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(54) **Non-cationic systems for dryer sheets**

(57) The present invention relates to tumble dryer articles and a method of use thereof having a fabric conditioning composition providing anti-static, softening, stain removal, stain guard and anti-active build-up benefits in an automatic clothes dryer. The composition

comprises 25 to 100 wt.% of a specific class of crypto-anionic surfactants, 0 to 75 wt.% of a non-surfactant release aid 0 to 50 wt. % of an anionic surfactant and up to 25 wt.% of optional and miscellaneous ingredients. A process for preparing the composition is also described.

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Description

The present invention relates to fabric conditioning compositions which provide both anti-static and softening benefits to fabrics tumble dried in an automatic clothes dryer, and a process for producing such compositions. Stain guard benefits, stain removal and anti-active build-up benefits are also obtained with these compositions.

The present invention relates to compositions which may be applied to articles of manufacture to provide anti-static and softening benefits to fabrics dried in an automatic clothes dryer. More specifically, the present invention relates to a non-cationic conditioning composition which provides effective anti-static control through a drying cycle period and articles made therefrom which exhibit good storage stability.

Non-cationic compositions for dryer sheets comprising a combination of ethoxylated fatty alcohols having from 8 to 22 carbon atoms, anionic surfactant and lipophilic non-surfactant release aids are described in U.S. S/N 08/588,746 (Knowlton et al.).

The present invention is directed towards the problem of providing alternative non-cationic conditioning compositions which provide effective anti-static and softening benefits.

Additional compositions based on non-cationic materials have now been discovered providing another means to provide effective fabric conditioning without cationic material.

It has been discovered that a combination of selected fatty acids and certain anionic surfactants, which possess a defined nonionic character, hereafter known as crypto-anionic surfactants, which are individually unsuitable as anti-static fabric softeners, can be combined to form mixtures capable of providing excellent antistatic efficacy throughout the entire drying cycle, while also exhibiting good storage stability.

The present invention relates to tumble dryer articles having a fabric conditioning composition providing both anti-static and softening benefits in an automatic clothes dryer. The composition comprises 25 to 100% of a crypto-anionic surfactant, 0 to 50% of an anionic surfactant, 0 to 75% of a non-surfactant release aid and from 0 up to 25 wt.% of a water or water soluble material, and is substantially cationic free.

A process for preparing the composition is also described.

The compositions of the invention are composed of selected detergent materials which when combined provide tumble dryer articles having a highly effective performance. Specially selected anionic surfactants, possessing a defined nonionic character, hereafter described as "crypto-anionic" surfactants, which are not conventionally used in fabric conditioning, non-surfactant release aids and optional ingredients are combined to form dryer articles with good anti-static and storage properties.

Anionic surfactants possessing a defined nonionic character and referred to as "crypto-anionic" surfactants are useful in the present invention.

The nonionic character of the surfactants is preferably described as a noncharged hydrophilic group. Non-limiting examples of such noncharged hydrophilic groups are ethylene oxide units, propylene oxide units, propylene and polypropylene glycol groups. The compositions of the invention contain such anionic surfactants in an amount of from 25 to 100 wt.%, preferably 30 to 75%, most preferably 35 to 60%.

The following classes of crypto-anionic surfactants are useful in the present composition:

(i) Water-soluble salts of ethoxylated fatty acids, i.e., "ethoxylated soaps", are useful crypto-anionic surfactants in the compositions herein. These include alkali soaps such as sodium and potassium, and ammonium and alkylammonium salts of higher ethoxylated fatty acids containing from 8 to 24 carbon atoms in the alkyl group, and preferably from 12 to 18 carbon atoms in the alkyl group, and from 1 to 20 units of ethylene oxide per molecule, preferably 1 to 15 units of ethylene oxide. These ethoxylated soaps can be made by the neutralization of free fatty acids. Particularly useful ethoxylated fatty acids are Neodox 23-4 and Neodox 25-11, both supplied by Shell Chemical.

(ii) Crypto-anionic surfactants also include the water-soluble salts, particularly the sodium, potassium, ammonium or alkylammonium salts of alkyl phenol ethylene oxide ether sulphates containing from 1 to 20 units of ethylene oxide per molecule and wherein the alkyl groups contain from 8 to 18 carbon atoms, preferably 8 to 15 carbon atoms, commercially available as Triton X-301 from Rohm and Haas or the Alipal series from Rhone Poulenc;

(iii) Other crypto-anionic surfactants useful herein are the water soluble salts, particularly sodium, potassium, ammonium or alkylammonium salts, of alkyl ethylene oxide ether sulphates containing 1 to 20 units of ethylene oxide per molecule and wherein the alkyl group contains from 8 to 20 carbon atoms, preferably 8 to 18 carbon atoms, commercially available as the Steol series from Stepan.

iv) Additional anionic surfactants possessing nonionic character which are suitable for the present invention are described in McCutcheons "Detergents and Emulsifiers" North American Edition, 1994 Annual, incorporated herein

by reference.

Particularly preferred crypto-anionic surfactants include the water soluble salts of C_{12} - C_{18} fatty acids containing 3 - 20 moles of ethylene oxide and the water soluble salts of a C_{12} - C_{18} alcohol sulphate containing 3-20 moles of ethylene oxide.

It is desirable to have additional ingredients present, for example, to help control the release characteristics of the formulation, to regulate the melting point, to aid in softening, or to aid in antistat performance.

The compositions of the invention contain an anionic surfactant in an amount of from 0 to 50 wt.%, preferably 4 to 35%, most preferably 5 to 25 wt.%.

The following anionic surfactants are useful in the present composition.

i) Water-soluble salts of the higher fatty acids, i.e., "soaps", are useful anionic surfactants in the compositions herein. These include alkali metal soaps such as the sodium, potassium, ammonium, and alkylammonium salts of higher fatty acids containing from 8 to 24 carbon atoms, and preferably from 12 to 18 carbon atoms. Soaps can be made by direct saponification of fats and oils or by the neutralization of free fatty acids. Particularly preferred are the sodium and potassium salts of the mixtures of free fatty acids derived from coconut oil and tallow, i.e., sodium or potassium tallowate and sodium or potassium cocoate. Especially preferred is the potassium salt.

ii) Useful anionic surfactants also include the water-soluble salts, preferably the alkali metal, ammonium and alkylammonium salts, of organic sulfuric reaction products having in their molecular structure an alkyl group containing 10 to 20 carbon atoms and a sulphonic acid or sulfuric acid ester group. (Included in the term "alkyl" is the alkyl portion of acyl groups.) Examples of this group of synthetic surfactants are the sodium and potassium alkyl sulphates, especially those obtained by sulfating the higher alcohols (C_8 - C_{18} carbon atoms) such as those product by reducing the glycerides of tallow or coconut oil; and the sodium and potassium alkyl benzene sulphonates in which the alkyl group contains from 9 to 15 carbon atoms, in straight chain or branched chain configuration. Examples of such synthetic surfactants are described in U.S. Patent Nos. 2,220,099 and 2,477,383 herein incorporated by reference. Especially preferred surfactants are linear straight chain alkyl benzene sulphonates in which the average number of carbon atoms in the alkyl group is from 9 to 14, i.e., C_9 - C_{14} LAS).

iii) Other useful anionic surfactants herein include the water-soluble salts of esters of alpha-sulphonated fatty acids containing from 6 to 20 carbon atoms in the fatty acid group and from 1 to 10 carbon atoms in the ester group; water-soluble salts of 2-acyloxy-alkane-1-sulfonic acids containing from 2 to 9 carbon atoms in the acyl group and from 9 to 23 carbon atoms in the alkane moiety; water-soluble salts of olefin sulphonates containing from 12 to 24 carbon atoms; and beta-alkyloxy alkane sulphonates containing from 1 to 3 carbon atoms in the alkyl group and from 8 to 20 carbon atoms in the alkane moiety.

iv) Additional anionic surfactants which are suitable for the present invention are described in McCutcheons "Detergents and Emulsifiers" North American Edition, 1994 Annual, incorporated herein by reference.

The crypto-anionic surfactants described herein are preferably formulated in combination with mixtures of lipophilic non-surfactant components which are solid or semi-solid at temperatures below 35°C but which soften and flow at automatic dryer temperatures, i.e., 50°C. to 100°C. These materials are referred to as "non-surfactant release aids" for the purposes of the present invention. These materials are not conventionally used as detergents or emulsifiers as found, for example, in McCutcheon's "Detergents and Emulsifiers" North American Edition, 1994 Annual.

The non-surfactant release aids are used in the compositions in an amount of from 0 to 75 wt.%, more preferably 15 to 60 wt%.

Suitable examples of non-surfactant release aids useful for the invention include but are not limited to:

i) Carboxylic acids having 8 to 30 carbon atoms and one carboxylic group per molecule. The alkyl portion has 8 to 30, for example 8 to 28, preferably 12 to 22 carbon atoms. The alkyl portion may be linear or branched, saturated or unsaturated, with linear saturated alkyl preferred. A preferred fatty acid for use in the composition herein includes stearic acid containing from 30 to 60 percent palmitic acid and from 40 to 70% stearic acid. A commercial example is supplied under the Emersol^(R) series by Henkel.

ii) Fatty acid esters of, e.g., hydroxy, (including polyhydroxy), alcohols, including glycerine, etc., and/or fatty alcohol esters of carboxylic acids. Useful glycerol and polyglycerol esters include monoesters with stearic, oleic, palmitic, lauric, isostearic, myristic, and/or behenic acids and the diesters of stearic, oleic, palmitic, lauric, isostearic, behenic, and/or myristic acids. It is understood that the typical mono-ester contains some di- and tri-ester, etc. Fatty

acid esters of monohydric alcohols are also understood to include fatty acid ester mixtures of different composition, including for example the carnauba wax obtainable from the leaves of the Brazilian fan palm *Copernicia prunivera*, the candelilla wax obtained from the leaves of *Euphorbiaceae*, jojoba oil and natural or synthetic beeswax.

iii) Fatty alcohols having 10 to 20 carbon atoms per molecule. The alkyl portion may be linear or branched, saturated or unsaturated, with linear saturated alkyl preferred. Especially preferred alcohols herein fall within the tallowalkyl range. A commercial example of a preferred fatty alcohol is Hydrenol D (linear saturated C_{16} - C_{18} alcohols), supplied by Henkel Corp.

iv) Glyceride mixtures, including mono-, di- and tri-glycerides and mixtures thereof. Glyceride mixtures of the type useful herein can be more conveniently prepared from natural or synthetic triglycerides by means of a trans-esterification reaction employing glycerine and a base. Such trans-esterification reactions take place in processes well-known in the art to provide random mixtures of mono-, di- and triglycerides. Preferred precursor materials for the glyceride mixtures herein include lard, winterized lard, tallow, hydrogenated (hardened) tallow, hydrogenated (hardened) soybean oil, and hydrogenated (hardened) peanut oil. Any of these materials can be trans-esterified in the presence of glycerine and base in processes conventionally used in the art to provide the glyceride mixtures useful herein.

v) Synthetic waxes such as paraffin wax are also useful. A paraffin wax is a petroleum wax consisting principally of normal alkanes. Paraffin, microcrystalline, and semicrystalline waxes may be differentiated using the refractive index of the wax and its congealing point as determined by ASTM D938 (36). Semimicrocrystalline and microcrystalline waxes are petroleum waxes containing substantial proportions of hydrocarbons other than normal alkanes. Paraffin wax is macrocrystalline, brittle, and it is composed of 40-90 wt.% normal paraffins and the remainder is C_{18} - C_{36} isoalkanes and cycloalkanes.

Preferred materials include the C_{10} - C_{22} fatty acids and C_{10} - C_{20} fatty alcohols.

It is to be understood that certain by-products, hydrotropes, solvents and the like that are present with the incoming raw material or formed as a result of the neutralization are allowed as miscellaneous ingredients in the present invention.

In a preferred embodiment, water or water-soluble materials in the amount of 0 up to 25%, preferably 3 to 15%, are present. Water is the most preferred optional ingredient. Water can be added to the composition or can come into the composition as a natural by-product of the neutralization reaction that forms the crypto-anionic and anionic surfactant. It has been found that amounts of water (up to 25 wt.%) can be incorporated into the formula without processing problems, and this inclusion may be commercially useful.

Other optional water-soluble ingredients useful in the present invention include polyhydric alcohols having from 1 to 6 carbon atoms, such as propylene glycol, glycerin or sorbitol.

Additives which may be optionally included in fabric conditioning compositions of the present invention in their conventional levels include optical brighteners or fluorescent agents, antioxidants, colorants, germicides, perfumes, enzymes, bacteriocides, colour care agents, polymeric soil releasing agents and the like. The general level of use of any such ingredient is up to 10%; preferably 0.1 to 5 wt.%.

The present antistatic, fabric softening compositions may be formed by combining pre-determined amounts of pre-neutralized crypto-anionic surfactants and optional anionic surfactants into non-surfactant release aids at temperature in the range of 100 - 210°F. The optional ingredients may be added to the mixture at any step of the process, but it is preferred that it be added at the end of the process. The pre-neutralized crypto-anionic surfactants and optional pre-neutralized anionic surfactants may also be added as aqueous solutions to simplify the mixing operation. The excess water is removed by evaporation during the mixing step at operation temperature of 100 - 210°F.

The preferred method is to prepare the present composition by (a) pre-mixing the crypto-anionic acid, optional anionic acid and release aids, (b) neutralize the crypto-anionic and optional anionic surfactants with a corresponding stoichiometric amount of alkaline agents at a temperature in the range of 100 - 210°F. Further modification of the composition can be achieved by adding additional pre-neutralized crypto-anionic surfactants, optional anionic surfactants, release aids and optional ingredients into the composition and mix at temperatures of 100 - 210°F.

The final product is a transparent isotropic liquid having a viscosity of less than 1,000 cps at 180°F, preferably less than 200 cps at 180°F.

In the preferred embodiment, the conditioning composition of the present invention may be coated onto a flexible substrate which carries a fabric conditioning amount of the composition and is capable of releasing the composition at dryer operating temperature. The conditioning composition in turn has a preferred melting (or softening) point of 25°C. to 150°C.

The fabric conditioning composition which may be employed in the invention is coated onto a dispensing means which effectively releases the fabric conditioning composition in a tumble dryer. Such dispensing means can be de-

signed for single usage or for multiple uses. One such multi-use article comprises a sponge material releasable enclosing enough of the conditioning composition to effectively impart fabric softness during several drying cycles. This multi-use article can be made by filling a porous sponge with the composition. In use, the composition melts and leaches out through the pores of the sponge to soften and condition fabrics. Such a filled sponge can be used to treat several loads of fabrics in conventional dryers, and has the advantage that it can remain in the dryer after use and is not likely to be misplaced or lost.

Another article comprises a cloth or paper bag releasable enclosing the composition and sealed with a hardened plug of the mixture. The action and heat of the dryer opens the bag and releases the composition to perform its softening.

As a further alternative, the fabric conditioning composition in particulate form is sprinkled over the fabrics in the dryer.

A highly preferred article comprises the inventive compositions releasably affixed to a flexible substrate such as a sheet of paper or woven or non-woven cloth substrate. When such an article is placed in an automatic laundry dryer, the heat, moisture, distribution forces and tumbling action of the dryer removes the composition from the substrate and deposits it on the fabrics.

The sheet conformation has several advantages. For example, effective amounts of the compositions for use in conventional dryers can be easily absorbed onto and into the sheet substrate by a simple dipping or padding process.

Thus, the end user need not measure the amount of the composition necessary to obtain fabric softness and other benefits. Additionally, the flat configuration of the sheet provides a large surface area which results in efficient release and distribution of the materials onto fabrics by the tumbling action of the dryer.

The substrates used in the articles can have a dense, or more preferably, open or porous structure. Examples of suitable materials which can be used as substrates herein include paper, woven cloth, and non-woven cloth. The term "cloth" herein means a woven or non-woven substrate for the articles of manufacture, as distinguished from the term "fabric" which encompasses the clothing fabrics being dried in an automatic dryer.

It is known that most substances are able to absorb a liquid substance to some degree; however, the term "absorbent" as used herein, is intended to mean a substrate with an absorbent capacity (i.e., a parameter representing a substrate's ability to take up and retain a liquid) from 4 to 12, preferably 5 to 7 times its weight of water.

If the substrate is a foamed plastics material, the absorbent capacity is preferably in the range of 15 to 22, but some special foams can have an absorbent capacity in the range from 4 to 12.

Determination of absorbent capacity values is made by using the capacity testing procedures described in U.S. Federal Specifications (UU-T-595b), modified as follows:

1. tap water is used instead of distilled water
2. the specimen is immersed for 30 seconds instead of 3 minutes;
3. draining time is 15 seconds instead of 1 minutes; and
4. the specimen is immediately weighed on a torsion balance having a pan with turned-up edges.

Absorbent capacity values are then calculated in accordance with the formula given in said Specification. Based on this test, one-ply, dense bleached paper (e.g., Kraft or bond having a basis weight of 32 pounds per 3,000 square feet) has an absorbent capacity of 3.5 to 4; commercially available household one-ply towel paper has a value of 5 to 6; and commercially available two-ply household toweling paper has a value of 7 to 9.5.

Suitable materials which can be used as a substrate in the invention herein include, among others, sponges, paper, and woven and non-woven cloth, all having the necessary absorbency requirements defined above.

The preferred non-woven cloth substrates can generally be defined as adhesively bonded fibrous or filamentous products having a web or carded fiber structure (where the fiber strength is suitable to allow carding), or comprising fibrous mats in which the fibers or filaments are distributed haphazardly or in random array (i.e., an array of fibers in a carded web wherein partial orientation of the fibers is frequently present, as well as a completely haphazard distributional orientation), or substantially aligned. The fibers or filaments can be natural (e.g., wool, silk, jute, hemp, cotton, lene, sisal, or ramie) or synthetic (e.g., rayon, cellulose ester, polyvinyl derivative, polyolefins, polyamides, or polyesters). Preferred polyester non-woven fabric substrates are prepared from a polyester fiber having a denier of from 2 to 6 as described in Childs et al., U.S. Patent No. 5,470,492.

The preferred absorbent properties are particularly easy to obtain with non-woven cloths and are provided merely by building up the thickness of the cloth, i.e., by superimposing a plurality of carded webs or mats to a thickness adequate to obtain the necessary absorbent properties, or by allowing a sufficient thickness of the fibers to deposit on the screen. Any diameter or denier of the fiber (generally up to 10 denier) can be used, inasmuch as it is the free space between each fiber that makes the thickness of the cloth directly related to the absorbent capacity of the cloth, and which, further, makes the non-woven cloth especially suitable for impregnation with a composition by means of inter-sectional or capillary action. Thus, any thickness necessary to obtain the required absorbent capacity can be used.

When the substrate for the composition is a non-woven cloth made from fibers deposited haphazardly or in random

array on the screen, the articles exhibit excellent strength in all directions and are not prone to tear or separate when used in the automatic clothes dryer.

In applying the fabric conditioning composition to the absorbent substrate, the amount impregnated into and/or coated onto the absorbent substrate is conveniently in the weight ratio range of from 10:1 to 0.5:1 based on the ratio of total conditioning composition to dry, untreated substrate (fiber plus binder). Preferably, the amount of the conditioning composition ranges from 5:1 to 1:1, most preferably from 3:1 to 1:1, by weight of the dry, untreated substrate.

The articles of manufacture of the present invention can be used for imparting the above-described fabric treatment composition to fabric to provide anti-static and/or softening effects to fabric in an automatic laundry dryer. Generally, the method of using the inventive composition is to commingle an effective amount of the fabric conditioning composition with pieces of damp fabric by tumbling the fabrics under heat in an automatic clothes dryer.

EXAMPLES

The following examples illustrate without limitation the present invention. Further modifications within the scope of the present invention will be obvious to the skilled man.

Example 1

Preparation of Conditioning Composition

Un-neutralized ethoxylated fatty acid and stearyl alcohol were placed in a glass vessel and heated to 140°F with mixing. A 45 w/w% potassium hydroxide aqueous solution was warmed and then added to the ethoxylated fatty acid and stearyl alcohol mix. Stearic acid was added to the resulting crypto-anionic surfactant and non-surfactant release aid mixture and mixed until clear. Perfume was added at this time.

Preparation of Conditioning Articles

Dryer sheets were prepared by applying the coating mixture to pre-weighed substrate sheets of 6.75 inches x 12 inches dimensions. The substrate sheets were comprised of 4 denier spun-bonded polyester. The formulation was then coated onto the substrate as conventionally known in the art. The sheet was weighed to determine the amount of coating mixture on the sheet. The target sheet weight was 1.5 grams. If the weight was either in excess of or less than the target weight, the sheet was passed through the coater to remelt the coating mixture and remove the excess or add additional coating mixture.

Dryer sheets having the following formulations were prepared as described above.

Table 1

Ingredient	Sample 1	Sample 2
Potassium salt of C ₁₂ -C ₁₃ fatty acid with 4 moles EO	48.0	-
Potassium salt of C ₁₂ -C ₁₅ fatty acid with 11 moles EO	-	48.0
Stearyl Alcohol	23.0	24.0
Stearic Acid	14.0	15.0
Water	9.0	8.0
Miscellaneous ¹	6.0	5.0

¹ includes impurities present in the ethoxylated fatty acid.

Example 2

To demonstrate the anti-static capabilities of the dryer sheets containing the compositions of the present invention, dryer sheets were evaluated using an in-situ static measurement methodology. In each test, the load was washed three times in a commercially available detergent in warm water. The load consisted of three 3' x 3' pieces of each of the following fabrics: 100% orlon, 100% acrylic blanket, 100% double knit polyester jersey, 100% single knit polyester lining and 100% nylon. The test bundle was then transferred to a Lady Kenmore Heavy Duty dryer which had been previously treated to ensure removal of any prior added anti-static/softener. A pre-weighed dryer sheet was added to the load, and the test load plus dryer sheet (if used) was tumble dried for a 60 minute timed heat cycle, which was followed by a 10-minute cool down. An electrostatic field meter probe, manufactured by Monroe Electronics, NY, was previously

mounted onto the inside door of the dryer. At the start of the drying cycle, an electrostatic field meter, also manufactured by Monroe Electronics, NY, was turned on, and the output was sent to a chart recorder. The electrostatic values at 0, 20, 40 and 70 minutes were recorded and tabulated to compare products.

The maximum absolute value possible for the electrostatic meter is 10. If a value is recorded as 10, then the real electrostatic field value most likely went off the scale of the meter and indicates a highly charged field. In general, if the 20 minute and the 40 minute values are less than 4 and the 70 minute value is less than 6, then the anti-static benefit of the product being tested is considered good. These values were determined from evaluations of commercial products and noting the temperature dependence of static measured in the dryer, i.e., electrostatic charges are generally lower under high heat conditions than at room temperature.

The electrostatic values of formulations outside the scope of the invention are as follows:

Table 2

Sample	Formula Description	0	20 min	40 min	70 min
Control	no dryer sheet	0	8.8	9.4	10
3	25% LAS/75% stearic acid	0	7.2	6.6	10
4	15% potassium stearate/85% stearic acid	0	10	4	9.2
5	50% DHTDMAMS ² /50% stearic acid	0	1.7	0.8	5.2
6	70% DHTDMAMS ¹ /30% stearic acid	0	1.6	0.6	4.4
In comparison Samples 1 and 2 of Example 1 within the invention exhibited the following electrostatic values.					

² Dihardened tallow dimethyl ammonium methyl sulphate.

Table 3

Sample	0	20 min	40 min	70 min
1	0	2.4	3.4	4.0
2	0	5.2	2.0	1.6

As can be seen from the data, dryer sheets of the present invention show antistatic properties as good as or at least as comparable as dryer sheets containing typical cationic containing compositions applied to dryer sheets. The data also shows that compositions composed of anionic surfactants without nonionic character do not possess antistat properties comparable to commercially available dryer sheets.

Example 3

An additional composition within the scope of the invention was prepared by mixing 1:1 ratio of pre-neutralized crypto-anionic surfactant (60% active) and molten stearic acid at a temperature of 140°F. The electrostatic values were determined as described in Example 1 with the results as indicated in Table 4.

Table 4

Sample	Formula Description	0	20 min	40 min	70 min
7	30 wt. % sodium fatty alcohol ethoxy sulphate 10 wt. % water 7 wt. % propylene glycol 3 wt. % ethanol 50 wt. % stearic acid	0	4.8	2.4	5.2

Claims

1. A tumble dryer article having an anti-static benefit comprising:

a) a fabric conditioning composition containing substantially no cationic actives and comprising:

- (i) 25 to 100 wt. % of a crypto-anionic surfactant;
- (ii) 0 to 75 wt. % of a non-surfactant release aid;
- (iii) 0 to 50 wt. % of an anionic surfactant; and
- (iv) up to 25 wt. % of water or a water soluble material; and

b) means for dispensing the fabric conditioning composition onto fabrics in a tumble dryer.

2. A tumble dryer article according to claim 1 wherein the crypto-anionic surfactants are selected from water soluble salts of ethoxylated fatty acids having 1 to 20 ethylene oxides, alkyl phenol ethylene oxide ether sulphates having from 1 to 20 ethylene oxides, alkyl ethylene oxide ether sulphates having from 1 to 20 ethylene oxides, and mixtures thereof.

3. A tumble dryer article according to claim 1 wherein the non-surfactant release aid is selected from carboxylic acids having 8 to 39 carbon atoms and one carboxylic group per molecule, fatty alcohols, waxes, fatty acid esters, glycerides, and mixtures thereof.

4. A tumble dryer article according to claim 3 wherein the carboxylic acid is a mixture of stearic and palmitic acids in the ratio of from 1:4 to 4:1.

5. A tumble dryer article according to claim 1 wherein the water is present in an amount of from 3 to 15 wt. %.

6. A tumble dryer article according to claim 1 wherein the means is polyester non-woven fabric prepared from a polyester fiber having a denier of from 2 to 6.

7. A tumble dryer article according to claim 1 further comprising up to a 10 wt. % of one or more optional additives selected from the group consisting of optical brighteners, fluorescent agents, antioxidants, colorants, germicides, perfumes, enzymes, bacteriocides, colour care agents, polymeric soil releasing agents, and mixtures thereof.

8. A method for providing an anti-static benefit to fabrics dried in a tumble dryer comprising the steps of:

a) selecting a tumble dryer article comprising:

(i) a fabric conditioning composition containing substantially no cationic actives and comprising:

- (a) 25 to 75 wt. % of a crypto-anionic surfactant;
- (b) 75 to 25 wt. % of a non-surfactant release aid;
- (c) 0 to 50 wt. % of an anionic surfactant; and
- (d) up to 25 wt. % of water or a water soluble material;

(ii) means for dispensing the fabric conditioning composition onto fabrics in a tumble dryer; and

b) contacting fabrics with the tumble dryer articles in a tumble dryer to provide an anti-static benefit.

9. A method according to claim 8 wherein the crypto-anionic surfactant of the tumble dryer article is selected from water soluble salts of ethoxylated fatty acids having from 1 to 20 ethylene oxides, alkyl phenol ethylene oxide ether sulphates having from 1 to 20 ethylene oxides, alkyl ethylene oxide ether sulphates having from 1 to 20 ethylene oxides, and mixtures thereof.

10. A method according to claim 8 wherein the non-surfactant release aid is selected from the group consisting of carboxylic acids having 8 to 30 carbon atoms and one carboxylic group per molecules, fatty alcohols, wax, fatty acid ester, glycerides, and mixtures thereof.

11. A method according to claim 8 wherein the means is polyester non-woven fabric prepared from a polyester fiber having a denier of from 2 to 6.

12. A method according to claim 8 wherein the water is present in an amount of from 5 to 15 wt. %.

13. A method according to claim 8 wherein the tumble dryer article further comprises up to 10 wt. % of one or more

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optional additives selected from the group consisting of optical brighteners, fluorescent agents, antioxidants, colorants, germicides, perfumes, enzymes, bacteriocides, colour care agents, polymeric soil releasing agents and mixtures thereof.

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