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(54) **Fabric softening compositions containing clays.**

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Description

This invention relates to fabric treatment compositions comprising cationic fabric softeners and clays having a low ion-exchange capacity. In more detail, this invention relates to the utilization of conventional fabric softeners in combination with clays having a low ion-exchange capacity and a specific surface area to provide textile treatment benefits not achieveable from conventional fabric-softener technologies containing cationic surface actives, if desired in combination with "detergent" clays. The term "detergent" in this context refers to clays such as montmorillonites which are well known to provide through-the-wash fabric benefits inclusive of softening. The technology herein can be embodied in various physical forms inclusive of liquid, paste and solid, and if desired, substrate-like compositions. The technology was found to be particularly beneficial for use in concentrated or conventional liquid rinse softeners.

The claimed compositions are capable of delivering enhanced softening performance as compared to what can be obtained from known fabric softener compositions. Another significant benefit originates from the dry, non-greasy, feel conferred by the claimed compositions as compared to a greasy-lubricated feel of textiles treated with conventional rinse softeners.

The clay compound can also provide desirable carrier properties for components which otherwise could not be effectively brought to the fiber to provide benefits e.g. aesthetics which are permanent in between successive laundry treatments.

Background of the Invention

The use of clays in textile treatment, particularly cleaning compositions, is well-known and has found commerical application.

The use of water-insoluble detergent additives, inclusive of clays, can, based on the mechanism by which these additivies exhibit their textile treatment functionality, abitrarily be categorized in two distinct classes, namely those which derive intrinsic softness benefits from compression or slipping of clay-platelets lubricated by the water in the inter-layers having an ion-exchange capacity above 50 meg/100 g, and composite textile benefits derived from spherical particles which do not exhibit ion-exchange properties and which act by virtue of a quasi-"roller-bearing" effect.

The clay-platelet prior art is represented by a large number of publications, some examples of which are referred to below. The use of collodial bentonites in synthetic detergent compositions, built or unbuilt, intended for the washing of hair, textiles, or hard surfaces, is known from British Patent No. 401,413, to Marriott.

British Patent No. 1,440,898, to The Procter & Gamble Company, also discloses the use of smectite-type clays in granular, built, laundry detergent compositions to provide through-the-wash fabric softening and/or anti-static benefits.

Comparable technology is also known from U.S. Patent No. 3,033,699, to du Pont de Nemours and Co.; it pertains to compositions and processes for improving antistatic properties of synthetic fibers with the aid of an aqueous suspension of a magnesium montomorillonite and colloidal silica.

U.S. Patent No. 3,886,075, to The Procter & Gamble Company, discloses the detergent utilization of particular smectite clays and cationic antistatic agents, in combination with amino-compatibilizing agents, thus providing cleaning and other desirable benefits, inclusive of softening. Comparable disclosures are also known from European Patent Application No. 80200878.9, to the Procter & Gamble Company; U.S. Patent No. 4,292,035, to The Procter & Gamble Company; and U.S. Patent No. 3,594,212, to General Mills, Inc.

The above clay-platelet state of the art is exemplified in the use of montmorllonites, smectites and comparable clays having significant ion-exchange capacities, as referred to above.

The water-insoluble additive art relative to particles having no ion-exchange capacity is represented by U.S. Patent No. 3,861,870, to The Procter & Gamble Company; it discloses a fabric softening composition containing a cation-active softening agent and substantially water-insoluble particulate materials which are free from exchangeable calcium and magnesium ions. The fiber-benefits are derived from the geometry and can be visualized as a quasi "roller-bearing" effect. The spherical geometry of the water-insoluble materials is defined with the aid of an anisotropy of from 5:1 to 1:1.

GB—A—2104540 discloses softening-through-the-wash detergent compositions containing metaleaolus.

The clay-detergent prior art is silent and non-suggestive concerning the utilisation of clays in rinse softener compositions and further is, at least implicitly, possessed of the principle that low ion-exchange capacity clays such as kaolins would not deliver textile benefits comparable to e.g. detergent smectites.

It was now discovered that kaolin-type clays can deliver remarkable textile treatment benefits upon incorporation into rinse softener compositions containing cationic surface active agent. The benefits and the parameter limitations of the claimed technology are explained in more detail hereinafter.

Summary of the Invention

The present invention provides rinse-added liquid fabric rinse softener compositions comprising from 2 to 25% by weight of a cationic fabric softener; from 0.1 to 10% by weight of a clay having an ion-exchange capacity from 2 to 35 meg/100 g and a specific surface area from 2 to 100 m^2/g, preferably 4 to

25 m^2/g; and from 40% to 98%, preferably from 65% to 98%, by weight of a liquid carrier and conventional additives, whereby the weight ratio of the cationic fabric softener to the clay lies in a range from 1:1 to 80:1, preferably from 2:1 to 25:1.

The present invention also contemplates rinse or dryer-added solid treatment compositions in particular compositions which are deposited onto a water-insoluble e.g. sheet-like carrier for use in e.g. hot air dryers.

Unless indicated to the contrary, the "percent" indications hereinafter stand for "percent by weight". In the following description, the terms "fabric softener" and "textile treatment" are used interchangeably.

Detailed Description of the Invention

The invention herein relates to fabric treatment technology comprising, in its broadest scope, a binary ingredient combination, namely a cationic textile treatment agent, and a clay having a low and narrowly defined ion-exchange capacity and a relatively low specific surface-area. These main parameters as well as preferred and optimized executions of the invention are described and illustrated in more detail in what follows.

The Cationic Component

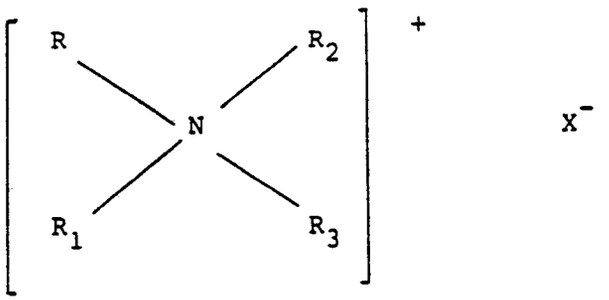
The cationic textile treatment component can be represented by all cationic surface-active agents which are known to be suitable for use in textile-treatment compositions and have found application in this field of technology. Particularly well-known in this respect are fabric softener/liquid textile treatment compositions for use in the rinsing step of an automatic washing machine operation.

In the liquid fabric treatment compositions herein, the cationic ingredient represents from 2% to 25% whereby the weight ratio of cationic ingredient to clay is in the range from 1:1 to 80:1.

In one execution of the preferred liquid fabric softener compositions, the cationic fabric softener represents from 4% to 8% whereas in another preferred, and more concentrated, execution, the cationic ingredient represents from 12% to 18% of the liquid textile treatment composition.

The weight ratio of cationic fabric softener to low ion-exchange clays in the most preferred liquid softening compositions is in the range from 2:1 to 25:1.

Suitable cationic ingredients herein are know textile-treatment components. Many of the like ingredients have found commercial application. Generally, the cationic ingredient is a nitrogen-containing material such as quarternary ammonium compounds and amines and have one or two straight-chain organic groups of at least eight carbon atoms. Preferably, they have one or two groups of from 12 to 22 carbon atoms. Preferred cationic components include the quarternary ammonium softener compounds corresponding to the formula:



wherein

R is hydrogen or an aliphatic group from 1 to 22 carbon atoms;

R_1 is an aliphatic group having 12 to 22 carbon atoms;

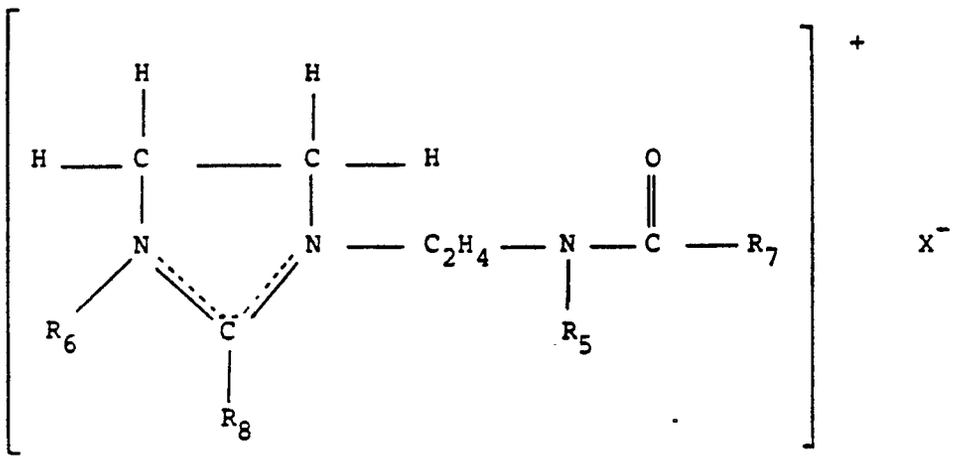
R_2 and R_3 are each alkyl groups of from 1 to 3 carbon atoms; and

X is an anion selected from halogen, acetate, phosphate, nitrate and methyl sulfate radicals.

Cation-active amines, namely primary, secondary and tertiary amines, having, at least, one straight-chain organic group of from 12 to 2 carbon atoms can also be used. A well-known example of diamines useful herein is tallow-N,N',N'-tris(2-hydroxyethyl)-1,3-propylenediamine. This diamine will be protonated depending upon the pH and qualifies as a cationic in the meaning of the claimed technology.

Preferred amines of this class are ethoxyamines, such as monotallow-dipolyethoxyamine, having a total of 2 to 30 ethoxygroups per molecule. A useful species of this class is C_{16-18}-alkyl-N-bis(2-hydroxyethyl)amines.

Other suitable cationic ingredients herein are the quaternary imidazolinium salts. Preferred salts are those conforming to the formula:



wherein

R_6 is an alkyl containing from 1 to 4, preferably from 1 to 2, carbon atoms,

R_5 is an alkyl containing from 1 to 4 carbon atoms or a hydrogen radical,

R_8 is an alkyl containing from 1 to 22, preferably at least 15, carbon atoms,

R_7, an alkyl containing from 8 to 22, preferably at least 15, carbon atoms, and

X is an anion, preferably methyl sulfate or chloride ions.

Other suitable anions include those disclosed with reference to the cationic quaternary ammonium fabric softeners described hereinbefore. Particularly preferred are those imidazolinium compounds in which both R_7 and R_8 are alkyls of from 12 to 22 carbon atoms, e.g., 1-methyl 2-tallow 3-tallowamidoethyl imidazolinium methosulfate.

Other cationic quartenary ammonium fabric softeners, which are useful herein include, for example, alkyl (C_{12} to C_{22})-pyridinium chlorides, alkyl (C_{12} to C_{22})-alkyl (C_1 to C_3)-morpholinium chlorides, and quarternary derivatives of amino acids and amino esters.

The cationic fabric softeners mentioned above can be used singly or in combination in the practice of the present invention.

The Clay Component

The essential clay component is presented in the compositions of the invention at levels from 0.1% to 10%, which amount varies depending upon the level of the cationic textile treatment agent.

In one preferred liquid formulation containing from 4% to 8% of the cationic fabric softener, the clay represents 0.1% to 0.5%, whereas in a more concentrated liquid execution containing from 12% to 18% of said cationic fabric softener, the clay ingredient can represent from 0.5% to 3.5%.

Clays generally are essentially alumino-silicates which can be crystallized in a variety of mineral structures.

They differ in chemical and physical properties, like cation-exchange capacity and specific surface area.

Clay minerals usually contain besides the alumino-silicate hydrous silicates of less abundant metal elements, inclusive of Mg, Fe and others. They are crystallized in layer structures. Their operability for use in the instant compositions is defined via:

(1) an ion-exchange capacity from 2 to 35 meq/100 g; and

(2) a specific surface area from 2 to 100 m^2/g, preferably 4 to 25 m^2/g.

Clay minerals can carry an excess of negative electric charge owing to internal substitution by lower valent cations. The exchangeable cations are held by weak electrical forces and more or less easily replaceable by others. No structural change in the mineral is involved as a result of the exchange. The ion-exchange is stoichiometric in nature, namely for each cation taken up from the medium, an equivalent amount of ion is released into the medium.

The cation-exchange capacity is measured in terms of milliequivalents per 100 g of clay. This is done with the aid of well-known techniques, such as: electrodialysis; exchange with ammonium ion followed by back titration; or the methylene blue procedure. A typical cation exchange reaction may be expressed as follows:

$$(clay)Na + NH_4OH \rightarrow (clay)NH_4 + NaOH$$

The ammonium ion back titration is frequently used and can be carried out in accordance with the operational mode in "The Chemistry and Physics of Clays", Interscience, 1971, pages 264—265.

The ion-exchange capacity of the clays herein is in the range of from 2 to 35 meq/100 g. These clays can, in fact, be termed as "low-ion-exchange" clays.

It is believed that the relatively low surface-charge as compared to e.g. montmorillonite varieties, generates an optimized clay-cationic coaction to provide unexpected fiber benefits. The like benefits are not achievable in the event the cationic softener is strongly linked to clays such as e.g. montmorillonites having relatively higher surface-charge.

The specifice surface area is the geometrical surface area per unit of volume. The method usually applied for the determination of this parameter is that proposed by Brunauer, Emmett and Teller, disclosed in "Physical and Chemical Aspects of Absorbents and Catalysts", Academic Press, 1970, p 21, 22, 23. It is known as the BET Method; the data are generated via the adsorption of nitrogen on solid substances.

The particular shape of the clays of the invention leads to a low surface-to-volume ratio, i.e., a low specific surface area.

The clay can, therefore, be more completely surrounded by cationics, and possibly spherical particles are formed, which can easily deposit onto the fabric. The clay component herein has a specific surface area from 2 to 100 m^2/g, preferably from 4 to 25 m^2/g.

Clay species particularly suitable for use herein include: kaolin, illite clays such as muscovite and mica, talc, and mixture of these clays.

Another useful property of the clays herein is that they can serve as carrier for optional substances that, in the context of prior art fabric softener technology, could not be effectively deposited onto the fabrics from an aqueous rinse in part because these compounds are quite soluble in water. These optional components usually serve to augment and improve known fiber benefits and include, for instance, short chain di- or polyfunctional alcohols such as glycerol or ethylene glycol, short chain amines such as triethanolamine, and hydrophilic polymers, e.g., polyethylene glycol, polyethyleneimine. Generally these compounds provide good softness properties to cotton fabrics if applied directly to the fabrics by a spray-on technique, or by immersing the fabrics in concentrated solutions of said compounds. They could up to now not be effectively deposited onto fabrics under conventional rinse conditions. Clays are known to form complexes with compounds of the type mentioned above, some of these complexes are described, for instance, in "The Chemistry of Clay Organic Reactions" by B. & C. Theng, A. Hilger 1974. In these complexes the organic compounds are believed to be adsorbed between the layers of the clay material. In this way these organic compounds can be deposited together with the clay to the fabrics where the optional component will exhibit the particular benefits. The weight ratio of clay carrier to component deposited thereon is preferably in the range of from 1:5 to 6:1, most preferably from 1:2 to 1:1.

The clay can also help the fabric deposition of other materials such as perfume, germicidal agents and other optional components for fabric softener compositions which (optimals) are usually present in sub-additive levels e.g. below 2%.

The carrier combination i.e. the clay and the optional component deposited thereon, are prepared separately, i.e., before being incorporated into the claimed compositions, by known means inclusive of mixing the additive and the clay.

Optional Ingredients

The compositions of this invention can contain, in addition to the essential components described in more detail hereinbefore, all kind of matrix ingredients, compatibilizing agents and optional performance additives with a view to facilitate the utilization of the technology by e.g. the housewife, to enhance and facilitate the industrial processing of optimized executions, and also to augment and improve desirable performance benefits. The like additives and optional ingredients are represented by well-know ingredients and ingredient mixtures, which are used for their known functionality in the art established levels. Non-limiting examples of useful optional ingredients are listed hereinafter.

The compositions herein frequently comprise inert matrix ingredients, fillers and/or liquid carriers. Matrix ingredients/fillers can generally comprise all neutral liquid or solid, frequently inert extenders, such as sodium sulfate, saccharose and possibly mixtures of polyphosphates and sodium-sulfate. In the liquid execution herein, the binary active system is stably incorporated and/or dispersed and/or suspended with the aid of from 40% to 98%, preferably 65% to 98% of a liquid carrier and additives. Suitable liquid carriers comprise water, lower aliphatic alcohols, especially ethanol, isopropanol, n-propanol, propanediol, hexanol, hexylene glycol, pentanol, isobutanol, as well as aromatic alcohols, like phenoxyethanol, benzyl alcohol, phenylethylalcohol, C_{1-18}-alkyl phenols ethoxylated with 2 moles of ethylene oxide, and mixtures thereof.

In order to increase the solubility of the cationic ingredient in the organic solvents, aromatic adjuncts could be added; preferred adjuncts of the acid, ester, ketone or phenol types include benzoic acid, m-chlorobenzoic acid, p-toluic acid, hydrocinnamic acid, salicyclic acid, benzyl benzoate, benzyle salicylate, trichlorophenol, benzophenone, benzene sulfonic acid and C_{1-18}-alkyl benzene sulfonic acid.

In addition to the cationic textile treatment agent, the compositions can also contain nonionic fabric softeners such as those described in German Offenlegungschrift 26 31 114, preferably fatty acid esters of polyhydric alchols having up to 8 carbon atoms. Examples of the like esters include sorbitan esters and glycerol esters such as sorbitan monostearate, sorbitan monooleate, glycerol mono-di- and tri-fatty acid esters wherein the acid is selected from stearic, oleic, lauric, capric, caprylic, caproic, valeric, butyric, propionic and acetic acid; an individual glycerol can be esterified by identical fatty acid groups or by mixed esters e.g. glycerol monostearatedioleate. Polyethyleneglycol esters of fatty acids such as monooleate,

dioleate, monolaurate and monostearate, wherein the polyethyleneglycol moiety has a molecular weight in the range from 200 to 400 are also included in that class. Fatty acid esters of monohydric alcohols having at least 4 carbon atoms such as isobutyl stearate and ethyl hexyl stearate can also be useful.

Additional nonionic fabric softeners which can be used are: glycerol, diglycerol, ethylene glycol, propylene glycol, diethylene glycol, dipropylene glycol, dihexylene glycol, polyethylene glycol (MW 200—100.000), polypropylene glycol (MW 200—100.000), polyvinylalcohol, polyoxyethylenepolyoxypropylene copolymers, polypropylene glycol (MW 900), glucose methylether, butyldiglycolether, diethyleneglycolmonobutylether, propyleneglycolmonoethyl or ethyl ether, ethylene carbonate, propylene carbonate.

Alkylpolyglucosides of the general formula $R^2O(C_nH_{2n}O)_t(glucosyl)_x$ wherein R^2 is alkyl, alkylphenyl, hydroxyalkyl, hydroxyalkylphenyl and mixture thereof wherein the alkyl chain has from 8 to 18 carbon atoms, t is from 0 and 2 and x from 2 to 7, can also be used in the composition. These glucosides exhibit desirable solvent properties and in addition can confer fiber benefits such as softness.

Lanolins and derivatives and paraffins having from 16 to 30 carbon atoms constitute another example of non-ionic softeners which can be used if desired.

Low melting oils from animal, vegetable or mineral origin are representative of this class of softeners. Carnation oil®, Jojoba oil® and Sunflower oil are specific examples which are found to work.

Other optional ingredients for improving the textile softness can be selected from mono-, di- and triethanolamine, triethanolaminemono-, di- and triglycolether, hydrochlorosalts of the above amines, polyethyleneimine, N-alkyl polyethyleneimine and N-alkylamine oxides, ethoxylated polyfunctional amines such as polyethoxytetraethylene pentamine (90 times ethoxylated).

The like nonionic textile treatment agents, can be used in liquid softener compositions in levels which do not exceed the level of cationic textile treatment agent.

The liquid compositions herein can also contain viscosity control agents such as calcium chloride and/or magnesium chloride at levels of from 100 to 2000 ppm.

The compositions may contain silicones such as described in DE—A—26 31 419. These materials can provide further benefits inclusive of ease of ironing and anti-wrinkling. The optional silicone component can be used in an amount of from about 0.1% to about 4%, preferably from 0.4% to 3% of the softener composition. Preferred silicones include aminosubstituted silicones, cationic silicones and non-substituted polydimethylsiloxanes. The silicone ingredient is frequently represented by a pre-emulsified silicone whereby the emulsifier can be represented by all kind of ionic and nonionic species. Highly ethoxylated fatty acid esters is one known class of suitable emulsifiers.

Other optional ingredients for use in the inventive compositions include emulsifiers, perfumes, preservatives, germicides, dyes, bactericides, stabilizers, brighteners, opacifiers, photoactivators, soil release agents and anti-yellowing agents. These additives are normally incorporated at their conventional low levels e.g. from about 0.001% to 5%.

Suitable preservatives are frequently used in levels from 0.001% to 0.3% and can be represented by 2-nitro-2-bromopropane-1,3-diol, glutaraldehyde, and 2-methyl-4-isothiazolin-3-one and its chloro-derivative.

Photoactivators such as sulfonated-Zn-phthalocyanine and those disclosed in EP—A—0.003.149 can be used in e.g. levels from 10 ppm to 2000 ppm.

Depending upon the exact formulation parameters of a given product execution, the sum of matrix ingredients, solvents, additives and other optional ingredients can vary over a very broad range e.g. from 0% to 98%.

While a major illustration in the context of this invention is directed to aqueous based liquid rinse added softener, it is understood that the combination of low ion-exchange clay and cationic can also be utilized in delivering a fabric conditioning effect via other ways of incorporation. In all cases the broad range of clay/cationic combinations still apply although the preferred ratios of clay to cationic and choice of type and level of additives will depend on the form of the softening agent and its desired physical and chemical properties. Some examples of alternative forms of the clay/cationic softening agent are as follows (not in any way meant to be all encompassing).

1. *A granular or powdered composition* of this invention can be produced by, for example spray cooling/drying, granulation, agglomeration or extrusion. This execution can for example be added directly into the final rinse or predispersed in water before use in which case dispersibility is a key desired attribute. A key criteria is to maintain the product free flowing at all times and is generally achieved when the clay/cationic with optional additives, has a softening point above normal room temperature, normally above 30—35°C.

2. *A substrate execution* where the softening composition is impregnated in or coated onto non-woven or foam substrates or contained within a pouch or sachet.

In the case of a substrate, the product can be added via the wash or into the hot air clothes dryer. Product characteristics are chosen to give a good balance between non-greasy/non-sticky product feel and good release in the wash/dryer.

In the case of product contained within a pouch or sachet, the key product characteristic desired is dispersibility with the release behaviour controlled by the material or sealing of the pouch/sachet. Examples of

the substrate are non-woven polyester or rayon with wood pulp, of the foam-polyether or polyurethane and of the pouch — polyvinyl acetate.

By way of illustration, ingredient ranges for solids and substrate executions herein are as follows:

INGREDIENT		% BY WEIGHT RANGE
— Binary active mixture		10—99
consisting of:	— clay 10—50%	
	— cationic fabric softener 90—50%	
— Additives and processing aids		90—1
inclusive of:	— polyethylene glycol 0—10%	
	— brightener 0—5%	
	— aesthetics 0—5%	
	— photoactivator 0—1000 ppm	
	— germicide 0—2%	

Example I

A concentrated liquid fabric softener was prepared having the composition listed hereinafter. The ditallowdimethyl ammonium chloride was molten and, at 65°, mixed with the imidazolinium material, the ethoxylated amine, the phosphoric acid and the kaolin. This premix was injected, under vigorous stirring, in a waterseat having a temperature of about 60°C.

Ingredients	Parts by weight
Ditallowdimethylammonium chloride	13
1-Methyl 2-tallow 3-tallowamidoethyl imidazolinium methosulfate	3
Monotallow di(polyethoxy)amine*	0.5
Kaolin**	1.5
Phosphoric acid	0.1
Water, $CaCl_2$ and minor ingredients	balance to 100

* containing in total 20 ethoxy-groups.
** having an ion-exchange capacity of 6 meq/100 g and specific surface area of 14 m^2/g.

The above composition was easily pourable, at ambient temperature, after preparation and after prolonged storage. It showed excellent phase stability and homogeneity after a one month storage at room temperature.

This composition, upon use in the rinsing step of an automatic washing machine, was found to impart superior textile softening properties compared to what was obtained from a conventional, non-kaolin-containing rinse softener.

Comparable results are obtained by the replacement of the kaolin in the above formula by an equivalent level of an illite clay, selected from:

mica : having an ion-exchange capacity of 19 meq/100 g and a specific surface area of 4 m^2/g.
muscovite: having an ion-exchange capacity of 25 meq/100 g and a specific surface area of 5 m^2/g.

Substantially identical textile benefits are also secured by the replacement of the kaolin in the above composition by an equivalent level of talc, having an ion-exchange capacity of 2.4 meq/100 g and a specific surface area of 17.6 m^2/g.

The following compositions were prepared as described in Example I.

INGREDIENTS	Composition in parts by weight							
	Comp. A	Ex. II	Comp. B	Ex. III	Comp. C	Ex. IV	Ex. V	Comp. D
Ditallowdimethylammonium chloride	13	13	13	13	13	13	13	13
1-Methyl 2-tallow 3-tallowamido-ethyl imidazolinium methosulfate	3	3	3	3	3	3	3	3
Monotallowdi (polyethoxy)-amine *	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Kaolin (1)		1.5		0.75		1.5	1.5	
Bentonite (2)					0.75			
Triethanolamine hydrochloride	3	3		1.5	1.5			
Polyethyleneglycol (3)						1.5		
Glycerol							1.5	3.0
Phosphoric acid	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Water & Minor additives	balance to 100							

* containing in total 20 ethoxy-groups.

(1) having an ion-exchange capacity of 6 meq/100 g and a specific surface area of 14 m2/g.

(2) having an ion-exchange capacity of 70 meq/100 g and a specific surface area of 600 m2/g.

(3) having a molecular weight of 6000-12.000.

The above compositions were evaluated thereby using the following softness test:

A bundle of mixed fabrics and terry cotton test swatches was washed in a commercial washing machine, with detergent in the washing cycle, and subsequently rinsed thereby using 40 grams of the liquid softening composition followed by line drying. The softness of the terry cotton swatches so treated were comparatively measured. The softness difference between the various swatches was evaluated on 4 replicates, in paired comparisons, by 2 expert judges thereby using a 0—4 scale (psu) whereby:

0 means: there is no difference
1 means: I think there is a difference
2 means: I know there is a difference
3 means: I know there is a big difference
4 means: There is a very large difference.

The composition of Example II was found to be significantly superior as compared to prior art Composition A.

	Softness Performance (psu)
Composition A	Reference
Example II	+ 1.0

Other comparisons referring to the listed compositions gave the following results:

	Softeness performance (psu)	Least Significant difference L.S.D.
- Composition B	Reference	-
- Example I	+ 0.3	0.2
- Example III	+ 0.5	0.4
- Composition C	- 0.1	-
- Example IV	+ 0.3	0.3
- Example V	+ 0.5	0.2
- Composition D	- 0.1	-

The testing evidence shows that the compositions of the invention provide remarkable softening benefits compared to prior art softening compositions containing no clay or quasi-art executions containing a bentonite clay.

Another series of concentrated liquid fabric softeners having the compositions given hereinafter are prepared.

INGREDIENTS	Parts by weight: Ex. VI	Ex. VII	Ex. VIII	Ex. IX	Ex. X	Ex. XI
Ditallowdimethylammonium chloride	15	13	13	14		10
1-Methyl(2-hydrogenated tallow)3-tallowamidoethyl imidazolinium methosulfate		3	3	2		
Monotallow di(polyethoxy)amine *		0.5	0.25	0.5		
Kaolin (a)	3.0				1.5	1.5
Muscovite (b)			1.5	0.75		
Talc (c)		0.75				
1-Methyl(2-tallow)3-tallowamido ethyl imidazolinium methosulfate					15	
Dicocoyl dimethylammonium chloride						5
Water and minor ingredients	balance to 100					

* containing in total 20 ethoxy-groups.

(a) having an ion-exchange capacity of 6meq/100 g and a specific surface area of 14 m2/g.

(b) having an ion-exchange capacity of 25meq/100 g and a specific surface area of 5 m2/g.

(c) having an ion-exchange capacity of 2.4meq/100 g and a specific surface area of 17.6 m2/g.

The compositions of Ex VI, Ex VII and Ex VIII were tested and were found to exhibit excellent textile treatment benefit as compared to conventional liquid treatment softeners.

Further examples of the invention are formulated having the compositions indicated below.

INGREDIENTS	Parts by weight						
	Ex. XII	Comp. E	Ex. XIII	Ex. XIV	Ex. XV	Comp. F	Ex. XVI
Di-tallowdimethylammonium chloride	15	13	13	15	13	10	12
1-Methyl(2-tallow)3-tallow-amidoethyl imidazolinium methosulfate		3	3		3	5	2
Monotallowdi(polyethoxy)-amine *		0.5	0.5		0.5	1	0.25
Kaolin (a)	1.5			1.5	3		0.75
Muscovite (b)			0.75				
Glycerol	1.5	0.75				2	10
Polyethylene glycol			1.5				
Triethanolamine		1.5				2	
Glycerol monocaprate				1.5			
Ethylene carbonate					1.5		
Water and minor ingredients	balance to 100						

* containing in total 20 ethoxy-groups.

(a) having an ion-exchange capacity of 6meq/100 g and a specific surface area of 14m2/g.

(b) having an ion-exchange capacity of 25meq/100 g and a specific surface area of 5m2/g.

Claims

1. A rinse-added liquid fabric treatment composition containing
— from 2% to 25% by weight of a cationic fabric softener;
— from 40% to 98% by weight of liquid carrier and additives;
characterized in that it further contains
— from 0.1 to 10% by weight of a clay having an ion-exchange capacity from 2 to 35 meq/100 gram, and a specific surface area from 2 to 100 m^2/gram;
and that the weight ratio of the cationic fabric softener to the clay is in the range from 1:1 to 80:1.

2. The composition in accordance with claim 1 wherein the cationic fabric softener is present in an amount from 4% to 8% by weight, the clay in an amount from 0.1% to 0.5% by weight, and wherein the weight ratio of cationic softener to clay is in the range from 2:1 to 25:1.

3. The composition in accordance with claim 1 wherein the cationic fabric softener is present in an amount from 12% to 18% by weight, the clay in an amount from 0.5% to 3.5% by weight, and wherein the weight ratio of cationic softener to clay is in the range from 2:1 to 25:1.

4. The composition in accordance with claim 1 wherein the clay has a specific surface area from 4 to 25 m^2/g.

5. The composition in accordance with claim 1 wherein the clay is selected from the group of kaolin, mica, muscovite, talc and mixtures thereof.

6. The composition in accordance with claim 1 wherein said clay has been mixed before being added with an optional component in a weight ratio of clay:optional component of from 1:5 to 6:1.

7. The composition in accordance with claim 6 wherein the optional component is glycerol, ethylene glycol, triethanolamine, polyethylene glycol, polyethyleneimine, or a mixture thereof.

8. The composition in accordance with claims 6 and 7 wherein the weight ratio of clay:optional component is from 1:2 to 1:1.

9. A rinse or dryer added solid fabric treatment composition containing a cationic fabric softener characterized in that it contains

(a) from 10% to 99% by weight of a binary active mixture consisting of, calculated by reference to the sum of two ingredients,

(i) from 90% to 50% by weight of the cationic fabric softener, and

(ii) from 10% to 50% by weight of a clay having an ion-exchange capacity from 2 to 35 meq/100 g and a specific surface area from 2 to 100m^2/g;

(b) from 1% to 90% of additives and processing aids.

10. The composition in accordance with claim 9 wherein the clay has a specific surface area from 4 to 25 m^2/g.

Patentansprüche

1. Eine flüssige Textilbehandlungszusammensetzung für den Zusatz beim Spülen, enthaltend
— 2 Gew.-% bis 25 Gew.-% eines kationischen Textilweichmachers;
— 40 Gew.-% bis 98 Gew.-% an flüssigem Träger und Zusätzen; dadurch gekennzeichnet, daß sie weiterhin
— 0,1 Gew.-% bis 10 Gew.-% eines Tons mit einer Ionenaustauschkapazität von 2 bis 35 Milliäqu./100 Gramm und einer wirksamen Oberfläche von 2 bis 100 m^2/Gramm enthält;
und daß das Gewichtsverhältnis des kationischen Textilweichmachers zum Ton im Bereich von 1:1 bis 80:1 liegt.

2. Die Zusammensetzung gemäß Anspruch 1, wobei der kationische Textilweichmacher in einer Menge von 1 Gew.-% bis 8 Gew.-%, und der Ton in einer Menge von 0,1 Gew.-% bis 0,5 Gew.-% vorliegen, und wobei das Gewichtsverhältnis von kationischem Weichmacher zu Ton im Bereich von 2:1 bis 25:1 liegt.

3. Die Zusammensetzung gemäß Anspruch 1, wobei der kationische Textilweichmacher in einer Menge von 12 Gew.-% bis 18 Gew.-%, und der Ton in einer Menge von 0,5 Gew.-% bis 3,5 Gew.-% vorliegen, und wobei das Gewichtsverhältnis von kationischem Textilweichmacher zu Ton im Bereich von 2:1 bis 25:1 liegt.

4. Die Zusammensetzung gemäß Anspruch 1, wobei der Ton eine worksame Oberfläche von 4 bis 25 m^2/g hat.

5. Die Zusammensetzung gemäß Anspruch 1, wobei der Ton aus der Gruppe Kaolin, Glimmer, Muscovit, Talk, und Gemischen davon, ausgewählt ist.

6. Die Zusammensetzung gemäß Anspruch 1, wobei der genannte Ton vor dem Zusatz mit einer fakultativen Komponente in einem Gewichtsverhältnis von Ton: fakultativer Komponente von 1 : 5 bis 6 : 1 vermischt worden ist.

7. Die Zusammensetzung gemäß Anspruch 6, wobei die fakultative Komponente Glycerin, Ethylenglykol, Triethanolamin, Polyethylenglykol, Polyethylenimin, oder ein Gemisch davon, ist.

8. Die Zusammensetzung gemäß den Ansprüchen 6 und 7, wobei das Gewichtsverhältnis von Ton: fakulatativer Komponente 1:2 bis 1:1 beträgt.

9. Eine feste Textilbehandlungszusammensetzung für den Zusatz beim Spülen oder im Trockner, die einen kationischen Textilweichmacher enthält, dadurch gekennzeichnet, daß sie

(a) 10 Gew.-% bis 99 Gew.-% eines binären Aktivgemisches, welches, berechnet unter Bezugnahme auf die Summe der beiden Bestandteile, aus

(i) 90 Gew.-% bis 50 Gew.-% des kationischen Textilweichmachers, und

(ii) 10 Gew.-% bis 50 Gew.-% eines Tons mit einer Ionenaustauschkapazität von 2 bis 35 Milliäqu./ 100 g und einer wirksamen Oberfläche von 2 bis 100 m^2/g besteht; und

(b) 1% bis 90% an Zusätzen und Verarbeitungshilfsmitteln enthält.

10. Die Zusammensetzung gemäß Anspruch 9, wobei der Ton eine worksame Oberfläche von 4 bis 25 m^2/g hat.

Revendications

1. Composition liquide de traitement des tissus ajoutée au rinçage, contenant
— de 2% à 25% en poids d'un adoucissant cationique pour tissus;
— de 40% à 98% en poids d'un véhicule liquide et d'additifs; caractérisée en ce qu'elle contient en outre
— de 0,1 à 10% en poids d'une argile ayant une capacité d'échange d'ions de 2 à 35 méq/100 g et une surface spécifique de 2 à 100 m^2/g; et en ce que le rapport pondéral de l'adoucissant cationique pour tissus à l'argile est dans l'intervalle de 1:1 à 80:1.

2. Composition selon la revendication 1, dans laquelle l'adoucissant cationique pour tissus est présent à raison de 4% à 8% en poids, l'argile à raison de 0,1% à 0,5% en poids, et dans laquelle le rapport pondéral de l'adoucissant cationique à l'argile est dans l'intervalle de 2:1 à 25:1.

3. Composition selon la revendication 1, dans laquelle l'adoucissant cationique pour tissus est présent à raison de 12% à 18% en poids, l'argile à raison de 0,5% à 3,5% en poids, et dans laquelle le rapport pondéral de l'adoucissant cationique à l'argile est dans l'intervalle de 2:1 à 25:1.

4. Composition selon la revendication 1, dans laquelle l'argile a une surface spécifique de 4 à 25 m^2/g.

5. Composition selon la revendication 1, dans laquelle l'argile est choisie dans le groupe constitué par le kaolin, le mica, la muscovite, le talc, et leurs mélanges.

6. Composition selon la revendication 1, dans laquelle ladite argile a été mélangée, avant d'être ajoutée, avec un constituant facultatif, selon un rapport pondéral de l'argile au constituant facultatif de 1:5 à 6:1.

7. Composition selon la revendication 6, dans laquelle le constituant facultatif est du glycérol, de l'éthylène-glycol, de la triéthanolamine, du polyéthylène-glycol, de la polyéthylène-imine, ou un mélange de ceux-ci.

8. Composition selon la revendications 6 et 7, dans laquelle le rapport pondéral de l'argile au constituant facultatif est de 1:2 à 1:1.

9. Composition solide de traitement des tissus, ajoutée au rinçage ou au séchage, contenant au adoucissant cationique pour tissus, caractérisée en ce qu'elle contient

(a) de 10% à 99% en poids d'un mélange binaire actif constitué, par rapport à la somme des deux ingrédients, par

(i) 90% à 50% en poids de l'adoucissant cationique pour tissus, et

(ii) 10% à 50% en poids d'une argile ayant une capacité d'échange d'ions de 2 à 35 méq/100 g et une surface spécifique de 2 à 100 m^2/g;

(b) de 1% à 90% d'additifs et d'auxiliaires de traitement.

10. Composition selon la revendication 9, dans laquelle l'argile a une surface spécifique de 4 à 25 m^2/g.