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(54) Title: ANTIPERSPIRANT AND DEODORANT COMPOSITIONS

(57) Abstract: The present application relates to personal care compositions including perfumes and sulfur-based perfume raw materials, and methods for making and using the personal care compositions to resist consumer fragrance habituation.



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## ANTIPERSPIRANT AND DEODORANT COMPOSITIONS

## TECHNICAL FIELD

The present disclosure generally relates to personal care compositions comprising  
5 perfumes and sulfur-based perfume raw materials, as well as methods for making and using such  
personal care compositions to resist consumer fragrance habituation.

## BACKGROUND

Consumers desire personal care compositions that provide a desired and long-lasting  
10 fragrance or scent each time the composition is applied or used. Consumers may also expect  
compositions that provide a scent that can mask or override other undesirable odors. While  
current personal care compositions provide desirable scents, consumers become habituated to the  
perfume raw materials (PRMs) and perfumes utilized in the existing compositions. As a result,  
for consumers to perceive the desired scent consumers can use increasingly large amounts of the  
15 product to overcome the habituation or the consumer can switch to a different product utilizing  
a different perfume for a significant period of time to reverse the habituation. There is, therefore,  
a need for personal care compositions that provide long-lasting and desirable scents that do not  
cause a habituation effect in consumers and do not require consumers to modify their habits.

## 20 SUMMARY

In one example, a personal care composition includes a perfume. The perfume includes,  
based on total perfume weight, from about 0.000001% to about 10%, of a perfume raw material.  
The perfume raw material includes a sulfur atom. The perfume raw material resists the fragrance  
habituation of a consumer to the personal care composition.

25 In one example, a personal care composition includes a perfume. The perfume includes,  
based on total perfume weight, a perfume raw material. The perfume raw material is selected  
from the group consisting of: (a) from about 0.0000001% to about 10%, of a perfume raw  
material comprising a thiol moiety; (b) from about 0.0000001% to about 10%, of a perfume raw  
material comprising a sulfide moiety; (c) from about 0.0000001% to about 10%, of a perfume  
30 raw material comprising a thiazole moiety; (d) from about 0.0000001% to about 10%, of a  
perfume raw material comprising an oxathiane moiety; (e) from about 0.00000005% to about  
5%, of a perfume raw material comprising an isothiocyanate; (f) from about 0.000001% to about  
10%, of a perfume raw material comprising a oxygen, sulfur, and nitrogen; and (g) mixtures

thereof. The perfume raw material resists the fragrance habituation of a consumer to the personal care composition.

In one example, a method of resisting the fragrance habituation of a personal care composition is provided. The method includes forming a personal care composition having a perfume. The perfume includes, based on total perfume weight, a perfume raw material. The perfume raw material is selected from the group consisting of: (a) from about 0.0000001% to about 10%, of a perfume raw material comprising a thiol moiety; (b) from about 0.0000001% to about 10%, of a perfume raw material comprising a sulfide moiety; (c) from about 0.0000001% to about 10%, of a perfume raw material comprising a thiazole moiety; (d) from about 0.0000001% to about 10%, of a perfume raw material comprising a oxathiane moiety; (e) from about 0.00000005% to about 5%, of a perfume raw material comprising an isothiocyanate; (f) from about 0.0000001% to about 10%, of a perfume raw material comprising a sulfur, oxygen and nitrogen; and (g) mixtures thereof.

#### DETAILED DESCRIPTION

This application claims priority to U.S. provisional application no. 61/737,257 filed December 14, 2012; U.S. provisional application no. 61/869,241 filed August 23, 2013; and U.S. provisional application no. 61/879,217; all of which are incorporated herein by reference.

#### Definitions

“Personal care composition” refers to compositions intended for topical application to skin or hair and can be, for example, in the form of a liquid, semi-liquid cream, lotion, gel, or solid. Examples of personal care compositions can include, but are not limited to, bar soaps, shampoos, conditioning shampoos, body washes, moisturizing body washes, shower gels, skin cleansers, cleansing milks, in-shower body moisturizers, pet shampoos, shaving preparations, etc.

“Bar soap” refers to compositions intended for topical application to a surface such as skin or hair to remove, for example, dirt, oil, and the like. The bar soaps can be rinse-off formulations, in which the product is applied topically to the skin or hair and then subsequently rinsed within minutes from the skin or hair with water. The product could also be wiped off using a substrate. Bar soaps can be in the form of a solid (e.g., non-flowing) bar soap intended for topical application to skin. The bar soap can also be in the form of a soft solid which is compliant to the body. The bar soap additionally can be wrapped in a substrate which remains on the bar during use.

“Rinse-off” means the intended product usage includes application to skin and/or hair followed by rinsing and/or wiping the product from the skin and/or hair within a few seconds to minutes of the application step.

“STnS” refers to sodium trideceth(n) sulfate, wherein n can define the average number of moles of ethoxylate per molecule.

“Structured” refers to having a rheology that can confer stability on the personal care composition. A cleansing phase can be considered to be structured if the cleansing phase has one or more following characteristics: (a) Zero Shear Viscosity of at least 100 Pascal-seconds (Pa-s), at least about 200 Pa-s, at least about 500 Pa-s, at least about 1,000 Pa-s, at least about 1,500 Pa-s, or at least about 2,000 Pa-s; (b) A Structured Domain Volume Ratio as measured by the Ultracentrifugation Method described hereinafter, of greater than about 40%, at least about 45%, at least about 50%, at least about 55%, at least about 60%, at least about 65%, at least about 70%, at least about 75%, at least about 80%, at least about 85%, or at least about 90%; or (c) A Young’s Modulus of greater than about 2 Pascals (Pa), greater than about 10 Pa, greater than about 20 Pa, greater than about 30 Pa, greater than about 40 Pa, greater than about 50 Pa, greater than about 75 Pa, or greater than about 100 Pa.

The term “habituating” or “habituation” refers an individual or group who has decreased sensitivity to perceiving a fragrance or fragrance material. A fragrance or fragrance material is considered habituating when their Degree of Habituation (percent change in odor detection threshold or “ODT”) is greater than 150%, greater than 300%, greater than 500%, greater than 1000% according to the method described in the Test Methods section of this specification.

The term “solid” includes granular, powder, bar and tablet product forms.

The term “fluid” includes liquid, gel, paste and gas product forms.

The term “situs” includes paper products, fabrics, garments, hard surfaces, hair and skin.

The term “substantially free of” refers to about 2% or less, about 1% or less, or about 0.1% or less of a stated ingredient. “Free of” refers to no detectable amount of the stated ingredient or thing.

#### Personal Care Compositions

Rinse-off personal care compositions can come in a variety of forms. For example, a personal care composition can be in a liquid form and can be a body wash, moisturizing body wash, shampoo, conditioning shampoo, shower gel, skin cleansers, cleansing milk, in-shower body moisturizer, pet shampoo, shaving preparation, etc. Rinse-off personal care compositions can also be in a solid form, such as a bar soap or can be in a semi-solid form, like a paste or gel.

Solid forms can also be created in many shapes and forms such as a rectangle, or be created in a powder or pellet form, for example. Additionally, solid and semi-solid forms can be combined with a substrate to form an article as described in more detail in U.S. Pre-Grant Publication Nos. 2012/0246851 A1; 2013/0043145 A1; 2013/0043146 A1; and 2013/0043147 A1.

5 Many personal care compositions can be water-based. However, water can be lost through processes such as evaporation during the process of making a personal care composition, or can be lost to packaging materials or the like after manufacturing. A personal care composition can, therefore, also include materials that bind water inside the composition such that the desired level of water can be maintained in the personal care composition. Examples of  
10 such materials can include carbohydrate structurants and humectants such as glycerin. Personal care compositions can also be anhydrous and can be produced or used without any appreciable water content.

Personal care compositions can include perfume materials. Many consumers prefer personal care compositions that can consistently provide a desired scent, or odor, that can be  
15 perceived each time the product is used. Perfume materials can provide the desired scent or odor to these personal care compositions. These perfume (i.e., fragrance) materials can include perfumes, perfume raw materials, and perfume delivery systems. Habituation of the perfume materials by the consumer, however, can lead to a diminished perception of the desired scent even when the quantity of perfume material in the personal care composition remains consistent.

20 While not being bound by theory, it is believed that habituation is a physiological phenomenon where the body is attempting to avoid having its sense of smell from becoming overwhelmed by any one stimulus after repeated chronic exposure as part of a primal, darwanistic, defense mechanism. Applicants, therefore, theorizing that the source of the habituation problem was evolutionary in nature, looked to odors that may be associated with  
25 danger as Applicants believed that the evolutionary path of those who became habituated to such odors would have been cut short. Surprisingly, it was discovered that certain chemical moieties that are associated with conditions that may be detrimental to, or important in sustaining life, are not subject to the habituation phenomenon. Personal care compositions can resist scent habitation by incorporating these chemical moieties as either perfume raw materials or as  
30 components in a perfume delivery system.

In one example, a personal care composition can incorporate a perfume that can reduce scent habituation. The perfume can incorporate perfume raw materials that can resist the habituation effect. The perfume raw material can include a thiol moiety, a sulfide moiety, a

thiazole moiety, an oxathiane moiety, an isothiocyanate, and compounds comprising oxygen, sulfur, and nitrogen. The perfume raw materials can also be a mixture of these groups.

The quantity of perfume raw materials incorporated in a base perfume can vary. In one example, as a weight percentage of the total perfume, a thiol moiety can range from about 0.0000001% to about 10%, a sulfide moiety can range from about 0.0000001% to about 10%, a thiazole moiety can range from about 0.000001% to about 10%, an oxathiane moiety can range from 0.0000001% to about 10%, an isothiocyanate can range from about 0.00000005% to about 5%, and the compounds comprising oxygen, sulfur, and nitrogen can range from about 0.000001% to about 10%.

In another example, as a weight percentage of the total perfume, the thiol moiety can range from about 0.000001% to about 5%, the sulfide moiety can range from about 0.0000001% to about 5%, the thiazole moiety can range from about 0.000005 % to about 5%, the oxathiane moiety can range from 0.000001% to about 5%, the isothiocyanate can range from about 0.0000001% to about 2.5%, and the compounds comprising oxygen, sulfur, and nitrogen can range from about 0.000005% to about 5%.

In another example, as a weight percentage of the total perfume, the thiol moiety can range from about 0.000005% to about 2.5%, the sulfide moiety can range from about 0.000005% to about 2.5%, the thiazole moiety can range from about 0.00001% to about 2.5%, the oxathiane moiety can range from 0.000005% to about 2.5%, the isothiocyanate can range from about 0.0000005% to about 2%, and the compounds comprising oxygen, sulfur, and nitrogen can range from about 0.00001% to about 2.5%.

In another example, as a weight percentage of the total perfume, the thiol moiety can range from about 0.00001% to about 1%, the sulfide moiety can range from about 0.00001% to about 1%, the thiazole moiety can range from about 0.0005% to about 1%, the oxathiane moiety can range from about 0.00001% to about 1%, the isothiocyanate can range from about 0.000001% to about 1%, and the compounds comprising oxygen, sulfur, and nitrogen can range from about 0.0005% to about 1%.

In another example, as a weight percentage of the total perfume, the thiol moiety can range from about 0.000025% to about 0.8%, the sulfide moiety can range from about 0.000025% to about 0.5%, the thiazole moiety can range from about 0.001% to about 0.1%, the oxathiane moiety can range from about 0.000025% to about 0.8%, the isothiocyanate can range from about 0.000005% to about 0.5%, and the compounds comprising oxygen, sulfur, and nitrogen can range from about 0.001% to about 0.1%.

Certain perfume raw materials can be incorporated into a base perfume to resist the habituating effect inherent to the base perfume. As a non-limiting example, compounds having a thiol moiety can include 5-methyl-5-sulfanylhexas-3-one; 2-(4-methyl-1-cyclohex-3-enyl)propane-2-thiol; 5-methyl-2-(2-sulfanylpropan-2-yl)cyclohexan-1-one; 4,7,7-trimethyl-6-thiabicyclo[3.2.1]octane; 4-methoxy-2-methylbutane-2-thiol; methanethiol; ethanethiol; prop-2-ene-1-thiol; propane-2-thiol; 2-methylpropane-2-thiol; propane-1-thiol; butane-2-thiol; butane-1-thiol; 2-methylpropane-1-thiol; methyldisulfanylmethane; 2-methylbutane-2-thiol; 3-methylbutane-2-thiol; 3-methylbutane-2-thiol; pentane-2-thiol; pentane-1-thiol; 2-methylbutane-1-thiol; cyclopentanethiol; 3-methyldisulfanylprop-1-ene; methylsulfanyldisulfanylmethane; 1-methyldisulfanylpropane; ethane-1,2-dithiol; 1-(methyldisulfanyl)prop-1-ene; 3-sulfanylbutan-2-one; ethyldisulfanylethane; hexane-1-thiol; 1-ethyldisulfanylpropane; thiophene-2-thiol; propane-1,3-dithiol; 3-sulfanylpentan-2-one; 2-propan-2-yldisulfanylpropane; butane-1,4-dithiol; benzenethiol; ethylsulfanyldisulfanylethane; 3-methylsulfanyldisulfanylprop-1-ene; 1-methylsulfanyldisulfanylpropane; butane-2,3-dithiol; 4-methyl-4-sulfanylpentan-2-one; 3-prop-2-enyldisulfanylprop-1-ene; 1-methoxyhexane-3-thiol; ethyl 2-sulfanylpropanoate; 1-(prop-2-enyldisulfanyl)propane; 1-propyldisulfanylpropane; 1-(4-hydroxy-3-methoxyphenyl)ethanone butane-1,3-dithiol; 1-propyldisulfanylprop-1-ene; 2-methylbenzenethiol; thiophen-2-ylmethanethiol; 3-sulfanylbutan-2-ol; phenylmethanethiol pentane-1,5-dithiol; 2-ethylbenzenethiol; 3-prop-2-enysulfanyldisulfanylprop-1-ene; methylsulfanyldisulfanylmethane; 1-propylsulfanyldisulfanylpropane; 2,7,7-trimethylbicyclo[3.1.1]heptane-2-thiol; 2,6-dimethylbenzenethiol; 2-phenylethanethiol; hexane-1,6-dithiol; 2-(methyldisulfanylmethyl)furan; pyridin-2-ylmethanethiol; 2-methoxybenzenethiol; (7,7-dimethyl-2-bicyclo[3.1.1]heptanyl)methanethiol; methyldisulfanylbenzene; 1-butylsulfanylbutane; (4-methoxyphenyl)methanethiol; 2-sulfanylpropanoic acid; ethyl 2-methyldisulfanylpropanoate; (2E)-3,7-dimethylocta-2,6-diene-1-thiol; 3,7-dimethylocta-2,6-diene-1-thiol; pyrazin-2-ylmethanethiol; methyldisulfanylmethylbenzene; 2-methyl-5-(1-sulfanylpropan-2-yl)cyclohexane-1-thiol; octane-1,8-dithiol; 2-pyrazin-2-ylethanethiol; naphthalene-2-thiol; 2-oxo-3-sulfanylpropanoic acid; 2-thiophen-2-yldisulfanylthiophene; cyclohexyldisulfanylcyclohexane; 2-(furan-2-ylmethyldisulfanylmethyl)furan; phenyldisulfanylbenzene; benzyldisulfanylmethylbenzene; 8-Hydroxy-5-quinolinesulfonic acid; bis(3-methylbutyl) 2-sulfanylbutanedioate; 2-aminoethanesulfonic acid; 2-phenyl-3H-benzimidazole-5-sulfonic acid; and 2-methyl-2-sulfanylpentan-1-ol.

Non-limiting examples compounds that have a sulfide moiety can include 1-butylsulfanylbutane; ethyl 3-methylsulfanylpropanoate; 2-(methylsulfanylmethyl)furan;

methylsulfanylmethane; methylsulfanylethane; 3-methylsulfanylprop-1-ene; S-methyl  
 ethanethioate; ethylsulfanylethane; 1-methylsulfanylpropane; S-ethyl ethanethioate; 1-  
 methylsulfanylbutane; 2-propan-2-ylsulfanylpropane; bis(methylsulfanyl)methane; 1-  
 ethylsulfanylpropane; thiolane; 1-propylsulfanylpropane; 1-ethylsulfanylbutane; S-ethyl  
 5 propanethioate; S-methyl butanethioate; S-methyl 3-methylbutanethioate; 3-  
 methylsulfanylpropanal; 3-prop-2-enylsulfanylprop-1-ene; methyl 2-methylsulfanylacetate; S-  
 prop-2-enyl propanethioate; 1-methylsulfanylbutan-2-one; 4-methylsulfanylbutan-2-one; 3-  
 methylsulfanylpropan-1-ol; 2,4,6-trimethyl-1,3,5-trithiane; 3-methylsulfanylbutanal; 2-methyl-  
 1,3-thiazolidine; 2-methyl-4,5-dihydro-1,3-thiazole; ethyl 2-methylsulfanylacetate; methyl 3-  
 10 methylsulfanylpropanoate; S-propan-2-yl 3-methylbutanethioate; 4-methyl-4-  
 methylsulfanylpentan-2-one; 2-methyl-1,3-dithiolane; methyl 2-methylsulfanylbutanoate; S-  
 methyl furan-2-carbothioate; S-propan-2-yl 3-methylbut-2-enethioate; thiolan-3-one; 3,5-diethyl-  
 1,2,4-trithiolane; methylsulfanylmethylbenzene; 3-methylsulfanylpropan-1-ol; 2-(propan-2-  
 ylsulfanylmethyl)furan; 2-methyl-5-methylsulfanylfuran; S-(furan-2-ylmethyl) methanethioate;  
 15 1,2,4-trithiolane; 2-methylthiolan-3-one; 4-methylsulfanylbutan-1-ol; S-butan-2-yl 3-  
 methylbutanethioate; S-butan-2-yl 3-methylbut-2-enethioate; S-(furan-2-ylmethyl) ethanethioate;  
 2-propyl-1,3-thiazolidine; 3-methyl-1,1-bis(methylsulfanyl)butane; 3-ethylsulfanylpropan-1-ol;  
 S-methyl benzenecarbothioate; 3,5-dimethyl-1,2,4-trithiolane; S-butan-2-yl 2-  
 methylbutanethioate; methylsulfanylbenzene; 1-pentylsulfanylpentane; (2R,4S)-2-methyl-4-  
 20 propyl-1,3-oxathiane; 2-methyl-4-propyl-1,3-oxathiane; ethyl 2-methyl-2-  
 methylsulfanylpropanoate; S-(furan-2-ylmethyl) propanethioate; 4,7,7-trimethyl-6-  
 thiabicyclo[3.2.1]octane; 3-methyl-1,2,4-trithiane; methylsulfanylmethyl hexanoate; 1-(4,5-  
 dihydro-1,3-thiazol-2-yl)ethanone; 3-methylsulfanylpropanoic acid; 5-methylsulfanyl-2-  
 (methylsulfanylmethyl)pent-2-enal; 4,5-dimethyl-2-(2-methylpropyl)-2,5-dihydro-1,3-thiazole;  
 25 3-methylsulfanylhexasan-1-ol; 2-methyl-4,5-dihydrofuran-3-thiol acetate; 4-(3-  
 oxobutylsulfanyl)butan-2-one; 3-methylsulfanylbutanoic acid; 2-methylsulfanylpurazine; 2-  
 methyl-3-methylsulfanylpurazine; 2-(furan-2-ylmethylsulfanylmethyl)furan; 2-  
 (methylsulfanylmethyl)purazine; 3,5-di(propan-2-yl)-1,2,4-trithiolane; 2-methylsulfanylphenol;  
 2-methyl-3-methylsulfanylpurazine; ethyl 3-(furan-2-ylmethylsulfanyl)propanoate; 2,2,4,4,6,6-  
 30 hexamethyl-1,3,5-trithiane; 2-methyl-5,7-dihydrothieno[3,4-d]pyrimidine; 2-amino-4-  
 methylsulfanylbutanoic acid; (2S)-2-amino-4-methylsulfanylbutanoic acid; 2',3a-  
 dimethylspiro[6,6a-dihydro-5H-[1,3]dithiolo[4,5-b]furan-2,3'-oxolane]; 2,5-dimethyl-1,4-  
 dithiane-2,5-diol; and methyl 2-thiofuroate.



Non-limiting examples of compounds that have a thiazole moiety can include 2-(2-methylpropyl)-1,3-thiazole; 2-(4-methyl-1,3-thiazol-5-yl)ethanol; 4-methyl-2-propan-2-yl-1,3-thiazole; 1-(1,3-thiazol-2-yl)ethanone; 2,4,5-Trimethylthiazole; 2-isopropyl-4-methylthiazole; 4-vinyl-5-methylthiazole; 2,4-Dimethyl-5-acetylthiazole 1,3-thiazole; 4-methyl-1,3-thiazole; 2,4-dimethyl-1,3-thiazole; 4,5-dimethyl-1,3-thiazole; 2,5-dimethyl-1,3-thiazole; 5-ethenyl-4-methyl-1,3-thiazole; 2-ethyl-4-methyl-1,3-thiazole; 4-ethyl-2-methyl-1,3-thiazole; 2-propyl-1,3-thiazole; 2,4,5-trimethyl-1,3-thiazole; 2-ethyl-1,3-thiazole; 2-ethoxy-1,3-thiazole; 2-butan-2-yl-1,3-thiazole; 5-methoxy-2-methyl-1,3-thiazole; 2-ethyl-4,5-dimethyl-1,3-thiazole; 1,3-benzothiazole; 2,5-diethyl-4-methyl-1,3-thiazole; 1-(1,3-thiazol-2-yl)propan-1-one; 4,5-dimethyl-2-(2-methylpropyl)-1,3-thiazole; 2-methyl-1,3-benzothiazole; 1-(2,4-dimethyl-1,3-thiazol-5-yl)ethanone; and 4-methyl-2-propan-2-yl-1,3-thiazole.

Non-limiting examples of compounds that have an oxathiane moiety can include (2R,4S)-2-methyl-4-propyl-1,3-oxathiane, 2-methyl-4-propyl-1,3-oxathiane, and 2-pentyl-4-propyl-1,3-oxathiane.

Non-limiting examples of the compounds containing oxygen, sulfur, and nitrogen include 2-(4-methyl-1,3-thiazol-5-yl)ethanol; 1-(1,3-thiazol-2-yl)ethanone; 6-methyl-7-Oxa-1-thia-4-azaspiro[4.4]nonane; 2-[(furan-2-ylmethyl)sulfanyl]-5-methylpyrazine; 2,4-Dimethyl-5-acetylthiazole; 2-ethoxy-1,3-thiazole; 5-methoxy-2-methyl-1,3-thiazole; 1-(4,5-dihydro-1,3-thiazol-2-yl)ethanone; 1-(1,3-thiazol-2-yl)propan-1-one; 1-(2,4-dimethyl-1,3-thiazol-5-yl)ethanone; 2-amino-4-methylsulfanylbutanoic acid; (2S)-2-amino-4-methylsulfanylbutanoic acid; 8-Hydroxy-5-quinolinesulfonic acid; 2-aminoethanesulfonic acid; 2-phenyl-3H-benzimidazole-5-sulfonic acid.

More specific examples of compounds that have a thiol moiety can include a-methyl-5-sulfanylhexan-3-one; 2-(4-methyl-1-cyclohex-3-enyl)propane-2-thiol; 5-methyl-2-(2-sulfanylpropan-2-yl)cyclohexan-1-one; 4,7,7-trimethyl-6-thiabicyclo[3.2.1]octane; and 4-methoxy-2-methylbutane-2-thiol.

More specific examples of compounds that have a sulfide moiety can include 1-butylsulfanylbutane; ethyl 3-methylsulfanylpropanoate; and 2-(methylsulfanylmethyl)furan.

More specific examples of compounds that have a thiazole moiety can include 2-(2-methylpropyl)-1,3-thiazole; 2-(4-methyl-1,3-thiazol-5-yl)ethanol; 4-methyl-2-propan-2-yl-1,3-thiazole; 4-methyl-2-propan-2-yl-1,3-thiazole; and 1-(1,3-thiazol-2-yl)ethanone.

A more specific example of a compound that has an oxathiane moiety can be (2R,4S)-2-methyl-4-propyl-1,3-oxathiane.

More specific examples of a compound comprising oxygen, sulfur, and nitrogen can include 2-(4-methyl-1,3-thiazol-5-yl)ethanol, 1-(1,3-thiazol-2-yl)ethanone; and 6-methyl-7-Oxa-1-thia-4-azaspiro[4.4]nonane.

In another example, the perfume raw materials can include sulfide moieties or thiazole moieties. The sulfide moieties can include 1-butylsulfanylbutane, 4,7,7-trimethyl-6-thiabicyclo[3.2.1]octane, and 2-methyl-3-methylsulfanylpiprazine. The thiazole moieties can include 1-(1,3-thiazol-2-yl)ethanone.

In another example, the perfume raw materials can be added to the base perfume in a group. Suitable groups can include group (a): 1-butylsulfanylbutane; (2R, 4S)-2-methyl-4-propyl-1,3-oxathiane; and 4-methoxy-2-methylbutane-2-thiol; group (b): 2-(4-methyl-1,3-thiazol-5-yl)ethanol; 7-Oxa-1-thia-4-azaspiro[4.4]nonane; and 6-methyl-, 1-(1,3-thiazol-2-yl)ethanone; group (c): 2-(methylsulfanylmethyl)furan; ethyl 3-methylsulfanylpropanoate; and 1-butylsulfanylbutane; group (d): 5-methyl-5-sulfanylhexan-3-one; 5-methyl-2-(2-sulfanylpropan-2-yl)cyclohexan-1-one; and 2-(4-methyl-1-cyclohex-3-enyl)propane-2-thiol; group (e): 2-(2-methylpropyl)-1,3-thiazole; 2-(4-methyl-1,3-thiazol-5-yl)ethanol; and 4-methyl-2-propan-2-yl-1,3-thiazole; and group (f): (2R,4S)-2-methyl-4-propyl-1,3-oxathiane; 2-(4-methyl-1-cyclohex-3-enyl)propane-2-thiol; and (NE)-N-[(6E)-2,4,4,7-tetramethylnona-6,8-dien-3-ylidene]hydroxylamine.

Examples of some formulated habituation-resistant perfumes suitable for incorporation into personal care compositions are disclosed in Table 1. The perfumes in Table 1 include thiol and oxathiane sulfur-based moieties in the grapefruit zest #925 and castech compounds respectively. Additionally, a nitrogen-based habituation reducing oxime group is included in the labienoxime compound.

Table 1

Perfume Raw Material	Perfume A	Perfume B	Perfume C	Perfume D	Perfume E	Perfume F	Perfume G
4 - Tertiary Butyl Cyclohexyl Acetate	2.50%	2.50%	3.00%	3.00%	3.50%	3.50%	3.50%
Allyl Caproate	0.20%	0.10%	0.10%	0.20%	0.10%	0.20%	0.20%
Allyl Cyclohexane Propionate	1.25%	2.00%	1.25%	2.00%	2.00%	2.00%	2.00%
Allyl Heptate	3.50%	2.90%	3.50%	3.50%	4.00%	3.00%	3.00%
Benzyl Acetate	3.00%	3.00%	3.00%	2.00%	2.00%	2.00%	3.00%
Benzyl Salicylate	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
Beta Gamma Hexenol	0.20%	0.15%	0.10%	0.20%	0.15%	0.10%	0.20%
Castech	1.00%	0.90%	1.00%	0.95%	1.25%	0.90%	0.85%
Cis 3 Hexenyl Acetate	0.10%	0.20%	0.10%	0.10%	0.20%	0.10%	0.10%

Cis Jasmone	0.10%	0.10%	0.10%	0.20%	0.10%	0.10%	0.10%
Cyclopentol Hc 937165	0.20%	0.20%	0.40%	0.40%	0.20%	0.40%	0.40%
Delta Damascone	0.10%	0.20%	0.10%	0.20%	0.10%	0.10%	0.10%
Dihydro Iso Jasmonate	1.00%	1.00%	1.25%	0.75%	1.50%	1.50%	0.79%
Dihydro Myrcenol	2.50%	3.00%	2.50%	2.50%	3.00%	3.00%	2.00%
Dimethyl Benzyl Carbiny Acetate	4.00%	2.00%	5.00%	1.00%	3.50%	3.00%	2.00%
Dimethyl Benzyl Carbiny Butyrate	1.00%	2.00%	1.00%	1.00%	0.70%	1.00%	2.00%
Ethyl 2 Methyl Pentanoate	0.20%	0.10%	0.15%	0.10%	0.15%	0.20%	0.40%
Ethyl Acetoacetate	1.50%	2.50%	2.50%	1.40%	1.75%	1.50%	2.00%
Ethyl Butyrate	0.10%	0.10%	0.25%	0.25%	0.20%	0.20%	0.10%
Ethyl Caproate FCC	0.50%	0.40%	0.40%	0.50%	0.50%	0.50%	0.50%
Ethyl Maltol	0.75%	0.50%	0.75%	0.50%	0.50%	1.00%	1.00%
Ethyl Oenanthate	0.50%	0.20%	0.15%	0.15%	0.20%	0.50%	0.40%
Ethyl-2-Methyl Butyrate	0.50%	0.75%	0.50%	0.50%	0.75%	0.75%	0.75%
Ethylene Brassylate	3.00%	4.00%	4.00%	5.00%	3.00%	3.00%	3.00%
Florhydral	0.25%	0.25%	0.25%	0.50%	0.50%	0.50%	0.25%
Gamma Decalactone	0.50%	1.00%	1.25%	0.78%	0.50%	0.40%	0.65%
Grapefruit Zest #925 (C-Citrus&Allied)	0.15%	0.30%	0.20%	0.25%	0.35%	0.35%	0.50%
Hexamethylindanopyran	10.00%	8.00%	8.00%	8.00%	8.00%	10.00%	10.00%
Hexyl Acetate	1.25%	1.75%	1.75%	1.50%	1.00%	0.50%	0.50%
Hexyl Cinnamic Aldehyde	7.00%	8.50%	10.00%	10.00%	5.00%	5.00%	7.00%
Indolene	0.10%	0.10%	0.10%	0.20%	0.10%	0.10%	0.20%
Ionone Beta	2.00%	1.50%	1.25%	1.25%	1.50%	1.50%	1.00%
Iso E Super Or Wood	2.50%	2.00%	1.50%	2.00%	2.00%	3.00%	2.50%
Italian Mandarin Oil Yellow #10567	0.50%	1.00%	0.50%	1.00%	0.50%	1.08%	0.50%
Jasmal	0.50%	0.40%	0.40%	0.50%	0.40%	0.50%	0.40%
Labienoxime 10 Opt	0.85%	0.75%	0.70%	1.00%	0.80%	1.00%	0.75%
Ligustral Or Triplal	0.20%	0.20%	0.40%	0.25%	0.35%	0.35%	0.20%
Linalool	6.00%	6.00%	6.00%	6.00%	6.00%	6.50%	7.00%
Linalyl Acetate	2.00%	2.00%	1.00%	2.00%	2.00%	3.00%	1.00%
Linalyl Benzoate	0.50%	1.00%	0.40%	0.40%	1.00%	0.50%	0.50%
Methyl Dihydro Jasmonate	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
Methyl Iso Butenyl Tetrahydro Pyran	0.05%	0.02%	0.02%	0.02%	0.05%	0.02%	0.01%
Methyl Phenyl Carbiny Acetate	0.68%	0.75%	1.50%	1.50%	1.00%	1.00%	0.60%
Nectaryl	2.00%	1.00%	1.00%	1.00%	2.00%	2.00%	1.00%
Nonalactone	0.50%	0.50%	0.75%	0.25%	0.75%	0.20%	0.20%
Oil Lemon Brazilcp Select Fcc Enh 15130	2.00%	3.00%	2.50%	2.00%	3.00%	2.50%	2.50%
Oil Pink Grapefruit	6.50%	7.00%	5.50%	7.00%	5.50%	6.50%	6.00%

California Fcc 15029							
Phenoxy Ethyl Iso Butyrate	3.00%	3.00%	2.00%	3.00%	5.00%	2.00%	5.00%
Prenyl Acetate	0.20%	0.25%	0.40%	0.25%	0.35%	0.45%	0.40%
Sandalore	0.50%	0.50%	0.50%	0.75%	1.00%	1.00%	1.00%
Synambran R 50% In IPM	0.22%	0.18%	0.18%	0.20%	0.40%	0.50%	0.20%
Undecalactone	7.00%	4.50%	4.50%	5.00%	5.00%	4.50%	5.00%
Undecavertol	0.10%	0.50%	0.10%	0.50%	0.10%	1.00%	0.50%
Veloutone	0.25%	0.25%	0.25%	0.50%	0.50%	0.50%	0.25%
Verdox	5.00%	5.00%	6.00%	6.00%	6.00%	5.00%	6.00%
TOTALS :	100%	100%	100%	100%	100%	100%	100%

Suitable perfume raw materials may be obtained from: Symrise GmbH, with offices located at Muhlenfeldstrasse 1, Holzminden, 37603, Germany; International Flavors & Fragrances Inc., a New York corporation having an address at 521 W 57th Street, New York, NY 10019; Givaudan Suisse SA a Swiss corporation having an address at 1214 Vernier, Switzerland; Firmenich Inc., with offices located at 250 Plainsboro Rd., Plainsboro Township, NJ 08536, United States; and Takasago International Corporation (USA), with offices located at 4 Volvo Drive, Rockleigh, NJ 07647, United States.

Personal care compositions can also incorporate desirable scents through inclusion of perfumes and perfume raw materials in perfume delivery systems. Certain perfume delivery systems, methods of making certain perfume delivery systems, and the uses of such perfume delivery systems are disclosed in U.S. Pre-Grant Publication No. 2007/0275866 A1. The perfumes and perfume raw materials previously disclosed can be used in such perfume delivery systems. Such perfume delivery systems include: polymer-assisted delivery (PAD), molecule-assisted delivery (MAD), fiber-assisted deliver (FAD), amine-assisted delivery (AAD), cyclodextrin delivery system (CD), starch encapsulated accord (SEA), inorganic carrier delivery system (ZIC), and Pro-Perfume (PP). Examples of these perfume delivery systems are further described below.

#### Polymer-Assisted Delivery (PAD)

This perfume delivery technology uses polymeric materials to deliver perfume materials. Classical coacervation, water soluble or partly soluble to insoluble charged or neutral polymers, liquid crystals, hot melts, hydrogels, perfumed plastics, microcapsules, nano- and micro-latexes, polymeric film formers, and polymeric absorbents, polymeric adsorbents, etc. are some examples. PAD systems can include, but are not limited to, matrix systems, and reservoir systems.

In a matrix system, the fragrance is dissolved or dispersed in a polymer matrix or particle. Perfumes, for example, may be 1) dispersed into the polymer prior to formulating into the product or 2) added separately from the polymer during or after formulation of the product. Diffusion of perfume from the polymer is a common trigger that allows or increases the rate of perfume release from a polymeric matrix system that is deposited or applied to the desired surface (situs), although many other triggers are known that may control perfume release. Absorption and/or adsorption into or onto polymeric particles, films, solutions, and the like are aspects of this technology. Nano, or micro-particles, composed of organic materials (e.g., latexes) are examples. Suitable particles include a wide range of materials including, but not limited to polyacetal, polyacrylate, polyacrylic, polyacrylonitrile, polyamide, polyaryletherketone, polybutadiene, polybutylene, polybutylene terephthalate, polychloroprene, polyethylene, polyethylene terephthalate, polycyclohexylene dimethylene terephthalate, polycarbonate, polychloroprene, polyhydroxyalkanoate, polyketone, polyester, polyethylene, polyetherimide, polyethersulfone, polyethylenechlorinates, polyimide, polyisoprene, polylactic acid, polymethylpentene, polyphenylene oxide, polyphenylene sulfide, polyphthalamide, polypropylene, polystyrene, polysulfone, polyvinyl acetate, polyvinyl chloride, as well as polymers or copolymers based on acrylonitrile-butadiene, cellulose acetate, ethylene-vinyl acetate, ethylene vinyl alcohol, styrene-butadiene, vinyl acetate-ethylene, and mixtures thereof.

A "standard" matrix system refers to systems that are "pre-loaded" with the intent of keeping the pre-loaded perfume associated with the polymer until the moment, or moments of, perfume release. Such polymers may also suppress the neat product odor and provide a bloom and/or longevity benefit depending on the rate of perfume release. One challenge with such systems is to achieve the ideal balance between 1) in-product stability (keeping perfume inside carrier until you need it) and 2) timely release (during use or from dry situs). Achieving such stability is particularly important during in-product storage and product aging. This challenge is particularly apparent for aqueous-based, surfactant-containing products, such as heavy duty liquid laundry detergents. Many "Standard" matrix systems available effectively become "Equilibrium" systems when formulated into aqueous-based products. One may select an "Equilibrium" system or a Reservoir system, which has acceptable in-product diffusion stability and available triggers for release (e.g., friction). "Equilibrium" systems are those in which the perfume and polymer may be added separately to the product, and the equilibrium interaction between perfume and polymer leads to a benefit at one or more consumer touch points (versus a free perfume control that has no polymer-assisted delivery technology). The polymer may also be pre-loaded with perfume; however, part or all of the perfume may diffuse during in-product

storage reaching an equilibrium that includes having desired perfume raw materials (PRMs) associated with the polymer. The polymer then carries the perfume to the surface, and release is typically via perfume diffusion. The use of such equilibrium system polymers has the potential to decrease the neat product odor intensity of the neat product (usually more so in the case of pre-loaded standard system). Deposition of such polymers may serve to “flatten” the release profile and provide increased longevity. As indicated above, such longevity would be achieved by suppressing the initial intensity and may enable the formulator to use more high impact or low odor detection threshold (ODT) or low Kovats Index (KI) PRMs to achieve FMOT benefits without initial intensity that is too strong or distorted. It is important that perfume release occurs within the time frame of the application to impact the desired consumer touch point or touch points. Suitable micro-particles and micro-latexes as well as methods of making same may be found in U.S. Pre-Grant Publication No. 2005/0003980 A1. Matrix systems also include hot melt adhesives and perfume plastics. In addition, hydrophobically modified polysaccharides may be formulated into the perfumed product to increase perfume deposition and/or modify perfume release. All such matrix systems, including for example polysaccharides and nanolatexes may be combined with other PDTs, including other PAD systems such as PAD reservoir systems in the form of a perfume microcapsule (PMC). Polymer Assisted Delivery (PAD) matrix systems may include those described in the following references: U.S. Pre-Grant Publication No. 2004/0110648 A1 and U.S. Patent No. 6,531,444.

Silicones are also examples of polymers that may be used as PDT, and can provide perfume benefits in a manner similar to the polymer-assisted delivery “matrix system”. Such a PDT is referred to as silicone-assisted delivery (SAD). One may pre-load silicones with perfume, or use them as an equilibrium system as described for PAD. Suitable silicones as well as making same may be found in U.S. Pre-Grant Publication No. 2005/0143282 A1. Functionalized silicones may also be used as described in U.S. Pre-Grant Publication No. 2006/003913 A1. Examples of silicones include polydimethylsiloxane and polyalkyldimethylsiloxanes. Other examples include those with amine functionality, which may be used to provide benefits associated with amine-assisted delivery (AAD) and/or polymer-assisted delivery (PAD) and/or amine-reaction products (ARP). Other such examples may be found in U.S. Pre-Grant Publication No. 2005/0003980 A1.

Reservoir systems are also known as a core-shell type technology, or one in which the fragrance is surrounded by a perfume release controlling membrane, which may serve as a protective shell. The material inside the microcapsule is referred to as the core, internal phase, or fill, whereas the wall is sometimes called a shell, coating, or membrane. Microparticles or

pressure sensitive capsules or microcapsules are examples of this technology. Microcapsules of the current invention are formed by a variety of procedures that include, but are not limited to, coating, extrusion, spray-drying, interfacial, in-situ and matrix polymerization. The possible shell materials vary widely in their stability toward water. Among the most stable are polyoxymethyleneurea (PMU)-based materials, which may hold certain PRMs for even long periods of time in aqueous solution (or product). Such systems include but are not limited to urea-formaldehyde and/or melamine-formaldehyde. Gelatin-based microcapsules may be prepared so that they dissolve quickly or slowly in water, depending for example on the degree of cross-linking. Many other capsule wall materials are available and vary in the degree of perfume diffusion stability observed. Without wishing to be bound by theory, the rate of release of perfume from a capsule, for example, once deposited on a surface is typically in reverse order of in-product perfume diffusion stability. As such, urea-formaldehyde and melamine-formaldehyde microcapsules for example, typically require a release mechanism other than, or in addition to, diffusion for release, such as mechanical force (e.g., friction, pressure, shear stress) that serves to break the capsule and increase the rate of perfume (fragrance) release. Other triggers include melting, dissolution, hydrolysis or other chemical reaction, electromagnetic radiation, and the like. Suitable capsule wall materials include, in addition to aminoplasts, polyvinyl alcohol, polyvinyl pyrrolidone, polyethylene glycol, polysaccharides and modified polysaccharides, gel forming proteins, modified celluloses such as carboxymethylcelluloses and hydroxyethylcelluloses, polyacrylates, polyureas, polyurethanes and mixtures thereof. The capsules may be further coated with an additional coating that can improve the deposition and/or retention of the capsule on the desired surface. Suitable coating materials include a cationic polymer selected from the group consisting of selected from the group consisting of polysaccharides, cationically modified starch, cationically modified guar, polysiloxanes, polydiallyl dimethyl ammonium halides, copolymers of polydiallyl dimethyl ammonium chloride and vinyl pyrrolidone, acrylamides, imidazoles, imidazolinium halides, imidazolium halides, polyvinyl amine, copolymers of polyvinyl amine and N-vinyl formamide to the surface of the capsule to form a cationically coated polymer encapsulated material. Typical capsules have a diameter of 1 micron to 500 microns. The use of pre-loaded microcapsules requires the proper ratio of in-product stability and in-use and/or on-surface (on-situs) release, as well as proper selection of PRMs. Microcapsules that are based on urea-formaldehyde and/or melamine-formaldehyde are relatively stable, especially in near neutral aqueous-based solutions. These materials may require a friction trigger which may not be applicable to all product applications.

Other microcapsule materials (e.g., gelatin) may be unstable in aqueous-based products and may even provide reduced benefit (versus free perfume control) when in-product aged.

#### Molecule-Assisted Delivery (MAD)

Non-polymer materials or molecules may also serve to improve the delivery of perfume.

5 Without wishing to be bound by theory, perfume may non-covalently interact with organic materials, resulting in altered deposition and/or release. Non-limiting examples of such organic materials include but are not limited to hydrophobic materials such as organic oils, waxes, mineral oils, petrolatum, fatty acids or esters, sugars, surfactants, liposomes and even other perfume raw material (perfume oils), as well as natural oils, including body and/or other soils.

10 Perfume fixatives are yet another example. In one example, non-polymeric materials or molecules have a CLogP greater than about 2. Molecule-Assisted Delivery (MAD) may also include those described in U.S. Patent No. 7,119,060.

#### Fiber-Assisted Delivery (FAD):

The choice or use of a situs itself may serve to improve the delivery of perfume. In fact,

15 the situs itself may be a perfume delivery technology. For example, different fabric types such as cotton or polyester will have different properties with respect to ability to attract and/or retain and/or release perfume. The amount of perfume deposited on or in fibers may be altered by the choice of fiber, and also by the history or treatment of the fiber, as well as by any fiber coatings or treatments. Fibers may be woven and non-woven as well as natural or synthetic. Natural

20 fibers include those produced by plants, animals, and geological processes, and include but are not limited to cellulose materials such as cotton, linen, hemp jute, flax, ramie, and sisal, and fibers used to manufacture paper and cloth. Fiber-Assisted Delivery may consist of the use of wood fiber, such as thermomechanical pulp and bleached or unbleached kraft or sulfite pulps. Animal fibers consist largely of particular proteins, such as silk, sinew, catgut and hair (including

25 wool). Polymer fibers based on synthetic chemicals include but are not limited to polyamide nylon, PET or PBT polyester, phenol-formaldehyde (PF), polyvinyl alcohol fiber (PVOH), polyvinyl chloride fiber (PVC), polyolefins (PP and PE), and acrylic polymers. All such fibers may be pre-loaded with a perfume, and then added to a product that may or may not contain free perfume and/or one or more perfume delivery technologies. In one example, the fibers may be

30 added to a product prior to being loaded with a perfume, and then loaded with a perfume by adding a perfume that may diffuse into the fiber, to the product. Without wishing to be bound by theory, the perfume may absorb onto or be absorbed into the fiber, for example, during product storage, and then be released at one or more moments of truth or consumer touch points.



Amine-Assisted Delivery (AAD)

The amine-assisted delivery technology approach utilizes materials that contain an amine group to increase perfume deposition or modify perfume release during product use. There is no requirement in this approach to pre-complex or pre-react the perfume raw material(s) and amine prior to addition to the product. In one example, amine-containing AAD materials suitable for use herein may be non-aromatic; for example, polyalkylimine, such as polyethyleneimine (PEI), or polyvinylamine (PVAm), or aromatic, for example, anthranilates. Such materials may also be polymeric or non-polymeric. In one example, such materials contain at least one primary amine. This technology will allow increased longevity and controlled release also of low ODT perfume notes (e.g., aldehydes, ketones, enones) via amine functionality, and delivery of other PRMs, without being bound by theory, via polymer-assisted delivery for polymeric amines. Without technology, volatile top notes can be lost too quickly, leaving a higher ratio of middle and base notes to top notes. The use of a polymeric amine allows higher levels of top notes and other PRMS to be used to obtain freshness longevity without causing neat product odor to be more intense than desired, or allows top notes and other PRMs to be used more efficiently. In one example, AAD systems are effective at delivering PRMs at pH greater than about neutral. Without wishing to be bound by theory, conditions in which more of the amines of the AAD system are deprotonated may result in an increased affinity of the deprotonated amines for PRMs such as aldehydes and ketones, including unsaturated ketones and enones such as damascone. In another example, polymeric amines are effective at delivering PRMs at pH less than about neutral. Without wishing to be bound by theory, conditions in which more of the amines of the AAD system are protonated may result in a decreased affinity of the protonated amines for PRMs such as aldehydes and ketones, and a strong affinity of the polymer framework for a broad range of PRMs. In such an example, polymer-assisted delivery may be delivering more of the perfume benefit; such systems are a subspecies of AAD and may be referred to as Amine- Polymer-Assisted Delivery or APAD. In some cases when the APAD is employed in a composition that has a pH of less than seven, such APAD systems may also be considered Polymer-Assisted Delivery (PAD). In yet another example, AAD and PAD systems may interact with other materials, such as anionic surfactants or polymers to form coacervate and/or coacervates-like systems. In another example, a material that contains a heteroatom other than nitrogen, for example sulfur, phosphorus or selenium, may be used as an alternative to amine compounds. In yet another example, the aforementioned alternative compounds can be used in combination with amine compounds. In yet another example, a single molecule may comprise an amine moiety and one or more of the alternative heteroatom moieties, for example, thiols, phosphines and

selenols. Suitable AAD systems as well as methods of making same may be found in U.S. Patent No. 6,103,678.

#### Cyclodextrin Delivery System (CD)

This technology approach uses a cyclic oligosaccharide or cyclodextrin to improve the delivery of perfume. Typically a perfume and cyclodextrin (CD) complex is formed. Such complexes may be preformed, formed in-situ, or formed on or in the situs. Without wishing to be bound by theory, loss of water may serve to shift the equilibrium toward the CD-Perfume complex, especially if other adjunct ingredients (e.g., surfactant) are not present at high concentration to compete with the perfume for the cyclodextrin cavity. A bloom benefit may be achieved if water exposure or an increase in moisture content occurs at a later time point. In addition, cyclodextrin allows the perfume formulator increased flexibility in selection of PRMs. Cyclodextrin may be pre-loaded with perfume or added separately from perfume to obtain the desired perfume stability, deposition or release benefit. Suitable cyclodextrin delivery systems as well as methods of making the same may be found in U.S. Pre-Grant Publication No. 2006/0263313 A1.

#### Starch Encapsulated Accord (SEA)

The use of a starch encapsulated accord (SEA) technology allows one to modify the properties of the perfume, for example, by converting a liquid perfume into a solid by adding ingredients such as starch. The benefit includes increased perfume retention during product storage, especially under non-aqueous conditions. Upon exposure to moisture, a perfume bloom may be triggered. Benefits at other moments of truth may also be achieved because the starch allows the product formulator to select PRMs or PRM concentrations that normally cannot be used without the presence of SEA. Another technology example includes the use of other organic and inorganic materials, such as silica to convert perfume from liquid to solid. Suitable SEAs as well as methods of making same may be found in U.S. Patent No. 6,458,754 B1.

#### Inorganic Carrier Delivery System (ZIC)

This technology relates to the use of porous zeolites or other inorganic materials to deliver perfumes. Perfume-loaded zeolite may be used with or without adjunct ingredients used for example to coat the perfume-loaded zeolite (PLZ) to change its perfume release properties during product storage or during use or from the dry situs. Suitable zeolite and inorganic carriers as well as methods of making same may be found in U.S. Pre-Grant Publication No. 2005/0003980 A1. Silica is another form of ZIC. Another example of a suitable inorganic

carrier includes inorganic tubules, where the perfume or other active material is contained within the lumen of the nano- or micro-tubules. Preferably, the perfume-loaded inorganic tubule (or Perfume-Loaded Tubule or PLT) is a mineral nano- or micro-tubule, such as halloysite or mixtures of halloysite with other inorganic materials, including other clays. The PLT technology may also comprise additional ingredients on the inside and/or outside of the tubule for the purpose of improving in-product diffusion stability, deposition on the desired situs or for controlling the release rate of the loaded perfume. Monomeric and/or polymeric materials, including starch encapsulation, may be used to coat, plug, cap, or otherwise encapsulate the PLT. Suitable PLT systems as well as methods of making same may be found in U.S. Patent No. 5,651,976.

#### Pro-Perfume (PP)

This technology refers to perfume technologies that result from the reaction of perfume materials with other substrates or chemicals to form materials that have a covalent bond between one or more PRMs and one or more carriers. The PRM is converted into a new material called a pro-PRM (i.e., pro-perfume), which then may release the original PRM upon exposure to a trigger such as water or light. Pro-perfumes may provide enhanced perfume delivery properties such as increased perfume deposition, longevity, stability, retention, and the like. Pro-perfumes include those that are monomeric (non-polymeric) or polymeric, and may be pre-formed or may be formed in-situ under equilibrium conditions, such as those that may be present during in-product storage or on the wet or dry situs.

Nonlimiting examples of pro-perfumes include Michael adducts (e.g., beta-amino ketones), aromatic or non-aromatic imines (Schiffs Bases), oxazolidines, beta-keto esters, and orthoesters. Another example includes compounds comprising one or more beta-oxy or beta-thio carbonyl moieties capable of releasing a PRM, for example, an alpha, beta-unsaturated ketone, aldehyde or carboxylic ester. The typical trigger for perfume release is exposure to water; although other triggers may include enzymes, heat, light, pH change, autoxidation, a shift of equilibrium, change in concentration or ionic strength and others. For aqueous-based products, light-triggered pro-perfumes are particularly suited. Such photo-pro-perfumes (PPPs) include but are not limited to those that release coumarin derivatives and perfumes and/or pro-perfumes upon being triggered. The released pro-perfume may release one or more PRMs by means of any of the above mentioned triggers. In one example, the photo-pro-perfume releases a nitrogen-based pro-perfume when exposed to a light and/or moisture trigger. In another example, the nitrogen-based pro-perfume, released from the photo-pro-perfume, releases one or more PRMs selected,

for example, from aldehydes, ketones (including enones) and alcohols. In still another example, the PPP releases a dihydroxy coumarin derivative. The light-triggered pro-perfume may also be an ester that releases a coumarin derivative and a perfume alcohol. In one example the pro-perfume is a dimethoxybenzoin derivative as described in U.S. Pre-Grant Publication No. 2006/0020459 A1. In another example the pro-perfume is a 3', 5'-dimethoxybenzoin (DMB) derivative that releases an alcohol upon exposure to electromagnetic radiation. In yet another example, the pro-perfume releases one or more low ODT PRMs, including tertiary alcohols such as linalool, tetrahydrolinalool, or dihydromyrcenol. Suitable pro-perfumes and methods of making same can be found in U.S. Patent No. 7,018,978 B2.

An amine reaction product ("ARP") is a subclass or species of PP. One may also use "reactive" polymeric amines in which the amine functionality is pre-reacted with one or more PRMs to form an amine reaction product (ARP). Typically the reactive amines are primary and/or secondary amines, and may be part of a polymer or a monomer (non-polymer). Such ARPs may also be mixed with additional PRMs to provide benefits of polymer-assisted delivery and/or amine-assisted delivery. Nonlimiting examples of polymeric amines include polymers based on polyalkylimines, such as polyethyleneimine (PEI), or polyvinylamine (PVAm). Nonlimiting examples of monomeric (non-polymeric) amines include hydroxyl amines, such as 2-aminoethanol and its alkyl substituted derivatives, and aromatic amines such as anthranilates. The ARPs may be premixed with perfume or added separately in leave-on or rinse-off applications. In another example, a material that contains a heteroatom other than nitrogen, for example oxygen, sulfur, phosphorus or selenium, may be used as an alternative to amine compounds. In yet another example, the aforementioned alternative compounds can be used in combination with amine compounds. In yet another example, a single molecule may comprise an amine moiety and one or more of the alternative heteroatom moieties, for example, thiols, phosphines and selenols. The benefit may include improved delivery of perfume as well as controlled perfume release. Suitable ARPs as well as methods of making same can be found in U.S. Patent No. 6,413,920 B1.

The perfumes disclosed herein can be used as the perfume component pro-perfume compounds that contain sulfur. The term "pro-perfume compound" herein refers to compounds resulting from the chemical bonding of perfume raw materials (PRMs) with materials that comprise sulfur. The pro-perfume compound can release the original PRM (i.e., pre-converted) upon exposure to a trigger such as water or light or atmospheric oxygen. Suitable methods of making the same can be found in U.S. Patent No. 7,018,978.

#### Amounts of Perfumes and PRMs Used In Delivery Systems

In one example, the perfumes and PRM disclosed herein, and stereoisomers thereof, are suitable for use, in perfume delivery systems at levels, based on total perfume delivery system weight, of from 0.001% to about 50%, from 0.005% to 30%, from 0.01% to about 10%, from 0.025% to about 5%, or even from 0.025% to about 1%.

5 In one example, the perfume delivery systems disclosed herein are suitable for use in personal care compositions at levels, based on total personal care composition weight, from about 0.001% to about 20%, from about 0.01% to about 10%, from about 0.05% to about 5%, from about 0.1% to about 0.5%.

10 In one example, the amount of the perfumes and PRM disclosed herein, based on the total microcapsules and/or nanocapsules (Polymer Assisted Delivery (PAD) Reservoir System) weight, may be from about 0.1% to about 99%, from 25% to about 95%, from 30 to about 90%, from 45% to about 90%, from 65% to about 90%.

15 In one example, the amount of total perfume based on total weight of starch encapsulates and starch agglomerates (Starch Encapsulated Accord (SEA)) ranges from 0.1% to about 99%, from 25% to about 95%, from 30 to about 90%, from 45% to about 90%, from 65% to about 90%. In one example, the perfumes and PRM disclosed herein, including stereoisomers thereof, are suitable for use, in such starch encapsulates and starch agglomerates. Such perfumes, PRMs and stereoisomers thereof may be used in combination in such starch encapsulates and starch agglomerates.

20 In one example, the amount of total perfume based on total weight of [cyclodextrin - perfume] complexes (Cyclodextrin (CD)) ranges from 0.1% to about 99%, from 2.5% to about 75%, from 5% to about 60%, from 5% to about 50%, from 5% to about 25%. In one example, the perfumes and PRM disclosed herein, and stereoisomers thereof, are suitable for use in such [cyclodextrin - perfume] complexes. Such perfumes, PRMs and stereoisomers thereof may be  
25 used in combination in such [cyclodextrin - perfume] complexes.

In one example, the amount of total perfume based on total weight of Polymer Assisted Delivery (PAD) Matrix Systems (including Silicones) ranges from 0.1% to about 99%, from 2.5% to about 75%, from 5% to about 60%, from 5% to about 50%, from 5% to about 25%. In one example, the amount of total perfume based on total weight of a hot melt perfume delivery  
30 system/perfume loaded plastic Matrix System and ranges from 1% to about 99%, from 2.5% to about 75%, from 5% to about 60%, from 5% to about 50%, from 10 % to about 50%. In one example, the perfumes and PRM disclosed herein, and stereoisomers thereof, are suitable for use, in such Polymer Assisted Delivery (PAD) Matrix Systems, including hot melt perfume delivery system/perfume loaded plastic Matrix Systems. Such perfumes, PRMs and stereoisomers thereof

may be used in combination in such Polymer Assisted Delivery (PAD) Matrix Systems (including hot melt perfume delivery system/perfume loaded plastic Matrix Systems).

In one example, the amount of total perfume based on total weight of Amine Assisted Delivery (AAD) (including Aminosilicones) ranges from 1% to about 99%, from 2.5% to about 75%, from 5% to about 60%, from 5% to about 50%, from 5% to about 25%. In one example, the perfumes and PRM disclosed herein, and stereoisomers thereof, are suitable for use, in such Amine Assisted Delivery (AAD) systems.

In one example, the amount of total perfume based on total weight of Pro-Perfume (PP) Amine Reaction Product (ARP) system ranges from 0.1% to about 99%, from about 1% to about 99%, from 5% to about 90%, from 10% to about 75%, from 20% to about 75%, from 25% to about 60%. In one example, the perfumes and PRM disclosed herein, and stereoisomers thereof, are suitable for use, in such Pro-Perfume (PP) Amine Reaction Product (ARP) systems.

A variety of optional ingredients can also be added to personal care compositions. Optional ingredients can include, but are not limited to, structurants, humectants, fatty acids, inorganic salts, and other antimicrobial agents or actives.

A personal care composition can also include hydrophilic structurants such as carbohydrate structurants and gums. Some suitable carbohydrate structurants include raw starch (corn, rice, potato, wheat, and the like) and pregelatinized starch. Some suitable gums include carageenan and xanthan gum. A personal care composition can include from about 0.1% to about 30%, from about 2% to about 25%, or from about 4% to about 20%, by weight of the personal care composition, of a carbohydrate structurant.

A personal care composition can also include one or more humectants. Examples of such humectants can include polyhydric alcohols. Further, humectants such as glycerin can be included in the personal care composition as a result of production or as an additional ingredient. For example, glycerin can be a by-product after saponification of the personal care composition. Including additional humectant can result in a number of benefits such as improvement in hardness of the personal care composition, decreased water activity of the personal care composition, and reduction of a weight loss rate of the personal care composition over time due to water evaporation.

A personal care composition can include inorganic salts. Inorganic salts can help to maintain a particular water content or level of the personal care composition and improve hardness of the personal care composition. The inorganic salts can also help to bind the water in the personal care composition to prevent water loss by evaporation or other means. A personal care composition can optionally include from about 0.01% to about 15%, from about 1% to about

12%, or from about 2.5% to about 10.5%, by weight of the personal care composition, of inorganic salt. Examples of suitable inorganic salts can include magnesium nitrate, trimagnesium phosphate, calcium chloride, sodium carbonate, sodium aluminum sulfate, disodium phosphate, sodium polymetaphosphate, sodium magnesium succinate, sodium tripolyphosphate, aluminum sulfate, aluminum chloride, aluminum chlorohydrate, aluminum-zirconium trichlorohydrate, aluminum-zirconium trichlorohydrate glycine complex, zinc sulfate, ammonium chloride, ammonium phosphate, calcium acetate, calcium nitrate, calcium phosphate, calcium sulfate, ferric sulfate, magnesium chloride, magnesium sulfate, and tetrasodium pyrophosphate.

A personal care composition can include one or more additional antibacterial agents that can serve to further enhance antimicrobial effectiveness of the personal care composition. A personal care composition can include, for example, from about 0.001% to about 2%, from about 0.01% to about 1.5%, or from about 0.1% to about 1%, by weight of the personal care composition, of additional antibacterial agent(s). Examples of suitable antibacterial agents can include carbanilides, triclocarban (also known as trichlorocarbanilide), triclosan, a halogenated diphenylether available as DP-300 from Ciba-Geigy, hexachlorophene, 3,4,5-tribromosalicylanilide, and salts of 2-pyridinethiol-1-oxide, salicylic acid, and other organic acids. Other suitable antibacterial agents are described in U.S. Patent No. 6,488,943.

#### Liquid Personal Care Compositions

Exemplary liquid rinse-off personal care compositions can include an aqueous carrier, which can be present at a level of from about 5% to about 95%, or from about 60% to about 85%. The aqueous carrier may comprise water, or a miscible mixture of water and organic solvent. Non-aqueous carrier materials can also be employed.

Such rinse-off personal care compositions can include one or more deterative surfactants. The deterative surfactant component can be included to provide cleaning performance to the product. The deterative surfactant component in turn comprises anionic deterative surfactant, zwitterionic or amphoteric deterative surfactant, or a combination thereof. A representative, non-limiting, list of anionic surfactants includes anionic deterative surfactants for use in the compositions can include ammonium lauryl sulfate, ammonium laureth sulfate, triethylamine lauryl sulfate, triethylamine laureth sulfate, triethanolamine lauryl sulfate, triethanolamine laureth sulfate, monoethanolamine lauryl sulfate, monoethanolamine laureth sulfate, diethanolamine lauryl sulfate, diethanolamine laureth sulfate, lauric monoglyceride sodium sulfate, sodium lauryl sulfate, sodium laureth sulfate, potassium lauryl sulfate, potassium laureth sulfate, sodium lauryl sarcosinate, sodium lauroyl sarcosinate, lauryl sarcosine, cocoyl sarcosine, ammonium cocoyl

sulfate, ammonium lauroyl sulfate, sodium cocoyl sulfate, sodium lauroyl sulfate, potassium cocoyl sulfate, potassium lauryl sulfate, triethanolamine lauryl sulfate, triethanolamine lauryl sulfate, monoethanolamine cocoyl sulfate, monoethanolamine lauryl sulfate, sodium tridecyl benzene sulfonate, sodium dodecyl benzene sulfonate, sodium cocoyl isethionate and combinations thereof. In one example, the anionic surfactant can be sodium lauryl sulfate or sodium laureth sulfate. The concentration of the anionic surfactant component in the product can be sufficient to provide a desired cleaning and/or lather performance, and generally ranges from about 2% to about 50%.

Amphoteric deterative surfactants suitable for use in the rinse-off personal care compositions are well known in the art, and include those surfactants broadly described as derivatives of aliphatic secondary and tertiary amines in which an aliphatic radical can be straight or branched chain and wherein an aliphatic substituent can contain from about 8 to about 18 carbon atoms such that one carbon atom can contain an anionic water solubilizing group, e.g., carboxy, sulfonate, sulfate, phosphate, or phosphonate. Examples of compounds falling within this definition can be sodium 3-dodecyl-aminopropionate, sodium 3-dodecylaminopropane sulfonate, sodium lauryl sarcosinate, N-alkyltaurines such as the one prepared by reacting dodecylamine with sodium isethionate according to the teaching of U.S. Patent No. 2,658,072, N-higher alkyl aspartic acids such as those produced according to the teaching of U.S. Patent No. 2,438,091, and products described in U.S. Patent No. 2,528,378. Other examples of amphoteric surfactants can include sodium lauroamphoacetate, sodium cocoamphoacetate, disodium lauroamphoacetate disodium cocodiamphoacetate, and mixtures thereof. Amphoacetates and diamphoacetates can also be used.

Zwitterionic deterative surfactants suitable for use in the rinse-off personal care compositions are well known in the art, and include those surfactants broadly described as derivatives of aliphatic quaternary ammonium, phosphonium, and sulfonium compounds, in which aliphatic radicals can be straight or branched chains, and wherein an aliphatic substituent can contain from about 8 to about 18 carbon atoms such that one carbon atom can contain an anionic group, e.g., carboxy, sulfonate, sulfate, phosphate, or phosphonate. Other zwitterionic surfactants can include betaines, including cocoamidopropyl betaine.

The liquid rinse off personal care composition can comprise one or more phases. Such personal care compositions can include a cleansing phase and/or a benefit phase (i.e., a single- or multi-phase composition). Each of a cleansing phase or a benefit phase can include various components. The cleansing phase and the benefit phase can be blended, separate, or a



combination thereof. The cleansing phase and the benefit phase can also be patterned (e.g. striped).

The cleansing phase of a personal care composition can include at least one surfactant. The cleansing phase can be an aqueous structured surfactant phase and constitute from about 5%  
5 to about 20%, by weight of the personal care composition. Such a structured surfactant phase can include sodium trideceth(n) sulfate, hereinafter STnS, wherein n can define average moles of ethoxylation. n can range, for example, from about 0 to about 3; from about 0.5 to about 2.7, from about 1.1 to about 2.5, from about 1.8 to about 2.2, or n can be about 2. When n can be less than 3, STnS can provide improved stability, improved compatibility of benefit agents within the  
10 personal care compositions, and increased mildness of the personal care compositions as disclosed in U.S. Pre-Grant Publication No. 2010/009285 A1.

The cleansing phase can also comprise at least one of an amphoteric surfactant and a zwitterionic surfactant. Suitable amphoteric or zwitterionic surfactants (in addition to those cited herein) can include, for example, those described in U.S. Patent No. 5,104,646 and U.S. Patent  
15 No. 5,106,609.

A cleansing phase can comprise a structuring system. A structuring system can comprise, optionally, a non-ionic emulsifier, optionally, from about 0.05% to about 5%, by weight of the personal care composition, of an associative polymer; and an electrolyte.

The personal care composition can optionally be free of sodium lauryl sulfate, hereinafter  
20 SLS, and can comprise at least a 70% lamellar structure. However, the cleansing phase could comprise at least one surfactant, wherein the at least one surfactant includes SLS. Suitable examples of SLS are described in U.S. Pre-Grant Publication No. 2010/0322878 A1.

Rinse-off personal care compositions can also include a benefit phase. The benefit phase can be hydrophobic and/or anhydrous. The benefit phase can also be substantially free of  
25 surfactant. A benefit phase can also include a benefit agent. In particular, a benefit phase can comprise from about 0.1% to about 50% benefit agent by weight of the personal care composition. The benefit phase can alternatively comprise less benefit agent, for example, from about 0.5% to about 20% benefit agent, by weight of the personal care composition. Examples of suitable benefit agents can include petrolatum, glyceryl monooleate, mineral oil, natural oils,  
30 and mixtures thereof. Additional examples of benefit agents can include water insoluble or hydrophobic benefit agents. Other suitable benefit agents are described in U.S. Pre-Grant Publication No. 2012/0009285 A1.

Non-limiting examples of glycerides suitable for use as hydrophobic skin benefit agents herein can include castor oil, safflower oil, corn oil, walnut oil, peanut oil, olive oil, cod liver oil,

almond oil, avocado oil, palm oil, sesame oil, vegetable oils, sunflower seed oil, soybean oil, vegetable oil derivatives, coconut oil and derivatized coconut oil, cottonseed oil and derivatized cottonseed oil, jojoba oil, cocoa butter, and combinations thereof.

Non-limiting examples of alkyl esters suitable for use as hydrophobic skin benefit agents  
5 herein can include isopropyl esters of fatty acids and long chain esters of long chain (i.e. C10-C24) fatty acids, e.g., cetyl ricinoleate, non-limiting examples of which can include isopropyl palmitate, isopropyl myristate, cetyl riconoleate, and stearyl riconoleate. Other example can include hexyl laurate, isohexyl laurate, myristyl myristate, isohexyl palmitate, decyl oleate, isodecyl oleate, hexadecyl stearate, decyl stearate, isopropyl isostearate, diisopropyl adipate,  
10 diisohexyl adipate, dihexyldecyl adipate, diisopropyl sebacate, acyl isononanoate lauryl lactate, myristyl lactate, cetyl lactate, and combinations thereof.

Non-limiting examples of polyglycerin fatty acid esters suitable for use as hydrophobic skin benefit agents herein can include decaglyceryl distearate, decaglyceryl diisostearate, decaglyceryl monomyriate, decaglyceryl monolaurate, hexaglyceryl monooleate, and  
15 combinations thereof.

The rinse-off personal care composition can be applied by a variety of means, including by rubbing, wiping or dabbing with hands or fingers, or by means of an implement and/or delivery enhancement device. Non-limiting examples of implements include a sponge or sponge-tipped applicator, a mesh shower puff, a swab, a brush, a wipe (e.g., wash cloth), a  
20 loofah, and combinations thereof. Non-limiting examples of delivery enhancement devices include mechanical, electrical, ultrasonic and/or other energy devices. Employment of an implement or device can help delivery of the particulate antimicrobial agent to target regions, such as, for example, hair follicles and undulations that can exist in the underarm. The rinse-off care product can be sold together with such an implement or device. Alternatively, an implement  
25 or device can be sold separately but contain indicium to indicate usage with a rinse-off care product. Implements and delivery devices can employ replaceable portions (e.g., the skin interaction portions), which can be sold separately or sold together with the rinse-off care product in a kit.

#### Solid Personal Care Compositions

30 As noted herein, personal care compositions can take on numerous forms. One suitable form is that of a solid personal care composition. Solid compositions can take many forms like powder, pellets, bars, etc. These forms will generally be described herein as bar soap, but it should be understood that the solid composition could be in another form or shape. One example of a bar soap personal care composition can include from about 0.1% to about 35%, by weight of

the personal care composition, of water, from about 45% to about 99%, by weight of the personal care composition, of soap, and from about 0.01% to about 5%, by weight of the personal care composition, of a particulate antimicrobial agent. Another suitable antimicrobial bar soap can include, for example, from about 0.1% to about 30%, by weight of the personal care composition, of water, from about 40% to about 99%, by weight of the personal care composition, of soap, and from about 0.25% to about 3%, by weight of the personal care composition, of a particulate antimicrobial agent.

Bar soap compositions can be referred to as conventional solid (i.e. non-flowing) bar soap compositions. Some bar soap composition can comprise convention soap, while others can contain synthetic surfactants, and still others can contain a mix of soap and synthetic surfactant. Bar compositions can include, for example, from about 0% to about 45% of a synthetic anionic surfactant. An example of a suitable conventional soap can include milled toilet bars that are unbuilt (i.e. include about 5% or less of a water-soluble surfactancy builder).

A personal care bar composition can include soap. By weight, the soap can be, for example, from about 45% to about 99%, or from about 50% to about 75%, by weight of the personal care composition. Such soaps can include a typical soap, i.e., an alkali metal or alkanol ammonium salt of an alkane- or alkene monocarboxylic acid. Sodium, magnesium, potassium, calcium, mono-, di- and tri-ethanol ammonium cations, or combinations thereof, can be suitable for a personal care composition. The soap included in a personal care composition can include sodium soaps or a combination of sodium soaps with from about 1% to about 25% ammonium, potassium, magnesium, calcium, or a mixture of these soaps. Additionally, the soap can be well-known alkali metal salts of alkanoic or alkenoic acids having from about 12 to about 22 carbon atoms or from about 12 to about 18 carbon atoms. Another suitable soap can be alkali metal carboxylates of alkyl or alkene hydrocarbons having from about 12 to about 22 carbon atoms. Additional suitable soap compositions are described in U.S. Pre-Grant Publication No. 2012/0219610 A1.

A personal care composition can also include soaps having a fatty acid. For example, one bar soap composition could contain from about 40% to about 95% of a soluble alkali metal soap of C<sub>8</sub>-C<sub>24</sub> or C<sub>10</sub>-C<sub>20</sub> fatty acids. The fatty acid can, for example, have a distribution of coconut oil that can provide a lower end of a broad molecular weight range or can have a fatty acid distribution of peanut or rapeseed oil, or their hydrogenated derivatives, which can provide an upper end of the broad molecular weight range. Other such compositions can include a fatty acid distribution of tallow and/or vegetable oil. The tallow can include fatty acid mixtures that can typically have an approximate carbon chain length distribution of 2.5% C<sub>14</sub>, 29% C<sub>16</sub>, 23% C<sub>18</sub>,

2% palmitoleic, 41.5% oleic, and 3% linoleic. The tallow can also include other mixtures with a similar distribution, such as fatty acids derived from various animal tallows and/or lard. In one example, the tallow can also be hardened (i.e., hydrogenated) such that some or all unsaturated fatty acid moieties can be converted to saturated fatty acid moieties.

5           Suitable examples of vegetable oil include palm oil, coconut oil, palm kernel oil, palm oil stearine, soybean oil, and hydrogenated rice bran oil, or mixtures thereof, since such oils can be among more readily available fats. One example of a suitable coconut oil can include a proportion of fatty acids having at least 12 carbon atoms of about 85%. Such a proportion can be greater when mixtures of coconut oil and fats such as tallow, palm oil, or non-tropical nut oils or  
10       fats can be used where principle chain lengths can be C<sub>16</sub> and higher. The soap included in a personal care composition can be, for example, a sodium soap having a mixture of about 67-68% tallow, about 16-17% coconut oil, about 2% glycerin, and about 14% water.

          Soap included in a personal care composition can also be unsaturated in accordance with commercially acceptable standards. For example, a soap included in a personal care composition  
15       can include from about 37% to about 45% unsaturated saponified material.

          Soaps included in a personal care composition can be made, for example, by a classic kettle boiling process or modern continuous soap manufacturing processes wherein natural fats and oils such as tallow or coconut oil or their equivalents can be saponified with an alkali metal hydroxide using procedures well known to those skilled in the art. Soap can also be made by  
20       neutralizing fatty acids such as lauric (C<sub>12</sub>), myristic (C<sub>14</sub>), palmitic (C<sub>16</sub>), or stearic (C<sub>18</sub>) acids, with an alkali metal hydroxide or carbonate.

          Soap included in a personal care composition could also be made by a continuous soap manufacturing process. The soap could be processed into soap noodles via a vacuum flash drying process. One example of a suitable soap noodle comprises about 67.2% tallow soap,  
25       about 16.8% coconut soap, about 2% glycerin, and about 14% water, by weight of the soap noodle. The soap noodles can then be utilized in a milling process to finalize a personal care composition.

## TEST METHODS

          The Degree of Habituation to a personal care composition containing a perfume can be  
30       determined by exposing a human panel to daily exposures of the perfume over a four week period. The Degree of Habituation can be calculated at both the week two and week four time points, relative to the initial baseline time point.

          For each exposure panel test, more than 15 panelists are recruited, and then exposed to the test scent in a manner, frequency, and concentration indicated by the intended product end

use, but including at least one exposure per day every day for four consecutive weeks. The perfume exposure must be sufficient that the panelists can detect the perfume of interest being delivered from the product or perfume delivery system contained within the product. The criteria for recruitment onto the exposure panel requires that panelists be typical consumers of the product in question, who agree to use the scent being tested, are non-smokers, and free of nasal congestion and allergies. The degree of habituation is calculated and reported as the percent change in the Odor Detection Threshold (ODT) value at week 2 and at week 4, versus the initial baseline ODT value. Since the degree of habituation is a relative measure, it accommodates the variation in absolute ODT values which can arise between different testing laboratories.

Raw materials and finished products comprising them can be used in conjunction in order to determine the degree of habituation. For example, daily exposures to the panelists may involve the use of a finished product while the ODT test measurements may involve the use of the respective neat perfume or PRMs. The conditions selected for use in either the daily exposures or in the ODT testing must be applied uniformly across all panelists, and remain unchanged for the entirety of the testing period. When the test perfume materials are available in their simple forms i.e., PRMs, neat perfumes, or fine fragrances, unincorporated into complex products or delivery systems, then the ODT test is to be conducted with these simple forms via an olfactometer, as this is the preferred method. When these simple forms of the test perfume materials are inaccessible for testing, then the ODT test may be conducted with finished products or complex formulations comprising the test perfume materials. Presentation devices other than an olfactometer may be required when conducting the ODT testing on finished products or complex formulations, and may include devices such as sniff cups, headspace chambers and capped bottles, as allowed for in the test method ASTM E679-04 described below.

The ODT value for each panelist is determined at each of three time points during the four week daily exposure period, namely; at an initial baseline, at two weeks, and at four weeks. The ODT values are always determined in accordance with test method ASTM E679-04 (Standard Practice for Determination of Odor and Taste Thresholds by a Forced-Choice Ascending Concentration Series of Limits) as reapproved in 2011 except, the following replaces the protocol of such test method's Sub-articles 4.4, 8.2 and 8.3.

Sub-article 4.4, Individual best-estimate values of the threshold are derived from the pattern of correct/incorrect responses produced separately by each panelist. The group average ODT value at a given time point is derived by fitting the entire data set from all panelists at that time point to a Log Logistic Regression Model.

Sub-article 8.2, If the concentration range has been correctly selected, it is not necessary that all panelists judge correctly within the range of concentration steps provided. Thus, the representation of the panelists' judgments as in 8.1 need not terminate with two or more consecutive plusses (+).

5 Sub-article 8.3, Since there is a finite probability that a correct answer will occur by chance alone, it is important that a panelist repeat the test three times. Panelists who fail the test at the highest concentration, are deemed anomic to the test material and their response is removed from the data set.

10 Additionally, the following selections are made in accordance with the test method's sub-articles 1.3, 1.4, 1.6, 1.7, and 4.1, and specified here as per sub-article 9.3.

Sub-article 1.3, The threshold is characterized as being a) only detection (awareness) that a very small amount of added substance is present but not necessarily recognizable.

15 Sub-article 1.4, When the preferred method is being conducted, namely using a simple perfume form presented via olfactometer, then the presentation medium is an air and pure nitrogen mix. When testing finished or complex products, alternative presentation media may be used, such as air.

20 Sub-article 1.6, When the preferred method is being conducted, namely using a simple perfume form presented via olfactometer, then the physical method of presentation is at a rate of 40L/min. When testing finished or complex products, alternative presentation devices may be used, including but not limited to sniff cups, headspace chambers or capped bottles.

Sub-article 1.7, Presentation is made to a panel of greater than 15 panelists, who are participating in the daily exposure panel.

25 Sub-article 4.1, Eight scale steps are used, with each step having an individual predetermined dilution factor suitable for the stimuli being tested, at a temperature of 35°C. PRM or neat perfume stimuli are typically introduced to the olfactometer system in the neat form via a pump syringe. Sometimes a dilution of the stimuli with ethanol is needed.

30 The group average ODT values from the three time points are used to calculate the degree of habituation. The degree of habituation is reported for 2 specific time points, as the percent change in group average ODT at one time point, relative to the group average ODT at the initial baseline time point. The degree of habituation is determined at the time points of: 2 weeks and 4 weeks, of the four week daily exposure period, using the following formula:

Degree of Habituation (percent change in ODT) at Time X =

$$((\text{Group Average ODT}_{(\text{Time } X)} - \text{Group Average ODT}_{(\text{Baseline})}) / \text{Group Average ODT}_{(\text{Baseline})}) \times 100$$

where *Time X* is either 2 weeks, or 4 weeks, of repeated daily exposure.

5

#### Anti-habituatation index

A perfume is considered to have an anti-habituatation index of:

For a two week test

- 10 • Zero (0) when the Degree of Habituation after 2 weeks of exposure to said perfume is from about 150% to 25%
- One (1) when the Degree of Habituation after 2 weeks of exposure to said perfume is less than 25% but greater than 10%;
- Two (2) when the Degree of Habituation after 2 weeks of exposure to said perfume is from 10% to 0%; or
- 15 • Three (3) when the Degree of Habituation after 2 weeks of exposure to said perfume is less than 0% to about -25%.
- Four (4) when the Degree of Habituation after 2 weeks of exposure to said perfume is less than -25% to about -500%

For a four week test

- 20 • Zero (0) when the Degree of Habituation after 4 weeks of exposure to said perfume is from about 150% to 25%
- One (1) when the Degree of Habituation after 4 weeks of exposure to said perfume is less than 25% but greater than 10%;
- Two (2) when the Degree of Habituation after 4 weeks of exposure to said perfume is from 10% to 0%; or
- 25 • Three (3) when the Degree of Habituation after 4 weeks of exposure to said perfume is less than 0% to about -25%.
- Four (4) when the Degree of Habituation after 4 weeks of exposure to said perfume is less than -25% to about -500%

30

## EXAMPLES

While particular examples of the present disclosure have been illustrated and described, it would be obvious to those skilled in the art that various other changes and modifications can be made without departing from the spirit and scope of the invention. It is therefore intended to cover in the appended claims all such changes and modifications that are within the scope of this invention. Weight percentages are intended in the examples below, unless otherwise denoted.

Example 1Table 2: Example Body Wash Compositions

	Formula I Body Wash	Formula II Body Wash	Formula III Body Wash
Sodium Laureth-3 Sulfate (as 28% active)	27.85%	27.85%	27.85%
Water	Q.S.	Q.S.	Q.S.
Sodium Lauryl Sulfate (as 29% active)	10.34	10.34	10.34
Cocamidopropyl Betaine B (30% active)	4.01	4.01	4.01
Citric Acid	0.18	0.18	0.18
Sodium Benzoate	0.3	0.3	0.3
Disodium EDTA	0.12	0.12	0.12
Methylchloroisothiazolinone/Methylisothiazolinone	0.04	0.04	0.04
Sodium Chloride	2.35%	1.7%	1.6%
Comparative Perfume A	1.25%	-	-
Comparative Perfume B	-	1.25%	-
Perfume from Table 1	-	-	1.25%

Q.S. – means quantum satis and indicates that this material is used to bring the total to 100%.

The formulations defined above contain various perfume formulations. Formula III contains Perfume from Table 1. Formula I and II contain comparative perfumes. The body wash compositions were prepared by mixing all of the ingredients, except for sodium chloride, for one minute at 2000 rpm in a suitable vessel. The one minute interval should be sufficient to achieve a homogenous solution. Next, the solution containing sodium chloride is added and all ingredients are then remixed.



Approximately 20 test subjects per usage group were recruited for the study. The test subjects placed in the study were assessed for their baseline threshold intensity according to the Odor Detection Threshold (ODT) method defined above for the perfume of interest that was in the product. Test subjects were placed in three study groups with a body wash according to Formulas I, II, and III and instructed to use the product daily, as they normally would use their current cleansing product throughout the four week study period, using no other cleansing products throughout the duration of the study. Their Odor Detection Threshold (ODT) was measured again after 2 weeks of usage, and again after 4 weeks of usage. The average Odor Detection Threshold was calculated for each usage group. Results are shown below.

The results indicate that the Odor Detection Threshold increases significantly above baseline (test subjects are less sensitive) for the usage group using Formula I (comparative perfume A) after 4 weeks of usage, indicating habituation. The surprising result is that the test group using the body wash containing the perfume from Table 1 had the lowest degree of habituation after 4 weeks of usage, indicating that they did not become habituated to the scent of the product over time. Therefore, the perfume used in Formula III is has an anti-habituation index of 0 when tested in a two week test and an anti-habituation index of 4 when tested in a four week test.

Table 3

Degree of Habituation (% change in group average ODT)			
Product Used	Type of Perfume Run in the ODT test	% Change in ODT at Week 2	% Change in ODT at Week 4
Formula I from Example 1	Comparative Perfume A	554%	2948%
Formula II from Example 1	Comparative Perfume B	-73%	-4%
Formula III from Example 1	Perfume from Table 1	121	-93%

Table 4: Example Shampoo Compositions

	Composition 1	Composition 2
Ammonium Laureth Sulfate (AE <sub>3</sub> S)	6.00	6.00
Ammonium Lauryl Sulfate (ALS)	10.00	10.00
Laureth-4 Alcohol	0.90	0.90
Trimethylammoniopropylmethacrylamide chloride-N-Acrylamide copolymer <sup>(25)</sup>	0.25	-
Trihydroxystearin <sup>(7)</sup>	0.10	0.10
Perfume Table 1	0.60	0.60
Sodium Chloride	0.40	0.40
Citric Acid	0.04	0.04

Sodium Citrate	0.40	0.40
Sodium Benzoate	0.25	0.25
Ethylene Diamine Tetra Acetic Acid	0.10	0.10
Dimethicone <sup>(9, 10, 11)</sup>	1.00 <sup>(9)</sup>	1.00 <sup>(9)</sup>
Water and Minors	Q.S.	Q.S.

Shampoo compositions that resist habituation can also be prepared. The shampoo compositions can be prepared by mixing all of the ingredients, except for sodium chloride, for one minute at 2000 rpm in a suitable vessel. The one minute interval should be sufficient to achieve a homogenous solution. Next, the solution containing sodium chloride is added and all ingredients are remixed.

Table 5: Example Lotion Compositions

	<u>Composition 3</u>	<u>Composition 4</u>	<u>Composition 5</u>
<u>Water Phase:</u>			
Water	Q.S.	Q.S.	Q.S.
Glycerin	5.0	5.0	5.0
Disodium EDTA	0.1	0.1	0.1
Methylparaben	0.2	0.2	0.2
Niacinamide	4.0	4.0	4.0
D-panthenol	0.5	0.5	0.5
Phenylbenzimidazole Sulfonic Acid	1.0	1.0	1.0
Pentylene Glycol	1.0	1.0	1.0
Benzyl alcohol	0.25	0.25	0.25
Triethanolamine	0.64	0.64	0.64
<u>Oil Phase:</u>			
Isopropyl Isostearate	1.33	1.33	1.33
Octisalate	4.0	4.0	4.0
Octocrylene	1.0	1.0	--
Avobenzone	2.0	2.0	--
Petrolatum	2	2	2
Shea Butter	0.5	0.5	0.5
Vitamin E Acetate	0.1	0.1	0.1
Ethylparaben	0.2	0.2	0.2
Propylparaben	0.2	0.2	0.2
Cetyl alcohol	0.3	0.3	0.3
Stearyl alcohol	0.4	0.4	0.4
Behenyl alcohol	0.4	0.4	0.4
Cetearyl Glucoside / Cetearyl Alcohol <sup>1</sup>	0.3	0.3	0.3
PEG-100 stearate	0.3	0.3	0.3
Tinosorb S <sup>5</sup>	--	1	2
Synovea DOI <sup>6</sup>	4.0	5.0	6.0

<u>Thickener:</u>			
Sepigel™ 305 <sup>2</sup>	2.25	2.25	2.25
<u>Additional Ingredients:</u>			
Perfume Table 1	1.0	0.75	1.25
Microthene FN510 <sup>3</sup>	1.0	1.0	1.0
Polysorbate 20	0.5	0.5	0.5
Dow Corning™ 1503 <sup>4</sup>	2.0	2.0	2.0
Total:	100%	100%	100%

<sup>1</sup> Emulgade™ PL68/50 from Cognis™

<sup>2</sup> Polyacrylamide, C13-14 isoparaffin, and laureth-7 from Seppic™

<sup>3</sup> Polyethylene homopolymer spheres from Equistar™

<sup>4</sup> Dimethicone and dimethiconol from Dow Corning™

5 <sup>5</sup> Bis-Ethylhexyloxyphenol Methoxyphenyl Triazine from BASF™

<sup>6</sup> Dioctanoyl Isosorbide from Syntheon™

Lotion compositions that resist habituation can also be produced. The lotion can be prepared by combining the water phase ingredients in a suitable vessel and heating the vessel to 75°C. In a separate suitable vessel, the oil phase ingredients are combined and heated to 75°C. Next the oil phase is added to the water phase and the resulting emulsion is milled (e.g., with a Tekmar T-25). The thickener is then added to the emulsion and the emulsion is cooled to 45°C while stirring. At 45°C, the remaining additional ingredients are added. The product is then cooled with stirring to 30°C, milled again, and then poured into suitable containers.

15 All documents cited in the Detailed Description are, in relevant part, incorporated herein by reference; the citation of any document is not to be construed as an admission that it is prior art with respect to the present invention. To the extent that any meaning or definition of a term in this document conflicts with any meaning or definition of the same term in a document incorporated by reference, the meaning or definition assigned to that term in this document shall govern. The perfume raw materials disclosed, claimed and/or used in the perfumes claimed and/or described herein encompass any stereoisomers of such perfume raw materials.

25 Unless otherwise noted, all component or composition levels are in reference to the active portion of that component or composition, and are exclusive of impurities, for example, residual solvents or by-products, which may be present in commercially available sources of such components or compositions.

All percentages and ratios are calculated by weight unless otherwise indicated. All percentages and ratios are calculated based on the total composition unless otherwise indicated.

30 It should be understood that every maximum numerical limitation given throughout this specification includes every lower numerical limitation, as if such lower numerical limitations were expressly written herein. Every minimum numerical limitation given throughout this

specification will include every higher numerical limitation, as if such higher numerical limitations were expressly written herein. Every numerical range given throughout this specification will include every narrower numerical range that falls within such broader numerical range, as if such narrower numerical ranges were all expressly written herein.

5           The dimensions and values disclosed herein are not to be understood as being strictly limited to the exact numerical values recited. Instead, unless otherwise specified, each such dimension is intended to mean both the recited value and a functionally equivalent range surrounding that value. For example, a dimension disclosed as “40 mm” is intended to mean “about 40 mm”.

10           Every document cited herein, including any cross referenced or related patent or application and any patent application or patent to which this application claims priority or benefit thereof, is hereby incorporated herein by reference in its entirety unless expressly excluded or otherwise limited. The citation of any document is not an admission that it is prior art with respect to any invention disclosed or claimed herein or that it alone, or in any  
15 combination with any other reference or references, teaches, suggests or discloses any such invention. Further, to the extent that any meaning or definition of a term in this document conflicts with any meaning or definition of the same term in a document incorporated by reference, the meaning or definition assigned to that term in this document shall govern.

20           While particular examples of the present invention have been illustrated and described, it would be obvious to those skilled in the art that various other changes and modifications can be made without departing from the spirit and scope of the invention. It is therefore intended to cover in the appended claims all such changes and modifications that are within the scope of this invention.

## CLAIMS

What is claimed is:

1. A personal care composition comprising a perfume, the perfume comprising, based on total perfume weight, from 0.000001% to 10%, of a perfume raw material comprising a sulfur atom, such that the perfume raw material resists the fragrance habituation of a consumer to the personal care composition.
2. The personal care composition of claim 1 comprising from 0.001% to 0.1%, of the perfume raw material.
3. The personal care composition of any preceding claim, wherein the perfume raw material further comprises one or more of a nitrogen atom and an oxygen atom.
4. The personal care composition of any preceding claim, wherein the perfume raw material comprising a sulfur atom is selected from the group consisting of:
  - a. from 0.0000001% to 10%, preferably from 0.00001% to 1%, more preferably from 0.000025% to 0.8%, of a perfume raw material comprising a thiol moiety;
  - b. from 0.0000001% to 10%, preferably from 0.00001% to 1%, more preferably from 0.000025% to 0.5%, of a perfume raw material comprising a sulfide moiety;
  - c. from 0.0000001% to 10%, preferably from 0.0005% to 1%, more preferably from 0.001% to 0.1%, of a perfume raw material comprising a thiazole moiety;
  - d. from 0.0000001% to 10%, preferably from 0.00001% to 1%, more preferably from 0.000025% to 0.8%, of a perfume raw material comprising an oxathiane moiety; and
  - e. from 0.00000005% to 5%, preferably from 0.000001% to 1%, more preferably from 0.000005% to 0.5%, of a perfume raw material comprising an isothiocyanate moiety;
  - f. mixtures thereof.
5. The personal care composition of claim 4, wherein:

the thiol moiety is selected from the group consisting of 5-methyl-5-sulfanylhexas-3-one; 2-(4-methyl-1-cyclohex-3-enyl)propane-2-thiol; 5-methyl-2-(2-sulfanylpropan-2-yl)cyclohexan-

1-one; 4,7,7-trimethyl-6-thiabicyclo[3.2.1]octane; 4-methoxy-2-methylbutane-2-thiol; methanethiol; ethanethiol; prop-2-ene-1-thiol; propane-2-thiol; 2-methylpropane-2-thiol; propane-1-thiol; butane-2-thiol; butane-1-thiol; 2-methylpropane-1-thiol; methyldisulfanylmethane; 2-methylbutane-2-thiol; 3-methylbutane-2-thiol; 3-methylbutane-2-thiol; pentane-2-thiol; pentane-1-thiol; 2-methylbutane-1-thiol; cyclopentanethiol; 3-methyldisulfanylprop-1-ene; methylsulfanyldisulfanylmethane; 1-methyldisulfanylpropane; ethane-1,2-dithiol; 1-(methyldisulfanyl)prop-1-ene; 3-sulfanylbutan-2-one; ethyldisulfanylethane; hexane-1-thiol; 1-ethyldisulfanylpropane; thiophene-2-thiol; propane-1,3-dithiol; 3-sulfanylpentan-2-one; 2-propan-2-ylsulfanylpropane; butane-1,4-dithiol; benzenethiol; ethylsulfanyldisulfanylethane; 3-methylsulfanyldisulfanylprop-1-ene; 1-methylsulfanyldisulfanylpropane; butane-2,3-dithiol; 4-methyl-4-sulfanylpentan-2-one; 3-prop-2-enylsulfanylprop-1-ene; 1-methoxyhexane-3-thiol; ethyl 2-sulfanylpropanoate; 1-(prop-2-enylsulfanyl)propane; 1-propylsulfanylpropane; 1-(4-hydroxy-3-methoxyphenyl)ethanone butane-1,3-dithiol; 1-propylsulfanylprop-1-ene; 2-methylbenzenethiol; thiophen-2-ylmethanethiol; 3-sulfanylbutan-2-ol; phenylmethanethiol pentane-1,5-dithiol; 2-ethylbenzenethiol; 3-prop-2-enylsulfanyldisulfanylprop-1-ene; methylsulfanyldisulfanylmethane; 1-propylsulfanyldisulfanylpropane; 2,7,7-trimethylbicyclo[3.1.1]heptane-2-thiol; 2,6-dimethylbenzenethiol; 2-phenylethanethiol; hexane-1,6-dithiol; 2-(methylsulfanylmethyl)furan; pyridin-2-ylmethanethiol; 2-methoxybenzenethiol; (7,7-dimethyl-2-bicyclo[3.1.1]heptanyl)methanethiol; methylsulfanylbenzene; 1-butylsulfanylbutane; (4-methoxyphenyl)methanethiol; 2-sulfanylpropanoic acid; ethyl 2-methylsulfanylpropanoate; (2E)-3,7-dimethylocta-2,6-diene-1-thiol; 3,7-dimethylocta-2,6-diene-1-thiol; pyrazin-2-ylmethanethiol; methylsulfanylmethylbenzene; 2-methyl-5-(1-sulfanylpropan-2-yl)cyclohexane-1-thiol; octane-1,8-dithiol; 2-pyrazin-2-ylethanethiol; naphthalene-2-thiol; 2-oxo-3-sulfanylpropanoic acid; 2-thiophen-2-ylsulfanylthiophene; cyclohexylsulfanylcyclohexane; 2-(furan-2-ylmethylsulfanylmethyl)furan; phenylsulfanylbenzene; benzyldisulfanylmethylbenzene; 8-Hydroxy-5-quinolinesulfonic acid; bis(3-methylbutyl) 2-sulfanylbutanedioate; 2-aminoethanesulfonic acid; 2-phenyl-3H-benzimidazole-5-sulfonic acid; 2-methyl-2-sulfanylpentan-1-ol; and mixtures thereof;

the sulfide moiety is selected from the group consisting of 1-butylsulfanylbutane; ethyl 3-methylsulfanylpropanoate; 2-(methylsulfanylmethyl)furan; methylsulfanylmethane; methylsulfanylethane; 3-methylsulfanylprop-1-ene; S-methyl ethanethioate; ethylsulfanylethane; 1-methylsulfanylpropane; S-ethyl ethanethioate; 1-methylsulfanylbutane; 2-propan-2-ylsulfanylpropane; bis(methylsulfanyl)methane; 1-ethylsulfanylpropane; thiolane; 1-

propylsulfanylpropane; 1-ethylsulfanylbutane; S-ethyl propanethioate; S-methyl butanethioate; S-methyl 3-methylbutanethioate; 3-methylsulfanylpropanal; 3-prop-2-enylsulfanylprop-1-ene; methyl 2-methylsulfanylacetate; S-prop-2-enyl propanethioate; 1-methylsulfanylbutan-2-one; 4-methylsulfanylbutan-2-one; 3-methylsulfanylpropan-1-ol; 2,4,6-trimethyl-1,3,5-trithiane; 3-methylsulfanylbutanal; 2-methyl-1,3-thiazolidine; 2-methyl-4,5-dihydro-1,3-thiazole; ethyl 2-methylsulfanylacetate; methyl 3-methylsulfanylpropanoate; S-propan-2-yl 3-methylbutanethioate; 4-methyl-4-methylsulfanylpentan-2-one; 2-methyl-1,3-dithiolane; methyl 2-methylsulfanylbutanoate; S-methyl furan-2-carbothioate; S-propan-2-yl 3-methylbut-2-enethioate; thiolan-3-one; 3,5-diethyl-1,2,4-trithiolane; methylsulfanylmethylbenzene; 3-methylsulfanylpropan-1-ol; 2-(propan-2-ylsulfanylmethyl)furan; 2-methyl-5-methylsulfanylfuran; S-(furan-2-ylmethyl) methanethioate; 1,2,4-trithiolane; 2-methylthiolan-3-one; 4-methylsulfanylbutan-1-ol; S-butan-2-yl 3-methylbutanethioate; S-butan-2-yl 3-methylbut-2-enethioate; S-(furan-2-ylmethyl) ethanethioate; 2-propyl-1,3-thiazolidine; 3-methyl-1,1-bis(methylsulfanyl)butane; 3-ethylsulfanylpropan-1-ol; S-methyl benzenecarbothioate; 3,5-dimethyl-1,2,4-trithiolane; S-butan-2-yl 2-methylbutanethioate; methylsulfanylbenzene; 1-pentylsulfanylpentane; (2R,4S)-2-methyl-4-propyl-1,3-oxathiane; 2-methyl-4-propyl-1,3-oxathiane; ethyl 2-methyl-2-methylsulfanylpropanoate; S-(furan-2-ylmethyl) propanethioate; 4,7,7-trimethyl-6-thiabicyclo[3.2.1]octane; 3-methyl-1,2,4-trithiane; methylsulfanylmethyl hexanoate; 1-(4,5-dihydro-1,3-thiazol-2-yl)ethanone; 3-methylsulfanylpropanoic acid; 5-methylsulfanyl-2-(methylsulfanylmethyl)pent-2-enal; 4,5-dimethyl-2-(2-methylpropyl)-2,5-dihydro-1,3-thiazole; 3-methylsulfanylhexasan-1-ol; 2-methyl-4,5-dihydrofuran-3-thiol acetate; 4-(3-oxobutylsulfanyl)butan-2-one; 3-methylsulfanylbutanoic acid; 2-methylsulfanylpurazine; 2-methyl-3-methylsulfanylpurazine; 2-(furan-2-ylmethylsulfanylmethyl)furan; 2-(methylsulfanylmethyl)purazine; 3,5-di(propan-2-yl)-1,2,4-trithiolane; 2-methylsulfanylphenol; 2-methyl-3-methylsulfanylpurazine; ethyl 3-(furan-2-ylmethylsulfanyl)propanoate; 2,2,4,4,6,6-hexamethyl-1,3,5-trithiane; 2-methyl-5,7-dihydrothieno[3,4-d]pyrimidine; 2-amino-4-methylsulfanylbutanoic acid; (2S)-2-amino-4-methylsulfanylbutanoic acid; 2',3a-dimethylspiro[6,6a-dihydro-5H-[1,3]dithiolo[4,5-b]furan-2,3'-oxolane]; 2,5-dimethyl-1,4-dithiane-2,5-diol; Methyl 2-thiofuroate; and mixtures thereof;

the thiazole moiety is selected from the group consisting of 2-(2-methylpropyl)-1,3-thiazole; 2-(4-methyl-1,3-thiazol-5-yl)ethanol; 4-methyl-2-propan-2-yl-1,3-thiazole; 1-(1,3-thiazol-2-yl)ethanone; 2,4,5-Trimethylthiazole; 2-isopropyl-4-methylthiazole; 4-vinyl-5-methylthiazole; 2,4-Dimethyl-5-acetylthiazole 1,3-thiazole; 4-methyl-1,3-thiazole; 2,4-dimethyl-1,3-thiazole; 4,5-dimethyl-1,3-thiazole; 2,5-dimethyl-1,3-thiazole; 5-ethenyl-4-methyl-1,3-

thiazole; 2-ethyl-4-methyl-1,3-thiazole; 4-ethyl-2-methyl-1,3-thiazole; 2-propyl-1,3-thiazole; 2,4,5-trimethyl-1,3-thiazole; 2-ethyl-1,3-thiazole; 2-ethoxy-1,3-thiazole; 2-butan-2-yl-1,3-thiazole; 5-methoxy-2-methyl-1,3-thiazole; 2-ethyl-4,5-dimethyl-1,3-thiazole; 1,3-benzothiazole; 2,5-diethyl-4-methyl-1,3-thiazole; 1-(1,3-thiazol-2-yl)propan-1-one; 4,5-dimethyl-2-(2-methylpropyl)-1,3-thiazole; 2-methyl-1,3-benzothiazole; 1-(2,4-dimethyl-1,3-thiazol-5-yl)ethanone; 4-methyl-2-propan-2-yl-1,3-thiazole; and mixtures thereof; and

the oxathiane moiety is selected from the group consisting of (2R,4S)-2-methyl-4-propyl-1,3-oxathiane, 2-methyl-4-propyl-1,3-oxathiane, 2-pentyl-4-propyl-1,3-oxathiane; and mixtures thereof.

6. The personal care composition of claim 4, wherein:

the thiol moiety is selected from the group consisting of 5-methyl-5-sulfanylhexan-3-one; 2-(4-methyl-1-cyclohex-3-enyl)propane-2-thiol; 5-methyl-2-(2-sulfanylpropan-2-yl)cyclohexan-1-one; 4,7,7-trimethyl-6-thiabicyclo[3.2.1]octane; 4-methoxy-2-methylbutane-2-thiol; and mixtures thereof;

the sulfide moiety is selected from the group consisting of 1-butylsulfanylbutane; ethyl 3-methylsulfanylpropanoate; 2-(methylsulfanylmethyl)furan; and mixtures thereof;

the thiazole moiety is selected from the group consisting of 2-(2-methylpropyl)-1,3-thiazole; 2-(4-methyl-1,3-thiazol-5-yl)ethanol; 4-methyl-2-propan-2-yl-1,3-thiazole; 4-methyl-2-propan-2-yl-1,3-thiazole; 1-(1,3-thiazol-2-yl)ethanone; and mixtures thereof; and

the oxathiane moiety is (2R,4S)-2-methyl-4-propyl-1,3-oxathiane; and the perfume raw material comprising oxygen, sulfur, and nitrogen is selected from the group consisting of 2-(4-methyl-1,3-thiazol-5-yl)ethanol, 1-(1,3-thiazol-2-yl)ethanone; 6-methyl-7-Oxa-1-thia-4-azaspiro[4.4]nonane; and mixtures thereof.

7. The personal care composition of any preceding claim, wherein the perfume raw materials are (a) 5-mercapto-5-methyl-3-hexanone; p-mentha-8-thiol-3-one; and 1-para-menthene-8-thiol; or

(b) 2-(4-methyl-1,3-thiazol-5-yl)ethanol; 2-(2-methylpropyl)-1,3-thiazol; and 4-methyl-2-propan-2-yl-1,3-thiazole.

8. The personal care composition of any preceding claim, wherein the composition exhibits an anti-habituating effect on a consumer.

9. The personal care composition of any preceding claim, wherein the composition is a body wash.



10. The personal care composition of claim 9, wherein the body wash is a single-phase or a multi-phase body wash.
11. The personal care composition of any of claims 1-8, wherein the composition is a shampoo or a lotion.
12. The personal care composition of any of claims 1-8, wherein the composition is a bar soap.
13. A method of resisting the fragrance habituation of a personal care composition, the method comprising:

forming a personal care composition comprising a perfume, the perfume comprising, based on total perfume weight, a perfume raw material selected from the group consisting of:

- a. from about 0.0000001% to about 10%, of a perfume raw material comprising a thiol moiety;
- b. from about 0.0000001% to about 10%, of a perfume raw material comprising a sulfide moiety;
- c. from about 0.0000001% to about 10%, of a perfume raw material comprising a thiazole moiety;
- d. from about 0.0000001% to about 10%, of a perfume raw material comprising a oxathiane moiety;
- e. from about 0.00000005% to about 5%, of a perfume raw material comprising an isothiocyanate;
- f. from about 0.000001% to about 10%, of a perfume raw material comprising a sulfur, oxygen and nitrogen; and
- g. mixtures thereof.

14. The method of claim 13, wherein the thiol moiety is selected from the group consisting of 5-methyl-5-sulfanylhexas-3-one; 2-(4-methyl-1-cyclohex-3-enyl)propane-2-thiol; 5-methyl-2-(2-sulfanylpropan-2-yl)cyclohexan-1-one; 4,7,7-trimethyl-6-thiabicyclo[3.2.1]octane; 4-methoxy-2-methylbutane-2-thiol; and mixtures thereof; and

the sulfide moiety is selected from the group consisting of 1-butylsulfanylbutane; ethyl 3-methylsulfanylpropanoate; 2-(methylsulfanylmethyl)furan; and mixtures thereof

15. The method of claim 13, wherein the perfume raw materials are (a) 5-mercapto-5-methyl-3-hexanone; p-mentha-8-thiol-3-one; and 1-para-menthene-8-thiol; or

(b) 2-(4-methyl-1,3-thiazol-5-yl)ethanol; 2-(2-methylpropyl)-1,3-thiazol; and 4-methyl-2-propan-2-yl-1-,3-thiazole.