase separation upon storage for 2 months at ambient temperature.

Examples 5 and 5a were stable after 2 months and 3 months respectively at ambient temperatures.

Comparative Examples

	Example A	Example B
Arquad 2HT[7]	5.9%	5.9%
HTFA[8]	0.39%	0.39%
PVI[9]	0.15%	0.3%

[8] HTFA is hardened tallow fatty acid.

[9] PVI is polyvinylimidazole.

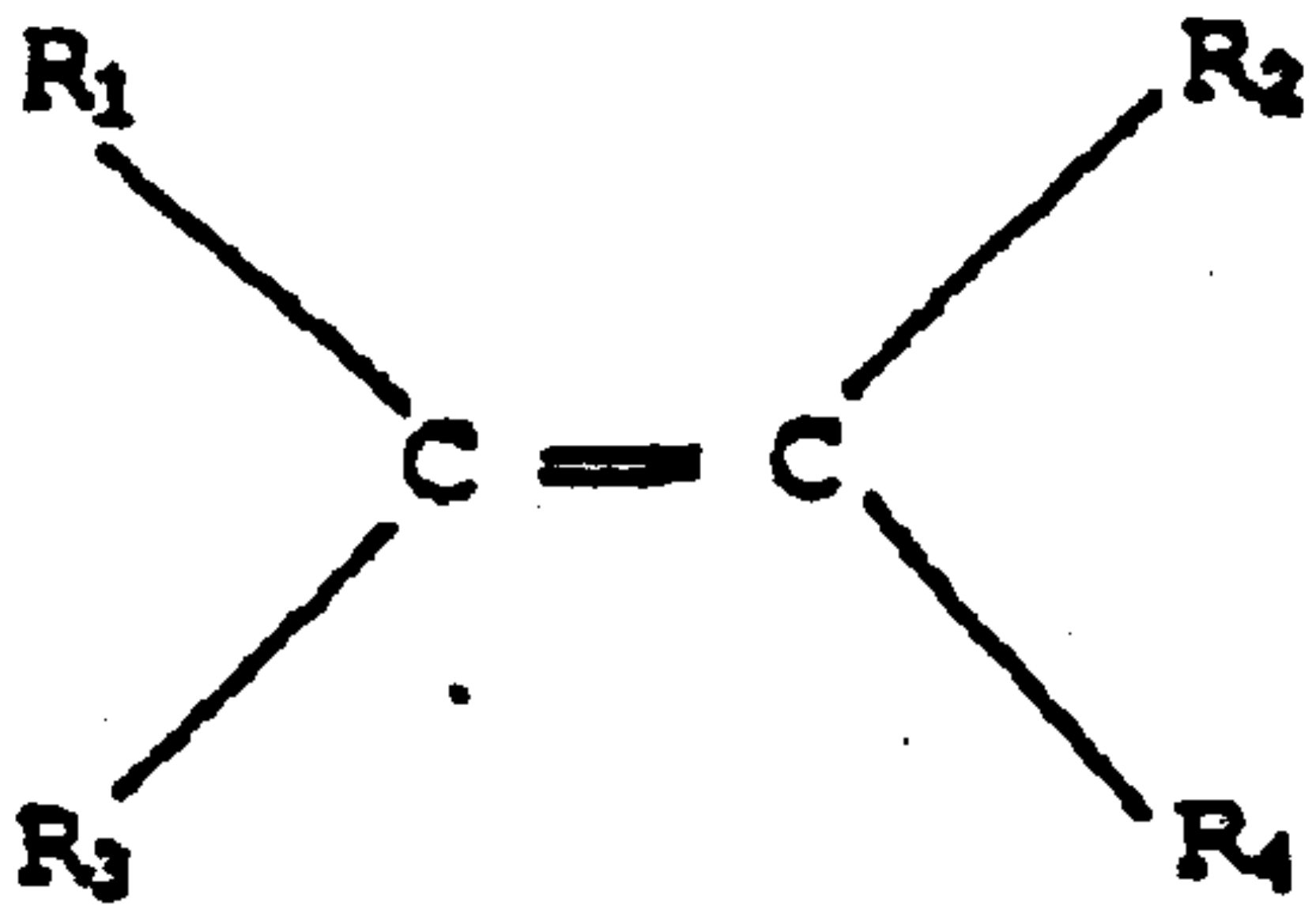
Example A displayed phase separation after 1 day at ambient temperature and Example B displayed phase separation after 4 days at ambient temperature.

CLAIMS

1. A fabric conditioning composition comprising at least one substantially water insoluble cationic fabric softening agent and a copolymer characterised in that the copolymer comprises both monomers a) and b)

   a) a negatively charged monomer of formula (I) having at least one carboxylate group:

   (I)



   wherein R_1, R_2, R_3, and R_4 are independently selected from H, or a C_1-C_4 alkyl group or a $(CH_2)_nCOOR_5$ in which n is an integer between 1 and 6 or is 0 and R_5 is H or a C_1-C_4 alkyl group, and wherein at least one of R_1, R_2, R_3, and R_4 is a $(CH_2)_nCOOH$ group, and

   b) a vinyl substituted heterocyclic monomer containing at least one nitrogen atom.

   and wherein the mole ratio of a):b) is 20:80 to 50:50.

2. A fabric conditioning composition according to claim 1 wherein the nitrogen atoms in the vinyl substituted heterocyclic monomers are not quaternised.

3. A fabric conditioning composition according to either of claim 1 or claim 2 wherein the negatively charged monomer a) comprises acrylate or methacrylate.

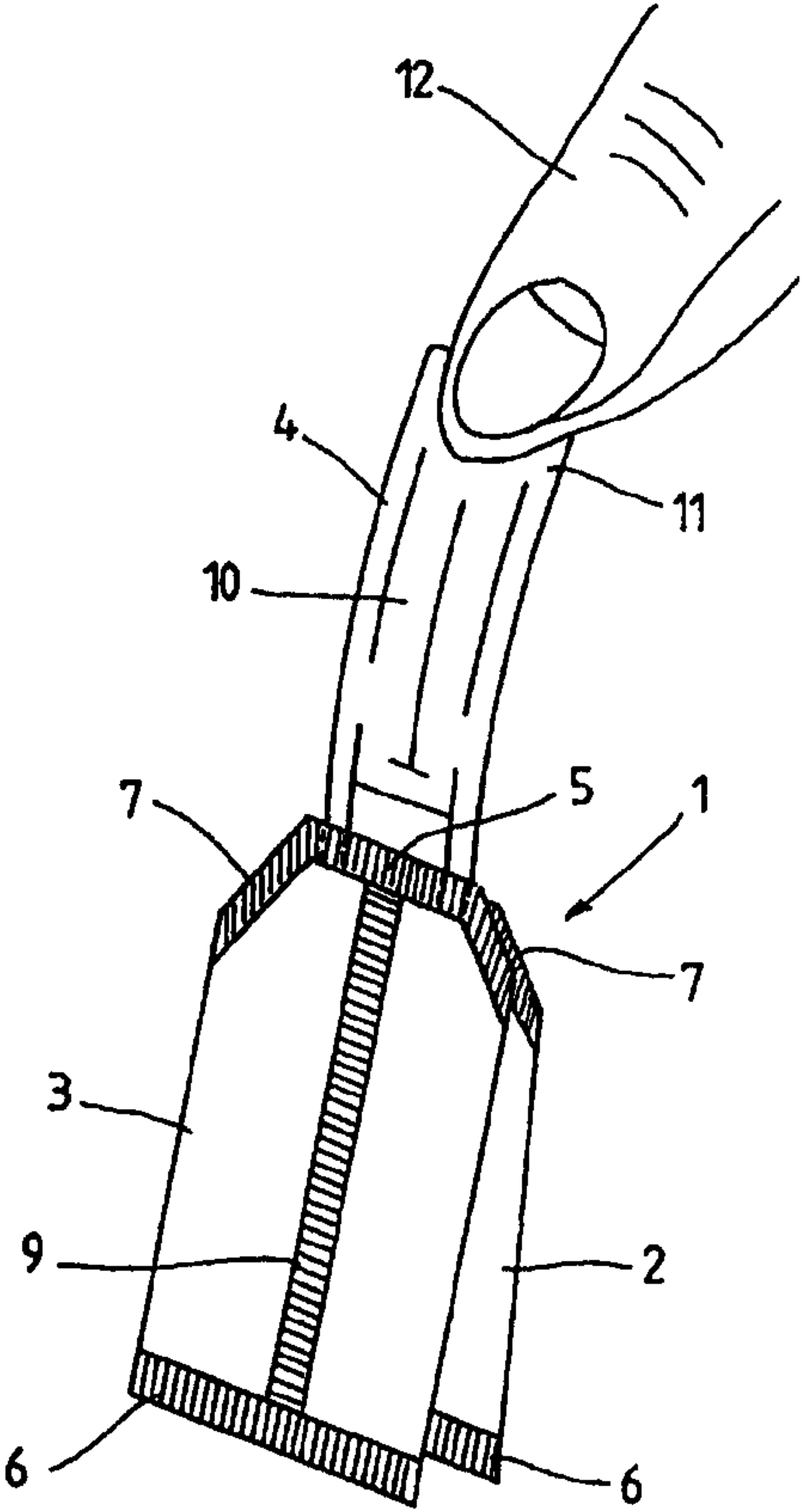
4. A fabric conditioning composition according to any one of claims 1 to 3 wherein the vinyl substituted heterocyclic monomer b) comprises N-vinyl imidazole.

5. A fabric conditioning composition according to any one of claims 1 to 4 in which the mole ratio of the negatively charged monomer a) to heterocyclic monomer b) lies in the range 25:75 to 45:55.

6. A fabric conditioning composition according to any one of claims 1 to 5 in which the copolymer further comprises a neutral monomer and wherein the neutral monomer is an ester of the negatively charged monomer a) defined in claim 1.

7. A fabric conditioning composition according to any one of claims 1 to 6 in which the copolymer is present in an amount from 0.025% to about 5% by weight.

8. Use of the copolymer as defined in any one of claims 1 to 7 as a dye transfer inhibiting copolymer in a fabric conditioning composition, wherein the copolymer does not cause de-stabilisation.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