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(54) **Title:** USE OF HYDROPHOBIC AEROGEL PARTICLES AS DEODORANT ACTIVE AGENT; METHOD FOR THE TREATMENT OF HUMAN BODY ODOURS

(57) **Abstract:** The invention relates to the cosmetic use of a hydrophobic aerogel as deodorant active agent, in particular as sole deodorant active agent. The invention also relates to a cosmetic method for treating human body odours, in particular axillary odours, which consists in applying, to human keratinous substances, a composition comprising, in a cosmetically acceptable support, at least one hydrophobic aerogel.

USE OF HYDROPHOBIC AEROGEL PARTICLES AS DEODORANT ACTIVE AGENT; METHOD FOR THE TREATMENT OF HUMAN BODY ODOURS

5 The invention relates to the cosmetic use of hydrophobic aerogel particles as deodorant active agent.

10 The invention also relates to a cosmetic method for treating human body odours, in particular axillary odours, which consists in applying, to human keratinous substances, a composition comprising, in a cosmetically acceptable support, hydrophobic aerogel particles as sole deodorant active agent.

Eccrine or apocrine sweat has little odour when it is secreted. It is its degradation by bacteria via enzymatic reactions that produces malodorous compounds.

15 The role of deodorants is to reduce or prevent the formation of unpleasant odours. This aim can be achieved in particular through a deodorant and/or antiperspirant activity.

20 Antiperspirant substances have the effect of limiting the flow of sweat. They are generally composed of aluminium salts which, on the one hand, are potentially irritating to the skin and which, on the other hand, reduce the flow of sweat by modifying the skin physiology, which is not satisfactory.

A deodorant activity can be obtained by various mechanisms, in particular:

- 25 - by odour absorption,
- by inhibition of the enzymes responsible for the formation of odorous compounds, and/or
- by bactericidal action, preferably selective bactericidal action, on the strains responsible for the odours, or by action which reduces the growth of the bacteria.

30 Odour absorbers "capture" or reduce the volatility of odorous compounds. Mention may in particular be made, as odour absorbers, of zinc ricinoleate, zeolites and cyclodextrins. These compounds are difficult to formulate as the compounds of the formulation can interact, which may result in a decline in their effectiveness.
35 Mention may in particular be made, among known and effective odour-absorbing deodorants, of active charcoal and metal zeolites. The main disadvantage of active charcoal is that it is black in colour and the use thereof thus cannot be envisaged in a cosmetic composition. Metal zeolites, in particular silver zeolites, are toxic (silver is toxic to man) and are difficult to formulate in all the possible
40 forms. These zeolites exhibit in particular the disadvantage of being in suspension in the media conventionally used in aerosol formulations and can thus block the aerosol nozzles used to dispense the product.

45 Among bactericides, it is known to use Triclosan or 2,4,4'-trichloro-2'-hydroxy-diphenyl ether (sold under the name Irgasan DP300) but it exhibits the disadvantage of being a broad-spectrum bactericide (WO 02/50002) and thus significantly modifies the ecology of the cutaneous flora. Other substances make it possible to reduce the growth of the bacteria. Mention may be made, among these substances, of chelating agents for transition metals, such as EDTA
50 (ethylenediaminetetraacetic acid) and DPTA (diethylenetriaminepentaacetic acid).

These materials deprive the medium of the metals necessary for the growth of the bacteria but are potentially ecotoxic.

5 There thus exists the need for novel deodorant active agents which are effective and easy to formulate and which do not exhibit the disadvantages of the deodorant active agents known in the prior art. In particular, the aim is to find milder routes which make it possible to combat the development of unpleasant odours.

10 Patent Application WO9513132 from Gillette describes the use of hydrophilic aerogels, in particular aerogels of aluminium and/or zirconium salts, as antiperspirant active agents. This patent application does not describe a deodorant activity apart from any antiperspirant activity.

15 The Applicant Company has discovered, surprisingly and unexpectedly, that the use of a composition comprising, in a cosmetically acceptable medium, at least hydrophobic aerogel particles makes it possible to achieve this objective.

20 The use of hydrophobic aerogel particles makes it possible in addition to improve the persistence of the cosmetic properties (in particular the deodorant effect) introduced by the composition on keratinous substances, in particular the skin, the impact of perspiration on the skin being limited in particular.

25 The invention relates to the cosmetic use of hydrophobic aerogel particles as deodorant active agent, in particular as sole deodorant active agent.

30 The invention also relates to a cosmetic method for treating human body odours, in particular axillary odours, which consists in applying, to human keratinous substances, a composition comprising at least, in a cosmetically acceptable support, hydrophobic aerogel particles as sole deodorant active agent.

35 The invention also relates to a cosmetic method for treating human body odours, in particular axillary odours, which consists in applying, to human keratinous substances, a composition comprising at least, in a cosmetically acceptable support, hydrophobic aerogel particles, the said composition not comprising an antiperspirant aluminium and/or zirconium salt.

This discovery forms the basis of the invention.

40 Other subject-matters of the invention will emerge later in the description.

The term "cosmetically acceptable" means compatible with the skin and/or its superficial body growths or mucous membranes, having a pleasant colour, odour and feel and not causing any unacceptable discomfort (stinging, tautness or redness) liable to discourage the consumer from using this composition.

45 The term "human keratinous substances" means the skin (body, face and outline of the eyes), hair, eyelashes, eyebrows, nonscalp hair, nails, lips or mucous membranes.

The term "deodorant active agent" is understood to mean, in the present invention, any molecule having an activity in decreasing, indeed even eliminating, unpleasant odours related to the decomposition of sweat, without necessarily reducing the flow of sweat.

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The term "composition not comprising antiperspirant aluminium and/or zirconium salt" is understood to mean any composition comprising at most 1% by weight of antiperspirant aluminium and/or zirconium salt.

10 **HYDROPHOBIC AEROGELS**

Aerogels are ultralight porous materials. The first aerogels were prepared by Kristler in 1932. They are generally synthesized by a sol-gel process in liquid medium and then dried, usually by extraction with a supercritical fluid, the most commonly used being supercritical CO₂. This type of drying makes it possible to prevent the pores and the material from contracting. Other types of drying also make it possible to obtain porous materials from gel, namely freeze drying, which consists in solidifying the gel at low temperature, in then subliming the solvent and drying by evaporation. The materials thus obtained are referred to respectively as cryogels and xerogels. The sol-gel process and the various drying operations are described in detail in Brinker C.J. and Scherer G.W., Sol-Gel Science: New York: Academic Press, 1990.

The aerogel particles in accordance with the present invention are hydrophobic aerogel particles.

The term "hydrophobic aerogel particles" is understood to mean any particle of the aerogel type exhibiting a water absorption capacity at the wet point of less than 0.1 ml/g, i.e. less than 10 g of water per 100 g of particle.

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The wet point corresponds to the amount of water that needs to be added to 1 g of particle in order to obtain a homogeneous paste. This method derives directly from the method of determining powder oil uptake described in Standard NF T 30-022. The measurements are taken in the same manner by means of the wet point and which has the following definition:

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WET POINT: weight expressed in grams per 100 g of product corresponding to the production of a homogeneous paste during the addition of a solvent to a powder.

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The wet point is measured according to the following protocol:

Equipment used

Glass plate (25 × 25 mm)

45 Spatula (wooden shaft and metal part (15 × 2.7 mm))

Brush with silk hairs

Balance

The glass plate is placed on the balance and 1 g of aerogel is weighed out. The beaker containing the solvent and the liquid sampling pipette is placed on the

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balance. The solvent is gradually added to the powder while regularly kneading the combination (every 3 to 4 drops) using the spatula. The weight of solvent necessary to obtain the wet point is recorded. The mean over 3 tests will be produced.

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The hydrophobic aerogels used according to the present invention can be organic, inorganic or organic/inorganic hybrids.

The organic aerogels can be based on resins formed from polyurethanes, resorcinol/formaldehyde, polyfurfuranol, cresol/formaldehyde, phenol/furfuranol, polybutadiene, melamine/formaldehyde, phenol/furfural, polyimides, polyacrylates, polymethacrylates, polyolefins, polystyrenes, polyacrylonitriles, phenol/formaldehyde, polyvinyl alcohol, dialdehydes, polycyanurates, epoxies, celluloses, cellulose derivatives, chitosan, agar, agarose, alginate, starches and mixtures of these.

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Aerosols based on organic/inorganic hybrids can also be envisaged, for example silica/PMMA, silica/chitosan and silica/polyether. Patent Applications US2005/0192366 and WO 2007126410 describe such organic/inorganic hybrid materials.

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The hydrophobic aerogel particles used in the present invention exhibit a specific surface per unit of weight (S_w) ranging from 200 to 1500 m²/g, preferably from 600 to 1200 m²/g and better still from 600 to 800 m²/g, and a size, expressed as volume-average diameter ($D[0.5]$), of less than 1500 μm and preferably ranging from 1 to 30 μm, preferably from 5 to 25 μm, better still from 5 to 20 μm and even better still from 5 to 15 μm.

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The specific surface per unit of weight can be determined by the nitrogen absorption method known as the BET (Brunauer–Emmett–Teller) method described in The Journal of the American Chemical Society, Vol. 60, page 309, February 1938, and corresponding to International Standard ISO 5794/1 (Appendix D). The BET specific surface corresponds to the total specific surface of the particles under consideration.

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The size of the aerogel particles according to the invention can be measured by static light scattering using a commercial particle sizer of MasterSizer 2000 type from Malvern. The data are treated on the basis of the Mie scattering theory. This theory, exact for isotropic particles, makes it possible to determine, in the case of nonspherical particles, an "effective" particle diameter. This theory is described in particular in the work by Van de Hulst, H.C., "Light Scattering by Small Particles", Chapters 9 and 10, Wiley, New York, 1957.

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According to an advantageous embodiment, the hydrophobic aerogel particles used in the present invention exhibit a specific surface per unit of weight (S_w) ranging from 600 to 800 m²/g and a size, expressed as volume-average diameter ($D[0.5]$), ranging from 5 to 20 μm and better still from 5 to 15 μm.

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The hydrophobic aerogel particles used in the present invention can advantageously exhibit a packed density ρ ranging from 0.04 g/cm³ to 0.10 g/cm³, preferably from 0.05 g/cm³ to 0.08 g/cm³.

- 5 In the context of the present invention, this density can be assessed according to the following "packed density" protocol:

40 g of powder are poured into a graduated measuring cylinder; then the measuring cylinder is placed on the STAV 2003 device from Stampf Volumeter; 10 the measuring cylinder is subsequently subjected to a series of 2500 packing motions (this operation is resumed until the difference in volume between 2 consecutive tests is less than 2%); then the final volume Vf of packed powder is measured directly on the measuring cylinder. The packed density is determined by the ratio w/Vf, to be specific 40/Vf (Vf being expressed in cm³ and w in g).

15 According to one embodiment, the hydrophobic aerogel particles used in the present invention exhibit a specific surface per unit of volume S_V ranging from 5 to 60 m²/cm³, preferably from 10 to 50 m²/cm³ and better still from 15 to 40 m²/cm³.

20 The specific surface per unit of volume is given by the relationship: $S_V = S_M \cdot \rho$ where ρ is the packed density, expressed in g/cm³, and S_M is the specific surface per unit of weight, expressed in m²/g, as defined above.

25 Preferably, the hydrophobic aerogel particles according to the invention have an oil absorption capacity, measured by the wet point method, ranging from 5 to 18 ml/g, preferably from 6 to 15 ml/g and better still from 8 to 12 ml/g.

30 The absorption capacity measured by the wet point method and denoted Wp corresponds to the amount of oil which has to be added to 100 g of particles in order to obtain a homogenous paste.

35 It is measured according to the "wet point" method or method of determination of powder oil uptake described in Standard NF T 30-022. It corresponds to the amount of oil adsorbed on the available surface of the powder and/or absorbed by the powder by measurement of the wet point, described below:

40 An amount w = 2 g of powder is placed on a glass plate and then the oil (isononyl isononanoate) is added dropwise. After adding from 4 to 5 drops of oil to the powder, mixing is carried out using a spatula and the addition of oil is continued until conglomerates of oil and powder are formed. From this moment, the oil is added at a rate of one drop at a time and the mixture is subsequently triturated with the spatula. The addition of oil is halted when a firm and smooth paste is obtained. This paste must be able to be spread on the glass plate without cracking or forming lumps. The volume Vs (expressed in ml) of oil used is then recorded.

45 The oil uptake corresponds to the ratio Vs/w.

50 According to a specific embodiment, the aerogel particles used are inorganic and more particularly hydrophobic silica aerogel particles exhibiting the properties stated above.

HYDROPHOBIC SILICA AEROGELS

5 Silica aerogels are porous materials obtained by replacing (by drying) the liquid component of a silica gel with air.

They are generally synthesized by a sol-gel process in a liquid medium and are then dried, usually by extraction with a supercritical fluid, the most commonly used being supercritical CO₂. This type of drying makes it possible to prevent the pores and the material from contracting. The sol-gel process and the various drying operations are described in detail in Brinker C.J. and Scherer G.W., Sol-Gel Science: New York: Academic Press, 1990.

15 The hydrophobic silica aerogels used according to the present invention are preferably silylated silica aerogels (INCI name: silica silylate).

The term "hydrophobic silica" is understood to mean any silica having a surface which is treated with silylating agents, for example with halogenated silanes, such as alkylchlorosilanes, siloxanes, in particular dimethylsiloxanes, such as hexamethyldisiloxane, or silazanes, so as to functionalize the OH groups with silyl groups Si-Rn, for example trimethylsilyl groups.

As regards the preparation of particles of hydrophobic silica aerogels modified at the surface by silylation, reference may be made to the document US 7 470 725.

25 Use will in particular be made of particles of hydrophobic silica aerogels modified at the surface by trimethylsilyl groups (trimethylsiloxyated silica).

Mention may be made, as hydrophobic silica aerogels which can be used in the invention, for example, of the aerogel sold under the name WM-2260 (INCI name: silica silylate) by Dow Corning, the particles of which exhibit an average size of approximately 1000 microns and a specific surface per unit of weight ranging from 600 to 800 m²/g.

35 Mention may also be made of the aerogel sold by Cabot under the references Aerogel TLD 201, Aerogel OGD 201, Aerogel TLD 203, Enova Aerogel MT 1100 and Enova Aerogel MT 1200.

40 Use will more particularly be made of the aerogel sold under the name VM-2270 (INCI name: Silica silylate) by Dow Corning, the particles of which exhibit an average size ranging from 5 to 15 microns and a specific surface per unit of weight ranging from 600 to 800 m²/g.

FORMULATION FORMS

45 The composition according to the invention can be provided in all the forms which can be envisaged for a deodorant composition. It can in particular be a lotion, dispensed as a spray or aerosol; a cream, in particular dispensed as a tube or as a grating; a fluid gel, dispensed as a roll-on or as a grating; in the form of a stick; in the form of a loose or compact powder, and comprising, in this respect, the

ingredients generally used in products of this type which are well known to a person skilled in the art, with the proviso that they do not interfere with the aerogels in accordance with the invention.

5 The composition according to the invention can comprise at least one aqueous phase. It is formulated in particular as an aqueous lotion or as a water-in-oil, oil-in-water or multiple emulsion (oil-in-water-in-oil or water-in-oil-in-water triple emulsion). Such emulsions are known and described, for example, by C. Fox in "Cosmetics and Toiletries", November 1986, Vol. 101, pages 101-112.

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The aqueous phase of the said composition comprises water and generally other water-soluble or water-miscible solvents. The water-soluble or water-miscible solvents comprise short-chain monoalcohols, for example C₁-C₄ monoalcohols, such as ethanol or isopropanol; or diols or polyols, such as ethylene glycol, 1,2-propylene glycol, 1,3-butylene glycol, hexylene glycol, diethylene glycol, 15 dipropylene glycol, 2-ethoxyethanol, diethylene glycol monomethyl ether, triethylene glycol monomethyl ether, glycerol and sorbitol. Use will more particularly be made of propylene glycol or glycerol.

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According to a specific form of the invention, the composition can be anhydrous. the term "anhydrous" is understood to mean, within the meaning of the invention, a composition for which the content of free or added water is less than 3% by weight and preferably for which the content of added water is less than 1% by weight, with respect to the total weight of the composition.

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According to a specific embodiment, the invention relates to a composition comprising, in a cosmetically acceptable support, a hydrophobic aerogel as sole deodorant active agent.

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The concentrations of hydrophobic aerogel to be used in the deodorant compositions of the invention depend in particular on the formulation form of the composition.

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Thus, the concentration of hydrophobic aerogel in a composition according to the invention can vary from 0.1 to 80% by weight, with respect to the total weight of the composition, for example from 0.1% by weight, in the case of a formulation in the aerosol form, to 80% by weight, in the case of a loose powder.

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In a formulation of roll-on type, the proportion of hydrophobic aerogel is typically from varies from 0.1 to 10% by weight and preferably from 0.5 to 6% by weight, with respect to the total weight of the composition.

FATTY PHASE

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The compositions according to the invention may contain at least one water-immiscible organic liquid phase, known as a fatty phase. This phase generally comprises one or more hydrophobic compounds that make the said phase water-immiscible. The said phase is liquid (in the absence of structuring agent) at room temperature (20-25°C). Preferentially, the water-immiscible organic-liquid organic

phase in accordance with the invention generally comprises at least one volatile oil and/or one non-volatile oil and optionally at least one structuring agent.

5 The term "oil" means a fatty substance that is liquid at room temperature (25°C) and atmospheric pressure (760 mmHg, i.e. 105 Pa). The oil may be volatile or non-volatile.

10 For the purposes of the invention, the term "volatile oil" means an oil that is capable of evaporating on contact with the skin or the keratinous fibre in less than one hour, at room temperature and atmospheric pressure. The volatile oils of the invention are volatile cosmetic oils which are liquid at ambient temperature and which have a nonzero vapour pressure, at ambient temperature and atmospheric pressure, ranging in particular from 0.13 Pa to 40 000 Pa (10^{-3} to 300 mmHg), in particular ranging from 1.3 Pa to 13 000 Pa (0.01 to 100 mmHg), and more particularly ranging from 1.3 Pa to 1300 Pa (0.01 to 10 mmHg).

15 "Nonvolatile oil" is understood to mean an oil which remains on the skin or keratinous fibre, at ambient temperature and atmospheric pressure, for at least several hours and which has in particular a vapour pressure of less than 10^{-3} mmHg (0.13 Pa).

20 The oil may be chosen from any physiologically acceptable oil and in particular cosmetically acceptable oil, especially mineral, animal, vegetable or synthetic oils; in particular volatile or nonvolatile hydrocarbon oils and/or silicone oils and/or fluorinated oils, and mixtures thereof.

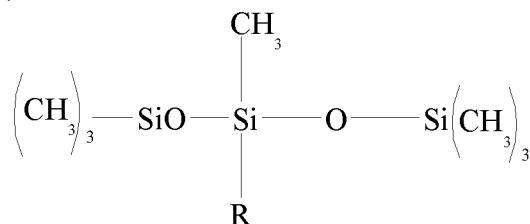
25 More precisely, the term "hydrocarbon oil" means an oil mainly comprising carbon and hydrogen atoms and optionally one or more functional groups chosen from hydroxyl, ester, ether and carboxylic functional groups. Generally, the oil has a viscosity of from 0.5 to 100 000 mPa.s, preferably from 50 to 50 000 mPa.s and more preferably from 100 to 300 000 mPa.s.

As examples of volatile oil that may be used in the invention, mention may be made of:

- 35 - volatile hydrocarbon oils chosen from hydrocarbon oils containing from 8 to 16 carbon atoms, and especially C8-C16 isoalkanes of petroleum origin (also known as isoparaffins), for instance isododecane (also known as 2,2,4,4,6-pentamethylheptane), isodecane and isohexadecane, for example the oils sold under the trade names Isopar or Permethyl, branched C8-C16 esters and isohexyl neopentanoate, and mixtures thereof. Other volatile hydrocarbon oils, such as petroleum distillates, in particular those sold under the name Shell Solt by Shell, can also be used like volatile linear alkanes, such as those described in the patent application of Cognis DE 10 2008 012 457;
- 40 - volatile silicones, for instance volatile linear or cyclic silicone oils, especially those with a viscosity ≤ 8 centistokes (8×10^{-6} m²/s) and especially containing from 2 to 7 silicon atoms, these silicones optionally comprising alkyl or alkoxy groups containing from 1 to 10 carbon atoms. As volatile silicone oils that may be used in the invention, mention may be made especially of octamethylcyclotetrasiloxane, decamethylcyclopentasiloxane, dodecamethylcyclohexasiloxane,

heptamethylhexyltrisiloxane, heptamethyloctyltrisiloxane, hexamethyldisiloxane, octamethyltrisiloxane, decamethyltetrasiloxane and dodecamethylpentasiloxane; - and mixtures thereof.

- 5 Mention may also be made of volatile linear alkyltrisiloxane oils of general formula (I):



in which R represents an alkyl group containing from 2 to 4 carbon atoms, of which one or more hydrogen atoms may be substituted with a fluorine or chlorine atom.

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Among the oils of general formula (I) that may be mentioned are:

3-butyl-1,1,1,3,5,5,5-heptamethyltrisiloxane,
3-propyl-1,1,1,3,5,5,5-heptamethyltrisiloxane, and
3-ethyl-1,1,1,3,5,5,5-heptamethyltrisiloxane,

- 15 corresponding to the oils of formula (I) for which R is, respectively, a butyl group, a propyl group or an ethyl group.

As examples of nonvolatile oil that may be used in the invention, mention may be made of:

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- hydrocarbon oils of animal origin, such as perhydrosqualene;

- hydrocarbon vegetable oils such as liquid triglycerides of fatty acids of 4 to 24 carbon atoms, for instance heptanoic or octanoic acid triglycerides, or wheatgerm oil, olive oil, sweet almond oil, palm oil, rapeseed oil, cottonseed oil, alfalfa oil, poppy oil, pumpkin oil, marrow oil, blackcurrant oil, evening primrose oil, millet oil,
25 barley oil, quinoa oil, rye oil, safflower oil, candlenut oil, passionflower oil, musk rose oil, sunflower oil, maize oil, soybean oil, grapeseed oil, sesame seed oil, hazelnut oil, apricot oil, macadamia oil, castor oil, avocado oil, caprylic/capric acid triglycerides, for instance those sold by Stéarineries Dubois or those sold under the names Miglyol 810, 812 and 818 by Dynamit Nobel, jojoba oil and shea butter oil,

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- linear or branched hydrocarbons, of mineral or synthetic origin, such as liquid paraffins and derivatives thereof, petroleum jelly, polydecenes, polybutenes, hydrogenated polyisobutene such as Parleam, and squalane,

- synthetic ethers containing from 10 to 40 carbon atoms;

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- synthetic esters, especially of fatty acids, for instance the oils of formula R₁COOR₂ in which R₁ represents a linear or branched higher fatty acid residue containing from 1 to 40 carbon atoms and R₂ represents a hydrocarbon chain, which is especially branched, containing from 1 to 40 carbon atoms, with R₁ + R₂ ≥ 10, for instance purcellin oil (cetostearyl octanoate), isononyl isononanoate,

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isopropyl myristate, isopropyl palmitate, C₁₂-C₁₅ alkyl benzoate, hexyl laurate, diisopropyl adipate, isononyl isononanoate, 2-ethylhexyl palmitate, 2-octyldodecyl stearate, 2-octyldodecyl erucate, isostearyl isostearate or tridecyl trimellitate; alcohol or polyalcohol octanoates, decanoates or ricinoleates, for instance propylene glycol dioctanoate; hydroxylated esters, for instance isostearyl lactate,

octyl hydroxystearate, octyldodecyl hydroxystearate, diisostearyl malate, triisocetyl citrate, and fatty alcohol heptanoates, octanoates or decanoates; polyol esters, for instance propylene glycol dioctanoate, neopentyl glycol diheptanoate or diethylene glycol diisononanoate; and pentaerythritol esters, for instance pentaerythrityl tetraisostearate,

- 5 - fatty alcohols that are liquid at room temperature, containing a branched and/or unsaturated carbon chain containing from 12 to 26 carbon atoms, for instance octyldodecanol, isostearyl alcohol, 2-butyloctanol, 2-hexyldecanol, 2-undecylpentadecanol or oleyl alcohol,
- 10 - higher fatty acids such as oleic acid, linoleic acid or linolenic acid;
- carbonates;
- acetates;
- citrates;
- 15 - fluorinated oils that are optionally partially hydrocarbon-based and/or silicone-based, for instance fluorosilicone oils, fluorinated polyethers and fluorosilicones as described in document EP-A-847 752;
- silicone oils, for instance non-volatile linear or cyclic polydimethylsiloxanes (PDMS); polydimethylsiloxanes comprising alkyl, alkoxy or phenyl groups, which are pendant or at the end of a silicone chain, these groups containing from 2 to 24
- 20 carbon atoms; phenyl silicones, for instance phenyl trimethicones, phenyl dimethicones, phenyl trimethylsiloxy diphenyl siloxanes, diphenyl dimethicones, diphenyl methyl-diphenyl trisiloxanes and 2-phenylethyl trimethylsiloxy silicates, and
- mixtures thereof.

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Structuring agent

The compositions according to the invention comprising a fatty phase may also contain at least one agent for structuring the said fatty phase, which may preferably be chosen from waxes, pasty compounds, and mineral or organic lipophilic gelling agents, and mixtures thereof.

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It is understood that the amount of these compounds may be adjusted by a person skilled in the art so as not to harm the effect desired in the context of the present invention.

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Wax(es)

The wax is in general a lipophilic compound that is solid at room temperature (25°C), with a solid/liquid reversible change of state, having a melting point of greater than or equal to 30°C, which may be up to 200°C and in particular up to 120°C.

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In particular, the waxes that are suitable for the invention may have a melting point of greater than or equal to 45°C and in particular of greater than or equal to 55°C.

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For the purposes of the invention, the melting point corresponds to the temperature of the most endothermic peak observed on thermal analysis (DSC) as described in Standard ISO 11357-3; 1999. The melting point of the wax can be

measured using a differential scanning calorimeter (DSC), for example the calorimeter sold under the name "MDSC 2920" by TA Instruments.

The measuring protocol is as follows:

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A sample of 5 mg of wax placed in a crucible is subjected to a first temperature rise ranging from -20°C to 100°C, at a heating rate of 10°C/minute, is then cooled from 100°C to -20°C at a cooling rate of 10°C/minute and is finally subjected to a second temperature rise ranging from -20°C to 100°C at a heating rate of 5°C/minute. During the second temperature rise, the variation in the difference in power absorbed by the empty crucible and by the crucible containing the sample of wax is measured as a function of the temperature. The melting point of the compound is the temperature value corresponding to the top of the peak of the curve representing the variation in the difference in power absorbed as a function of the temperature.

15

The waxes that may be used in the compositions according to the invention are chosen from waxes that are solid at room temperature of animal, vegetable, mineral or synthetic origin, and mixtures thereof.

20

As illustrations of waxes that are suitable for the invention, mention may be made especially of hydrocarbon waxes, for instance beeswax, lanolin wax, Chinese insect waxes, rice bran wax, carnauba wax, candelilla wax, ouricury wax, esparto grass wax, berry wax, shellac wax, Japan wax and sumach wax; montan wax, orange wax and lemon wax, refined sunflower wax sold under the name Sunflower Wax by Koster Keunen, microcrystalline waxes, paraffin waxes and ozokerite; polyethylene waxes, the waxes obtained by the Fischer-Tropsch synthesis and waxy copolymers, and also esters thereof.

25

Mention may also be made of waxes obtained by catalytic hydrogenation of animal or vegetable oils containing linear or branched C8-C32 fatty chains. Among these waxes that may especially be mentioned are isomerized jojoba oil such as the trans-isomerized partially hydrogenated jojoba oil manufactured or sold by Desert Whale under the commercial reference Iso-Jojoba-50®, hydrogenated sunflower oil, hydrogenated castor oil, hydrogenated coconut oil, hydrogenated lanolin oil and the bis(1,1,1-trimethylolpropane) tetrastearate sold under the name Hest 2T-4S® by Heterene.

35

Mention may also be made of silicone waxes (C30-45 alkyl dimethicone) and fluorinated waxes.

40

The waxes obtained by hydrogenation of castor oil esterified with cetyl alcohol, sold under the names Phytowax Castor 16L64® and 22L73® by Sophim, may also be used. Such waxes are described in Patent Application FR-A-2 792 190.

45

A wax that may be used is a C20-C40 alkyl (hydroxystearoxy)stearate (the alkyl group containing from 20 to 40 carbon atoms), alone or as a mixture.

Such a wax is especially sold under the names Kester Wax K 82 P®, Hydroxypolyester K 82 P® and Kester Wax K 80 P® by Koster Keunen.

50

Mention may in particular be made, as microwaxes which can be used in the compositions according to the invention, of carnauba microwaxes, such as that sold under the name of MicroCare 350® by Micro Powders, synthetic wax microwaxes, such as that sold under the name of MicroEase 114S® by Micro Powders, the microwaxes composed of a mixture of carnauba wax and of polyethylene wax, such as those sold under the names of MicroCare 300® and 310® by Micro Powders, the microwaxes composed of a mixture of carnauba wax and of synthetic wax, such as that sold under the name MicroCare 325® by Micro Powders, polyethylene microwaxes, such as those sold under the names of Micropoly 200®, 220®, 220L® and 250S® by Micro Powders, the commercial products Performalen 400 Polyethylene and Performalene 500-L Polyethylene from New Phase Technologies, Performalene 655 Polyethylene or paraffin waxes, such as the wax having the INCI name Microcrystalline Wax and Synthetic Wax and sold under the trade name Microlease by Sochibo; or polytetrafluoroethylene microwaxes, such as those sold under the names Microslip 519® and 519 L® by Micro Powders.

The composition according to the invention will preferably comprise a content of wax(es) ranging from 3% to 20% by weight relative to the total weight of the composition, in particular from 5% to 15% and more particularly from 6% to 15%.

According to one particular form of the invention, in the context of anhydrous solid compositions in stick form, use will be made of polyethylene microwaxes in the form of crystallites with an aspect ratio at least equal to 2, and with a melting point ranging from 70 to 110°C and preferably from 70 to 100°C, so as to reduce or even eliminate the presence of strata in the solid composition.

These crystallites in needle form and especially the dimensions thereof may be characterized visually according to the following method.

The wax is deposited on a microscope slide, which is placed on a hotplate. The slide and the wax are heated to a temperature generally at least 5°C higher than the melting point of the wax or of the mixture of waxes under consideration. At the end of melting, the liquid thus obtained and the microscope slide are allowed to cool in order to solidify. Observation of the crystallites is performed using a Leica DMLB100 optical microscope, with an objective lens selected as a function of the size of the objects to be viewed, and under polarized light. The dimensions of the crystallites are measured using image analysis software such as that sold by Microvision.

The crystallite polyethylene waxes in accordance with the invention preferably have an average length ranging from 5 to 10 µm. The term "average length" denotes the dimension given by the statistical granulometric distribution of half the population, which is written as D50.

Use will be made more particularly of a mixture of the waxes Performalene 400 Polyethylene and Performalene 500-L Polyethylene from New Phase Technologies.

Pasty compounds

For the purposes of the present invention, the term "pasty compound" is intended to denote a lipophilic fatty compound that undergoes a reversible solid/liquid change of state, that has, in the solid state, an anisotropic crystalline arrangement and that comprises, at a temperature of 23°C, a liquid fraction and a solid fraction.

The pasty compound is preferably chosen from synthetic compounds and compounds of vegetable origin. A pasty compound may be obtained by synthesis from starting materials of vegetable origin.

The pasty compound may be advantageously chosen from:

- lanolin and the derivatives thereof,
- polymeric or non-polymeric silicone compounds,
- polymeric or non-polymeric fluorinated compounds,
- vinyl polymers, especially :
 - olefin homopolymers,
 - olefin copolymers,
 - hydrogenated diene homopolymers and copolymers,
 - linear or branched oligomers which are homo- or copolymers of alkyl (meth)acrylates preferably having a C8-C30 alkyl group,
 - oligomers which are homo- and copolymers of vinyl esters having C8-C30 alkyl groups,
 - oligomers which are homo- and copolymers of vinyl ethers having C8-C30 alkyl groups,
- fat-soluble polyethers resulting from the polyetherification between one or more C2-C100, preferably C2-C50, diols,
- esters,
- the mixtures thereof.

Among the esters, the following are especially preferred:

- esters of a glycerol oligomer, especially diglycerol esters, in particular condensates of adipic acid and of glycerol, for which some of the hydroxyl groups of the glycerols have reacted with a mixture of fatty acids such as stearic acid, capric acid, isostearic acid and 12-hydroxystearic acid, especially such as those sold under the brand name Softisan 649 by Sasol,
- the arachidyl propionate sold under the brand name Waxenol 801 by Alzo,
- phytosterol esters,
- fatty acid triglycerides and the derivatives thereof,
- pentaerythritol esters,
- noncrosslinked polyesters resulting from the polycondensation between a linear or branched C4-C50 dicarboxylic acid or polycarboxylic acid and a C2-C50 diol or polyol,
- aliphatic esters of an ester, resulting from the esterification of an aliphatic hydroxycarboxylic acid ester with an aliphatic carboxylic acid,
- polyesters resulting from the esterification, with a polycarboxylic acid, of an aliphatic hydroxycarboxylic acid ester, the said ester comprising at least two hydroxyl groups, such as the products Risocast DA-H® and Risocast DA-L®,

- esters of a diol dimer and of a diacid dimer, where appropriate esterified on their free alcohol or acid functional group(s) with acid or alcohol radicals, such as Plandool-G,
- the mixtures thereof.

5

Among the pasty compounds of vegetable origin that will preferably be chosen is a mixture of soybean sterols and oxyethylenated (5 OE) oxypropylenated (5 OP) pentaerythritol, sold under the reference Lanolide by Vevy.

10 Lipophilic gelling agents

The lipophilic gelling agents can in particular be polymeric organic lipophilic gelling agents, such as for example, partially or completely crosslinked organopolysiloxane elastomers with a three-dimensional structure, such as those
15 sold under the names of KSG6®, KSG16® and KSG18® by Shin-Etsu, of Trefil E-505C® and Trefil E-506C® by Dow Corning, of Gransil SR-CYC®, SR DMF10®, SR-DC556®, SR 5CYC gel®, SR DMF 10 gel® and SR DC 556 gel® by Grant Industries and of SF 1204® and JK 113® by General Electric; ethylcellulose, such as that sold under the name Ethocel® by Dow Chemical; galactomannans
20 comprising from one to six and in particular from two to four hydroxyl groups per monosaccharide and substituted by a saturated or unsaturated alkyl chain, such as guar gum alkylated by C1 to C6 and in particular C1 to C3 alkyl chains, and their mixtures; or block copolymers of "diblock", "triblock" or "radial" type, of the polystyrene/polyisoprene or polystyrene/polybutadiene type, such as the products
25 sold under the name Luvitol HSB® by BASF, of the polystyrene/copoly(ethylene-propylene) type, such as the products sold under the name Kraton® by Shell Chemical Co., or of the polystyrene/copoly(ethylene-butylene) type, and mixtures of triblock and radial (star) copolymers in isododecane, such as those sold by Penreco under the name Versagel®, for instance the mixture of
30 butylene/ethylene/styrene triblock copolymer and of ethylene/propylene/styrene star copolymer in isododecane (Versagel M 5960).

Lipophilic gelling agents that may also be mentioned include polymers with a
35 weight-average molecular weight of less than 100 000, comprising a) a polymer backbone with hydrocarbon repeating units containing at least one heteroatom, and optionally b) at least one optionally functionalized pendent fatty chain and/or terminal fatty chain, containing from 6 to 120 carbon atoms and being linked to these hydrocarbon units, as described in Patent Applications WO-A-02/056847 and WO-A-02/47619, the content of which is incorporated by reference; in
40 particular, polyamide resins (especially comprising alkyl groups containing from 12 to 22 carbon atoms) such as those described in US-A-5 783 657, the content of which is incorporated by reference.

45 Among the lipophilic gelling agents that may be used in the compositions according to the invention, mention may also be made of fatty acid esters of dextrin, such as dextrin palmitates, especially the products sold under the name Rheopearl TL® or Rheopearl KL® by Chiba Flour.

Silicone polyamides of the polyorganosiloxane type may also be used, such as those described in the documents US-A-5 874 069, US-A-5 919 441, US-A-6 051 216 and US-A-5 981 680.

- 5 These silicone polymers may belong to the following two families:
- polyorganosiloxanes comprising at least two groups capable of establishing hydrogen interactions, these two groups being located in the chain of the polymer, and/or
 - polyorganosiloxanes comprising at least two groups capable of establishing
- 10 hydrogen interactions, these two groups being located on grafts or branches.

ORGANIC POWDERS

15 The compositions according to the invention can also comprise at least one organic powder. In the present patent application, "organic powder" is understood to mean any organic solid which is insoluble in the medium at ambient temperature (25°C).

20 Mention may be made, as organic powders capable of being used in the composition of the invention, for example, of polyamide particles and in particular those sold under the Orgasol names by Atochem; polyethylene powders; microspheres based on acrylic copolymers, such as those made of ethylene glycol dimethacrylate/lauryl methacrylate copolymer sold by Dow Corning under the name of Polytrap; polymethyl methacrylate microspheres, sold under the name

25 Microsphere M-100 by Matsumoto or under the name Covabead LH85 by Wackherr; ethylene/acrylate copolymer powders, such as those sold under the name Flobeads by Sumitomo Seika Chemicals; expanded powders, such as hollow microspheres, in particular the microspheres formed of a terpolymer of vinylidene chloride, of acrylonitrile and of methacrylate sold under the name

30 Expancel by Kemanord Plast under the references 551 DE 12 (particle size of approximately 12 µm and density of 40 kg/m³), 551 DE 20 (particle size of approximately 30 µm and density of 65 kg/m³) and 551 DE 50 (particle size of approximately 40 µm) or the microspheres sold under the name Micropearl F 80 ED by Matsumoto; powders formed of natural organic materials, such as powders

35 formed of starch, in particular of crosslinked or noncrosslinked maize, wheat or rice starches, such as the powders formed of starch crosslinked with octenylsuccinic anhydride sold under the name Dry-Flo by National Starch; silicone resin microbeads, such as those sold under the name Tospearl by Toshiba Silicone, in particular Tospearl 240; amino acid powders, such as the

40 lauroyllysine powder sold under the name Amihope LL-11 by Ajinomoto; wax microdispersion particles which preferably have mean dimensions of less than 1 µm and in particular ranging from 0.02 µm to 1 µm and which are essentially composed of a wax or of a mixture of waxes, such as the products sold under the name Aquacer by Byk Cera, in particular: Aquacer 520 (mixture of synthetic and

45 natural waxes), Aquacer 514 or 513 (polyethylene wax) or Aquacer 511 (polymeric wax), or such as the products sold under the name Jonwax 120 by Johnson Polymer (mixture of polyethylene and paraffin waxes) and under the name Ceraflour 961 by Byk Cera (micronized modified polyethylene wax); and the mixtures thereof.

50

The cosmetic composition according to the invention can additionally comprise cosmetic adjuvants chosen from waxes, softening agents, antioxidants, opacifying agents, stabilizing agents, moisturizing agents, vitamins, fragrances, preservatives, polymers, thickening agents, propellants or any other ingredient generally used in cosmetics for this type of application.

The waxes may be chosen from animal, fossil, vegetable, mineral or synthetic waxes. Mention may be made especially of beeswax, carnauba wax, candelilla wax, sugar cane wax, Japan wax, ozokerites, montan wax, microcrystalline waxes, paraffin waxes, and silicone waxes and resins.

The thickeners, which are preferably nonionic, may be chosen from modified or unmodified guar gums and celluloses such as hydroxypropyl guar gum or cetylhydroxyethylcellulose, or silicas, for instance Bentone Gel MIO sold by NL Industries or Veegum Ultra sold by Polyplastic.

Needless to say, a person skilled in the art will take care to select this or these optional additional compound(s) such that the advantageous properties intrinsically associated with the cosmetic composition in accordance with the invention are not, or are not substantially, adversely affected by the envisaged addition(s).

The amounts of these various constituents which may be present in the cosmetic composition according to the invention are those conventionally used in deodorant compositions.

The composition according to the invention can be pressurized and packaged in an aerosol device.

The propellants generally used in products of this type, which are well known to a person skilled in the art, are, for example, dimethyl ether (DME), volatile hydrocarbons, such as n-butane, propane or isobutane, and their mixtures, optionally with at least one chlorinated and/or fluorinated hydrocarbon; mention may be made, among the latter, of the compounds sold by Dupont de Nemours under the Freon® and Dymel® names, in particular monofluorotrichloromethane, difluorodichloromethane, tetrafluorodichloroethane and 1,1-difluoroethane, sold in particular under the trade name Dymel 152 A by Dupont. Use may also be made, as propellant, of carbon dioxide gas, nitrous oxide, nitrogen or compressed air.

The compositions comprising the hydrophobic silica aerogel particles and the propellant or propellants can occur in the same compartment or in different compartments in the aerosol container. According to the invention, the concentration of propellant generally varies from 50 to 90% and more preferably from 55 to 85% by weight, with respect to the total weight of the pressurized composition.

The dispensing means, which forms a part of the aerosol device, is generally composed of a dispensing valve controlled by a dispensing head, itself comprising a nozzle via which the aerosol composition is vaporized. The container containing

the pressurized composition may be opaque or transparent. It may be made of glass, of polymer or of metal, optionally coated with a protective lacquer coat.

LOOSE POWDERS

5

The deodorant composition according to the invention can also be provided in the form of a loose powder.

10

The composition according to the invention comprises a particulate phase comprising at least one filler other than the hydrophobic aerogel particles of the invention.

15

The term "filler" should be understood as meaning colourless or white and inorganic or synthetic particles of any shape which are insoluble in the medium of the composition, whatever the temperature at which the composition is manufactured.

20

The filler(s) are present in concentrations preferably ranging from 50% to 99% by weight, more preferentially from 75% to 99% by weight and even more preferentially from 80% to 99% by weight relative to the total weight of the composition.

25

Preferentially, the composition according to the invention comprises a mixture of spherical particles and of lamellar particles.

30

In the present patent application, the term "spherical particles" means particles in the form or substantially in the form of a sphere, which are insoluble in the medium of the composition according to the invention, even at the melting point of the medium (about 100°C).

35

In addition, the term "lamellar particles" means herein particles of parallelepipedal shape (rectangular or square surface), discoidal shape (circular surface) or elliptical shape (oval surface), characterized by three dimensions: a length, a width and a height, these particles being insoluble in the medium of the composition according to the invention, even at the melting point of the medium (about 100°C).

Spherical particles

40

The spherical particles used according to the invention have or substantially have the shape of a sphere and may be hollow or solid. Advantageously, the particles of the invention have a particle size (number-average diameter) ranging from 0.1 µm to 250 µm, better still ranging from 1 µm to 150 µm and better still ranging from 10 µm to 100 µm.

45

The spherical particles may be organic or mineral microspheres. As spherical particles that may be used in the composition of the invention, examples that may be mentioned include silica powder; polyamide particles and especially Nylon 12 particles, for instance the product sold under the name Orgasol by Atochem; polyethylene powders; microspheres based on acrylic copolymers, such as those made of ethylene glycol dimethacrylate/lauryl methacrylate copolymer sold by Dow

50

5 Corning under the name Polytrap; expanded powders such as hollow microspheres, and especially the poly(vinylidene chloride/acrylonitrile) microspheres sold under the name Expancel by Kemanord Plast or under the name Micropearl F 80 ED by Matsumoto; powders of natural organic materials
10 such as natural maize starch, wheat starch or rice starch, that may or may not be crosslinked, starch powders crosslinked with octenylsuccinic anhydride, sold under the name Dry-Flo by National Starch; silicone resin microbeads, in particular silsesquioxane powders described especially in Patent EP 293 795, such as those sold under the name Tospearl by Toshiba Silicone; and the mixtures thereof.

10 Preferentially, a natural maize, wheat or rice starch will be chosen, and more particularly a maize starch (INCI name: Zea mays starch).

15 These spherical particles may be present in amounts preferably ranging from 20% to 100% by weight, more preferentially from 20% to 50% by weight and more particularly from 25% to 35% by weight relative to the total weight of the mixture of spherical particles and lamellar particles.

20 Lamellar particles

20 As indicated above, lamellar particles are particles of parallelepipedal shape (rectangular or square surface), discoidal shape (circular surface) or elliptical shape (oval surface), characterized by three dimensions: a length, a width and a height. When the shape is circular, the length and the width are identical and
25 correspond to the diameter of a disc, whereas the height corresponds to the thickness of the disc. When the surface is oval, the length and the width correspond, respectively, to the large axis and the small axis of an ellipse and the height corresponds to the thickness of the elliptical disc formed by the platelet. When it is a parallelepiped, the length and the width may be of identical or different
30 dimensions: when they are of the same dimension, the shape of the surface of the parallelepiped is a square; in the contrary case, the shape is rectangular. As regards the height, it corresponds to the thickness of the parallelepiped.

35 The length of the lamellar particles used according to the invention preferably ranges from 0.01 to 100 μm , better still from 0.1 to 50 μm and even better still from 1 to 50 μm . The width of these platelets preferably ranges from 0.01 to 100 μm , better still from 0.1 to 50 μm and even better still from 1 to 10 μm . The height (thickness) of these platelets preferably ranges from 0.1 nm to 1 μm (0.1 to 1000 nm), better still from 1 nm to 600 nm and even better still from 1 nm to 500 nm.

40 Mention may be made, as lamellar particles which can be used in the composition of the invention, of talcs, micas, pearlescent agents and their mixtures.

45 Talcs are hydrated magnesium silicates usually comprising aluminium silicate. The crystal structure of talc consists of repeated layers of a sandwich of brucite between layers of silica.

More particularly, the lamellar particles will be chosen from talcs.

50 Advantageously, use is more particularly made, in the composition of the invention, as lamellar particles, of talc, such as those sold under the names Rose

Talc and Talc SG-2000 by Nippon Talc; mica, such as those sold under the names Mica M RP and Silk Mica by Merck; or mica-titanium oxides, such as the mica-titanium oxide-brown iron oxide (CTFA: Mica/Iron oxides/Titanium dioxide) sold under the name Cloisonné Rouge Flambé 440 X by Engelhard.

5

These lamellar particles may be present in amounts preferably ranging from 40% to 100% by weight, more preferentially from 50% to 91% and better still from 60% to 80% by weight relative to the total weight of the mixture of spherical particles and lamellar particles.

10

Pigments

Besides fillers, the particulate phase of the composition according to the invention may comprise pigments.

15

The term "pigments" should be understood as meaning mineral or organic particles that are insoluble in the liquid organic phase, and which are intended to colour and/or opacify the composition.

20

The pigments may be mineral or organic pigments. Pigments that may be used include metal oxides, for instance iron oxides (especially yellow, red, brown or black iron oxides), titanium dioxides, cerium oxide, zirconium oxide, chromium oxide; manganese violet, ultramarine blue, Prussian blue and ferric blue, and the mixtures thereof.

25

Iron oxide or titanium dioxide pigments are preferably used.

The pigments may be treated with a hydrophobic agent to make them compatible with the organic phase of the composition. The hydrophobic treatment agent may be chosen from silicones such as methicones, dimethicones and perfluoroalkylsilanes; fatty acids such as stearic acid; metal soaps such as aluminium dimyristate, the aluminium salt of hydrogenated tallow glutamate, perfluoroalkyl phosphates, perfluoroalkylsilanes, perfluoroalkylsilazanes, polyhexafluoropropylene oxides, polyorganosiloxanes comprising perfluoroalkyl perfluoropolyether groups, amino acids, N-acylamino acids or the salts thereof; lecithin, isopropyl triisostearyl titanate, and the mixtures thereof.

35

The N-acylamino acids may comprise an acyl group containing from 8 to 22 carbon atoms, for instance a 2-ethylhexanoyl, caproyl, lauroyl, myristoyl, palmitoyl, stearyl or cocoyl group. The salts of these compounds may be the aluminium, magnesium, calcium, zirconium, zinc, sodium or potassium salts. The amino acid may be, for example, lysine, glutamic acid or alanine.

40

The term "alkyl" mentioned in the compounds cited above especially denotes an alkyl group containing from 1 to 30 carbon atoms and preferably containing from 5 to 16 carbon atoms.

45

Hydrophobic treated pigments are described especially in Patent Application EP-A-1 086 683.

50 **Dyes**

Besides fillers and pigments, the particulate phase of the invention may comprise dyes.

- 5 The composition according to the invention may also comprise water-soluble or liposoluble dyes.

The term "liposoluble dyes" should be understood as meaning compounds that are generally organic, which are soluble in fatty substances such as oils.

10

The liposoluble dyes are, for example, Sudan red, D&C Red 17, D&C Green 6, β -carotene, soybean oil, Sudan brown, D&C Yellow 11, D&C Violet 2, D&C Orange 5, quinoline yellow, annatto and bromo acids.

15 **ADDITIONAL DEODORANT ACTIVE AGENTS**

The compositions according to the invention may also contain, in addition, one or more additional deodorant active agents.

- 20 The term "deodorant active agent" refers to any substance that is capable of masking, absorbing, improving and/or reducing the unpleasant odour resulting from the decomposition of human sweat by bacteria.

The deodorant active agents can be bacteriostatic agents or bactericidal agents which act on the microorganisms of axillary odours, such as 2,4,4'-trichloro-2'-hydroxydiphenyl ether (®Triclosan), 2,4-dichloro-2'-hydroxydiphenyl ether, 3',4',5'-trichlorosalicylanilide, 1-(3',4'-dichlorophenyl)-3-(4'-chlorophenyl)urea (®Triclocarban) or 3,7,11-trimethyldodeca-2,5,10-trienol (®Farnesol); quaternary ammonium salts, such as cetyltrimethylammonium salts or cetylpyridinium salts, 30 DPTA (1,3-diaminopropanetetraacetic acid), 1,2-decanediol (Simclariol from Symrise), biguanide derivatives, such as polyhexamethylene biguanide salts or chlorhexidine and its salts; or 4-methyl-4-phenyl-2-pentanol (Symdeo MPP from Symrise).

- 35 Mention may also be made, among the additional deodorant active agents, of zinc salts, such as zinc salicylate, zinc gluconate, zinc pidolate, zinc sulphate, zinc chloride, zinc lactate, zinc phenolsulphonate or zinc ricinoleate;
- sodium bicarbonate;
 - salicylic acid and the derivatives thereof, such as 5-(n-octanoyl)salicylic acid;
 - 40 - metal zeolites, in particular silver-free zeolites;
 - alum.

The deodorant active agents may preferably be present in the compositions according to the invention in concentrations by weight ranging from 0.01% to 5% by weight relative to the total weight of the composition.

45

EXAMPLES

- 50 **Example 1: Comparison of the deodorant activity of hydrophobic silica aerogels with that of particles normally used or of similar materials**

Cyclomethicone	Dow Corning 245 Fluid (Dow Corning)	53
Cyclopentasiloxane (and) dimethiconol	Dow Corning 1501 Fluid (Dow Corning)	9

Procedure:

- 5 The hydrophobic silica aerogel is dispersed in the mixture of the other starting materials using an UltraTurrax mixer. A soft paste which flows under its own weight is obtained and is packaged in a roll-on.

Example 3: Anhydrous deodorant roll-on

10

INCI name	Commercial reference	% by weight
Polydimethylsiloxane (viscosity: 10 cst)	Dow Corning SH 200 C Fluid 10 CS (Dow Corning)	70.5
Isopropyl palmitate	Isopropyl palmitate (Cognis)	6
Dimethicone (and) dimethiconol	Dow Corning 1501 Fluid (Dow Corning)	11
Triethyl citrate	Citroflex 2 (Reilly Chemicals)	7
Silica aerogel	VM-2270 (Dow Corning)	5.5

Procedure:

- 15 The hydrophobic silica aerogel is dispersed in the mixture of the other starting materials using an UltraTurrax mixer. A soft paste which flows under its own weight is obtained and is packaged in a roll-on.

Example 4: Anhydrous deodorant roll-on

20

INCI name	Commercial reference	% by weight
Polydimethylsiloxane (viscosity: 10 cSt)	Dow Corning SH 200 C Fluid 10 CS (Dow Corning)	35
Isopropyl myristate		21
Isopropyl palmitate	Isopropyl palmitate (Cognis)	24
Polydimethylsiloxane (viscosity: 350 cSt)	Silicone Fluid 350 CS (Dow Corning)	9
Dimethicone (and) dimethiconol	Dow Corning 1501 Fluid (Dow Corning)	5

Silica aerogel	VM-2270 Corning	(Dow Corning)	6
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Tests of in vivo effectiveness of composition 4

The tests are carried out on a panel of 20 people.

5

The amount applied is 0.4 g, applied to the surface of the armpit. The deodorant is applied after wiping the armpit.

10

The intensity of the odour of perspiration and of the annoyance of the latter is evaluated by a direct sniff test 8 hours and then 24 hours after 1 application.

The deodorant effectiveness is evaluated by the following two criteria:

15

(1) the intensity of the odour of perspiration (scale from 1: imperceptible intensity, to 9: extremely strong intensity); the lower the value, the fainter the odour;

(2) the hedonic value (scale from 1: extremely unpleasant odour, to 9: extremely pleasant odour); the higher the value, the less the annoyance.

20

The mean variation in the intensity of the odour and the mean variation in the annoyance, expressed as % with respect to an untreated armpit, are measured.

% of variation = (treated armpit value – untreated armpit value) × 100/untreated armpit value

Time after application	Variation in the intensity of the odour	Variation in the hedonic value
8 hours	- 5 %	+3 %
24 hours	- 6 %	+7%

25

Example 5: Anhydrous aerosol

Phase	INCI name	Commercial reference	% by weight
A	Polydimethylsiloxane (viscosity: 10 cSt)	Dow Corning SH 200 C Fluid 10 CS (Dow Corning)	8.65
	Isopropyl palmitate	Isopropyl palmitate (Cognis)	3.7
	Cyclopentasiloxane (and) dimethiconol	Dow Corning 1501 Fluid (Dow Corning)	1.65
B	Silica aerogel	VM-2270 (Dow Corning)	1

C	Isobutane	A-31 (Aeropres)	85
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Procedure:

- 5 The hydrophobic silica aerogel VM 2270 is dispersed in the mixture of the other starting materials using the UltraTurrax mixer constituting the phase A. Pressurization is carried out in an aerosol can with isobutane.

CLAIMS

- 5 1. Cosmetic use of hydrophobic aerogel particles as deodorant active agent.
2. Use according to Claim 1, where the hydrophobic aerogel particles exhibit a specific surface per unit of weight ranging from 200 to 1500 m²/g and a size, expressed as volume-average diameter (D[0.5]), of less than 1500 μm.
- 10 3. Use according to Claim 1 or 2, where the hydrophobic aerogel particles exhibit a specific surface per unit of weight ranging from 600 to 1200 m²/g and better still from 600 to 800 m²/g.
- 15 4. Use according to any one of Claims 1 to 3, where the hydrophobic aerogel particles exhibit a size, expressed as volume-average diameter, ranging from 5 to 25 μm and better still from 5 to 20 μm.
- 20 5. Use according to any one of Claims 1 to 3, where the hydrophobic aerogel particles exhibit a packed density ranging from 0.04 g/cm³ to 0.10 g/cm³, preferably from 0.05 g/cm³ to 0.08 g/cm³.
- 25 6. Use according to any one of Claims 1 to 5, where the hydrophobic aerogel particles exhibit a specific surface per unit of volume ranging from 5 to 60 m²/cm³, preferably from 10 to 50 m²/cm³ and better still from 15 to 40 m²/cm³.
- 30 7. Use according to any one of Claims 1 to 6, where the hydrophobic aerogel particles have an oil absorption capacity, measured by the wet point method, ranging from 5 to 18 ml/g of particles, preferably from 6 to 15 ml/g and better still from 8 to 12 ml/g.
8. Use according to any one of Claims 1 to 6, where the hydrophobic aerogel particles are organic, inorganic or organic/inorganic hybrids.
- 35 9. Use according to any one of Claims 1 to 8, where the hydrophobic aerogel particles are hydrophobic silica aerogel particles and preferably silylated silica aerogel particles and more particularly trimethylsilylated silica aerogel particles.
- 40 10. Use according to any one of Claims 1 to 8, where the hydrophobic aerogel particles are used as sole deodorant active agent.
- 45 11. Cosmetic method for treating human body odours, in particular axillary odours, which consists in applying, to human keratinous substances, a composition comprising at least, in a cosmetically acceptable support, hydrophobic aerogel particles as defined in Claims 1 to 10 as sole deodorant active agent.
12. Cosmetic method for treating human body odours, in particular axillary odours, which consists in applying, to human keratinous substances, a composition comprising at least, in a cosmetically acceptable support, hydrophobic aerogel

particles as defined in Claims 1 to 10, the said composition not comprising an antiperspirant aluminium and/or zirconium salt.