United States Patent Office 3,451,927 Patented June 24, 1969

3,451,927

FABRIC CONDITIONER

John Barry Tune, Higher Bebington, Cheshire, England, assignor to Lever Brothers Company, New York, N.Y., a corporation of Maine

No Drawing. Filed July 1, 1965, Ser. No. 468,918
Int. Cl. D06m 13/40, 13/46
U.S. Cl. 252—8.75 2 Claims

ABSTRACT OF THE DISCLOSURE

A composition for use in the rinsing of washed fabrics to provide a soft, anti-static finish on synthetics, particularly nylon, which consists essentially of employing quaternary ammonium cationic fabric softening agents in conjunction with alkyl ethanolamides such as tallow ethanolamide and tallow diethanolamide, and also this composition modified by the inclusion of 1,3-diphenyl pyrazoline optical brightening agent, thereby to provide enhanced whitening of both natural and synthetic fabrics.

The present invention relates to compositions for fabric conditioning. It relates particularly to fabric conditioning compositions which are suitable for use in a water rinse. The compositions of the present invention provide both a softening effect and an antistatic finish.

There are many compounds which are known to give a softening finish to fabrics. Of the many types commercially available, e.g. anionic, quaternary cationic, non-quaternary cationic or nonionic compounds, the cationic compounds are generally more substantive and the compositions of the present invention employ a known cationic softening agent.

It has been found, surprisingly, that the softening effect of the cationic agent is enhanced and considerably improved and an antistatic finish is achieved when the cationic softening agent is used in conjunction with an alkyl ethanolamide.

Accordingly, the invention is concerned with a fabric conditioner composition which comprises a cationic softening agent and an alkyl ethanolamide.

Preferably the alkyl group has about 12–18 carbon atoms.

The cationic softening agent may be a quaternary ammonium salt, imidazoline or hydrazine. Suitable quaternary ammonium salts are those of formula

$$\left[\begin{array}{c} R_2 \\ | \\ R_1\text{—}N\text{—}R_3 \\ | \\ R_1 \end{array}\right] X_y$$

wherein R_1 is an aliphatic hydrocarbon group containing from 16–22 carbon atoms; R_2 is an alkyl group containting from 1–3 carbon atoms, R_3 is R_1 or R_2, and X is an anion, e.g. halide, sulphate, alkyl sulphate having 1–3 carbon atoms in the alkyl group, or acetate, and y is the valency of X.

The preferred cationic softening agent is di-(hardened tallow) dimethyl ammonium chloride.

Members of the alkyl ethanolamide class are relatively ineffective antistatic agents when used alone and especially at the low concentrations used in a rinse process, but we have found that, in combination with the cationic softening agent, particularly with the above-mentioned preferred cationic softener, an excellent antistatic effect is conferred on nylon. This effect is markedly better than that given by either the cationic softener alone or by an ethanolamide alone. It is preferred to use a mixture of tallow mono- and di-ethanolamides.

Typical fabric conditioner compositions in accordance

with the present invention contain from 1 to 10 parts by weight of fabric softening agent and from 1 to 10 parts by weight of tallow ethanolamide and may be formulated in any customary manner, for example, as aqueous emulsion concentrates having from 1 to 10 percent active fabric softener.

The enhanced antistatic effect referred to above is proven by the set of typical results, given in Table I, which were obtained by the following procedure: Woven nylon fabric was washed for 5 minutes at 45° C. in 0.2% commercial detergent and rinsed twice for 2 minutes in water. The wash and rinse procedure was repeated and the nylon finally rinsed for 3 minutes at 30° C. in 0.2% fabric conditioner having the effective ingredients detailed in Table I made up to 100% with water, at a liquor/cloth ratio of 60/1 in distilled water. The nylon was dried and its resistance measured with a "Twenty Million Megohmmeter" (E.I.L.) at 40% relative humidity.

Table I shows that the greater antistatic effect of the cationic softener/ethanolamide mixture is not due to the greater content of active in this composition, since results 5 and 4 using products with softener alone and mixed ethanolamides alone, each with a total solid content equal to that of the preferred mixture, are inferior to result 3. Similar results are obtained when the mixture of tallow mono- and di- ethanolamides is replaced by either the mono- or the di- ethnanolamide.

TABLE I

Composition No.	(Di (hardened tallow) dimethyl ammonium chloride	Tallow ehtanolamide	Tallow diethanolamide	Resistance $\times 10^{-12}$ ohms per square (2 days after treatment)
1	Nil	2.25	2.25	25
2	3.75	Nil	Nil	>50
3	3.75	2.25	2.25	1.0
4	Nil	4.125	4.125	25
5	8.25	Nil	Nil	11
Control (water only)				>50

That the ethanolamide improves the softening finish imparted by the cationic softener has been proven by the usual subjective appraisal test by an panel of women. Although this test is not an objective one, it is nevertheless an established and reliable procedure for determining the relative softness of treated fabrics. Testing has shown that a composition containing cationic softener and alkyl ethanolamide gives appreciably greater softening than that of a product comprising the same concentration of the cationic softener only and to be significantly better than water alone.

The compositions of the present invention will be further described by way of the following examples.

EXAMPLE 1

	Percent
Di-(hardened tallow) dimethyl ammonium chloride	3.75
Tallow ethanolamide	2.25
Tallow diethanolamide	2.25
Wetting agent (to facilitate mixing the components with water)	0.75
Water, up to 100%.	

EXAMPLE 2

	Percent
Di-(hardened tallow) dimethyl ammonium chloride	6
Tallow ethanolamide	3
Tallow diethanolamide	3
Water, up to 100%.	

EXAMPLE 3

	Percent
1-methyl - 1 - stearylamidoethyl-2-stearylimidazolinium methosulphate	4.5
Tallow ethanolamide	2.25
Tallow diethanolamide	2.25
Water, up to	100

The softening effect of a cationic softener in the rinsing of natural or synthetic fabric, particularly cotton, is sometimes accompanied by a reduction in the whiteness level of the fabric. It has now been found that this "quench" effect can be overcome by inclusion of a nonionic optical brightening agent of the 1,3-diphenyl pyrazoline class within the composition. Although there are other nonionic optical brightening agents which are known for improving whiteness of natural fabric, these are difficult or impossible to include in a composition which softens by cationic softener, in the amount necessary to overcome the quench effect. The difficutly arises because these nonionic brightening agents, e.g. α-(1-hydroxyethylbenzimidazol-2-yl)-β-benzimidazol-2-yl ethylene, (hereafter designated (C)) in the needed amount, crystallise out on storage. It has now been found that a brightener selected from the 1,3-diphenyl pyrazoline class of optical brighteners, usually employed exclusively in the treatment of nylon, can be included in amounts necessary to overcome the quench effect in natural or synthetic fabrics and remain stable in storage.

Accordingly, the present invention also concerns compositions which comprise a cationic softening agent, an alkyl ethanolamide and an optical bridghtening agent of the 1,3-diphenyl pyrazoline class.

Incorporation of the optical brightening agent does not impair the softening or the antistatic finish properties which are conferred by the cationic softener and ethanolamide.

Conveniently, the optical brighteners used in the composition of the invention are (1-p-sulphoamidophenly)-3-(p-chlorophenyl) Δ^2-pyrazoline (hereafter referred to as A) and 1-(p-methoxycarbonyl-phenyl)-3-(p-chlorophenyl) Δ^2-pyrazoline (hereafter referred to as B).

In addition to overcoming the quench effect, they may also provide optical brightening additional to that accruing from a wash cycle wherein a detergent containing an optical brightener was used.

The storage stability of the compositions can be determined by testing the nylon whitening effect of the composition immediately on preparation and after 3 months storage at 20° C. as follows: non-flourescent nylon is washed for 3 minutes at 45° C. in 0.4% fluorescer-free commercial detergent, rinsed in water, and then for 5 minutes at 40° C. in 0.15% concention of composition. 5 wash/rinse cycles were carried out, at a liquor/cloth ratio of 30/1 using distilled water. Results are tabulated below:

	Harrison fluorescence meter [1] reading		
	On Preparation	After storage at 20° C.	
		3 months	6 months
(i) 0.065% brightener (C)	59	34	
(ii) 0.13% brightener (C)	76	54	
(iii) 0.13% brightener (A)	61	62	60

[1] Commercially available instrument.

The whitening efficiency and "quench" overcoming power of the brightener-containing compositions of the invention has been established by a series of trails on cotton and nylon fabrics in which the composition used was that of Example 1 modified by the inclusion of 0.13% optical brightener (A). This composition is referred to in the trials as "Modified composition."

Cotton. fluorescent.—Desized cotton sheeting was washed for 1 minute at 45° C. at a liquor/cloth ratio of 50/1 in 0.4% commercially available detergent containing a fluorescer used in the art as a "cotton" fluorescer. The cotton was rinsed for 1 minute in water at room temperature and liquor/cloth ratio of 50/1 and then rinsed in the products listed in Table II at 0.15% concentration in water, of 24° H., for 2 minutes at 40° C. and a liquor/cloth ratio of 100/1. The results after 5 wash/rinse cycles are tabulated; these and visual comparisons clearly show that the modified composition is effective in overcoming the quench effect on fluorescent cotton.

TABLE II

Product	Harrison meter reading
(1) Water alone	137
(2) Composition of Example 1 in water	102
(3) Modified composition in water	134

Nylon: non-fluorescent.—Non-fluorescent nylon was washed for 3 minutes at 45° C. in 0.4% fluorescer-free commercial detergent, rinsed in water and then for 5 minutes at 40° C. in 0.15% concentrtaion of the modified composition in water. 5 wash/rinse cycles were carried out. A liquor/cloth ratio of 30/1 and distilled water were used. The results are shown in Table III and demonstrate the enhancing of the whiteness level by the modified composition.

TABLE III

	Harrison meter reading
Rinse in water alone	10
Rinse in modified composition solution	66

Nylon: Fluorescent.—Fluorescent nylon, prepared by rinsing for 10 minutes at 60° C. in 5 ppm. of optical brightener (A) at a liquor/cloth ratio of 100/1, was washed for 3 minutes at 45° C. in 0.15% of a commercial detergent, rinsed for 2 minutes in water and for 2 minutes at 40° C. in the products of Table IV. Distilled water and a liquor/cloth ratio of 30/1 were used.

TABLE IV

	Initially	After 5 wash/rinse cycles	After 10 wash/rinse cycles
(1) Water	142	135	130
(2) Composition of Example 1 in water (0.15% solution in water)	142	137	130
(3) Modified composition (0.15% solution in water)	142	148	152

Comparison of the original fluorescent nylon with the test-pieces after 10 wash/rinse cycles clearly shows that rinsing in the modified composition has maintained the initial whiteness of the nylon, whereas water rinsing or rinsing in a product having no optical brightener shows a loss in whiteness.

Suitable modified compositions are those comprising 2.5–7.5% cationic softener, 3–9% mixture of alkyl ethanolamide and 0.05–0.5% optical brightener of the 1,3-diphenyl pyrazoline class. Typical modified compositions are as follows:

EXAMPLE 4

The composition of Example 1 having 0.13% A or 0.13% B therein.

EXAMPLE 5

The composition of Example 2 having 0.20% A therein.

EXAMPLE 6

The composition of Example 3 having 0.13% A or 0.13% B therein.

Inorganic salts, perfume, colourants and ingredients which are similarly non-deleterious to the softening or fluorescing activity can be included. Also, additives for the purpose of obtaining improved freeze-thaw characteristics, e.g. ethylene glycol, polyethylene glycol and short-chain quaternary ammonium compounds, may be included.

The fabric conditioner is preferably made up as an aqueous dispersion by heating the mixed components at ca. 90° C. and addition of water to 100%. The cooled

product is thinned, if necessary, by addition of electrolyte, e.g. sodium carbonate with stirring. The fabric conditioner may also be prepared in solid form by employing urea in place of the water. It is preferably employed at a concentration of 0.1–0.5% by weight of conditioner in water. It can be applied to the fabric by immersing the fabric in a bath containing it. Other methods such as spraying or padding on may be employed.

The present invention is concerned also with the fabric so treated.

The compositions according to this invention have the advantage of applicability to all the usual ingredients of the domestic wash and achieve softening and maintenance or enhancement of the whiteness level together with an antistatic finish where appropriate in a single rinse treatment.

What is claimed is:

1. A fabric softening composition for softening and rendering antistatic a textile fabric which consists essentially of a mixture of (i) 3.75% by weight of di-hardened tallow dimethyl ammonium chloride, and (ii) 2.25% by weight of tallow ethanolamide and 2.25% by weight of tallow diethanolamide, the balance of said composition consisting essentially of water.

2. A fabric softening composition consisting essentially of (i) 3.75% by weight of di-hardened tallow dimethyl ammonium chloride; (ii) 2.25% by weight tallow ethanolamide and 2.25% by weight tallow diethanolamide; and (iii) 0.13% by weight of 1-(p-sulphonamidophenyl)-3-(p-chlorophenyl Δ^2-pyrazoline, the balance of said composition consisting essentially of water.

References Cited

UNITED STATES PATENTS

3,256,180	6/1966	Weiss et al.	252—8.8
3,255,203	6/1966	Schinzel et al.	252—301.2
3,216,944	11/1965	Frederickson	252—8.8
3,223,545	12/1965	Gallaugher et al.	252—8.8 X
2,067,202	1/1937	Pool et al.	117—139.5 X
2,089,212	8/1937	Kritchevsky	252—357 X
3,135,742	6/1964	Wagner et al.	117—33.5 X
3,357,988	12/1967	Hausermann et al.	117—33.5

HERBERT B. GUYNN, *Primary Examiner.*

U.S. Cl. X.R.

117—33.5, 139.5; 252—8.8, 301.2