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(54) Title: FRAGRANCING SUBSTRATE

(57) Abstract: A fragrancng substrate comprising a porous polymer material which comprises one or more inorganic particles, and which has absorbed or adsorbed an air treatment composition. The air fragrancng substrate provides good perceived delivery of an air treatment composition over a timespan of several weeks.



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FRAGRANCING SUBSTRATE

The present invention relates to a fragrancng substrate. More specifically, the
10 present invention relates to a fragrancng substrate which does not require a reservoir or
quantity of a liquid or gel of a fragrancng composition, such as a fragrancng oil as a
supply source for the fragrancng substrate.

It is highly desirable in many consumer as well as in institutional applications to
provide a device which includes a fragrancng or other air treatment feature. Such can for
15 example be an air treatment device whose primary technical purpose is to provide a
volatile material to an ambient air space. Alternately, such can be a device which
provides a different primary technical functions such as a cleaning a function, and which
as a secondary technical function provides such a fragrancng (or other air treatment)
feature. For example, contemplated are devices which include a liquid contained within a
20 reservoir wherein said liquid may optionally include in a fragrance but which is
substantially directed to providing a cleaning or disinfecting benefit to a substrate and/or
article, namely respectively, a lavatory appliance such as a toilet, or to a hard surface,
wherein said device also includes one or more elements or portions thereof which provide
a fragrancng (or other air treatment) benefit to the ambient environment surrounding the
25 device, which may be provided either independently of, or in conjunction with the
primary technical benefit of the device.

Various fragrancng substrates are long known to the art, however these are not
without shortcomings. For example, is known to impregnate a fibrous carrier or web
such as a felt pad with a quantity of an air treatment composition, e.g. a fragrance or other
30 volatile material. Exposure of the impregnated fibrous carrier or web to the ambient
environment permits for the release of and volatilization of the fragrance or other volatile
material into the ambient environment. However, such impregnated fibrous carriers or
webs are typically not long lasting and usually suffer a very short useful service life
particularly when used in a high humidity and/or high temperature ambient environments.

A further known fragrancing substrate is a vessel containing a quantity of a liquid air treatment composition and one or more wicks which at one end are immersed within the quantity of the liquid air treatment composition, and another end or part of the same wick is exposed to the ambient environment. Such are advantageous in providing a useful lead long service life usually on the order of several weeks and perhaps even months depending upon the ambient environment and operating conditions within which such a device is used. However, the production and use of such a vessel containing the liquid composition in the wick typically requires careful consideration of providing appropriate physical liquid seals to ensure that inadvertent tipping over of the vessel, or inadvertent contact of the saturated exposed end or exposed parts of the wick to not prematurely release the liquid air treatment composition. Such are highly undesirable particularly as many known liquid air treatment compositions are usually oils and are prone to leave permanent stains particularly on textiles or other fibrous substrates.

A still further known and popular fragrancing substrate is in the form of a gel body or mass which contains a quantity of a volatile air treatment composition contained therein. While such a gel body or mass overcome certain of the technical problems of the foregoing types of known fragrancing substrates, they too are not without their attendant shortcomings. Frequently, the nature of the carrier matrix used to form the gel provides only a limited possible concentration of the air treatment composition which can be contained within the gel body or mass. Additionally, any such carrier matrix needs to be chemically compatible with the air treatment composition, e.g., fragrance, in order to ensure that a sufficiently strong gel body or gel mass is formed. Additionally, it is not uncommon that such a gel body or mass becomes relatively unattractive as the volatile air treatment composition contained therein is released to the atmosphere and escapes from the gel body or mass; shrinkage and deformation of the gel body or mass from its original shape or known to occur but are unattractive from a consumer perspective.

Thus, it is amongst the objects of the invention to provide a fragrancing substrate which overcomes one or more of the technical shortcomings known to the art.

Accordingly, in a first aspect of the invention there is provided a fragrancing substrate which does not require a reservoir or quantity of a liquid or gel of an air

treatment composition, such as a fragranting oil as a supply source for the fragranting substrate or to replenish the fragranting substrate.

In a second aspect of the invention is provided an improved method for delivering an air treatment composition to an ambient environment, which method contemplates the use of the fragranting substrate according to the first aspect of the invention.

In a third aspect of the invention is provided a method for the manufacture of the fragranting substrate described with respect to the first aspect of the invention.

In a fourth aspect of the invention is provided an article which comprises the fragranting substrate according to the first aspect of the invention.

These and further aspects and advantages of the invention will be apparent from a review of the present patent specification.

The present invention provides a fragranting substrate which does not require a reservoir or quantity of a liquid or gel of a fragranting composition, such as a fragranting oil as a supply source for the fragranting substrate or to replenish the fragranting substrate. A fragranting substrate comprises a porous material which provides for both the retention of, as well as the diffusion of an air treatment composition from within said material. Thus, the fragranting substrate acts both as a reservoir for an air treatment composition as well as a dispenser for the inner treatment composition contained therein. Thus, the fragranting substrate permits for the diffusion of an air treatment composition, typically in liquid form, from within the interior of the fragranting substrate to pass to the exposed surfaces, typically planar surfaces of the fragranting substrate and to volatilize into the ambient environment from said surfaces. At the same time, such volatilization of the air treatment composition from said surfaces causes a negative diffusion or capillary gradient within the interior of the fragranting substrate, thereby inducing a further quantity of the air treatment composition contained within the interior of the fragranting device to move such as by migration, such as capillary migration or diffusive migration to one or more surfaces of the porous fragranting substrate and to thereby emitted or delivered to the ambient environment of the porous fragranting substrate.

Fragranting substrates are preferably made from or include one or more polymer materials which also include one or more inorganic materials, particularly one or inorganic materials in particulate form, such as silica and/or carbon, e.g. in powder form.

Nonlimiting examples of suitable polymer materials include, but are not limited to polyamides, polyolefins (e.g., polypropylene, polyethylene) as well as polyalkyleneterephthalates (i.e., polyethylene terephthalate, polybutylene terephthalate), polystyrenes, polysulfones, polycarbonates as well as copolymers formed from
5 monomers of one or more of the foregoing synthetic polymers. Other naturally occurring or synthetic polymers but it will also be used although not specifically described herein, it is only required that the selected polymer or copolymer be fabricable into a fragrancing substrate as described herein. Of these, polyolefins are particularly preferred.

The fragrancing substrates also include one or inorganic materials in particulate
10 form, such as silica and/or carbon which are preferably provided in a comminuted, i.e., powder form, whereby the inorganic materials may be mixed into, or compounded into the polymer material. Advantageously, the inorganic materials are generally uniformly dispersed within the polymer material such that they are present at a relatively homogenous concentration within the bulk of the polymer material used to form the
15 fragrancing substrates. The size of the inorganic materials is usually expressed in terms of average particle size, and generally average particle sizes on the order of from about 0.001 microns to about 1000 microns, preferably from about 10 microns to about 500 microns may be used. Of course, depending upon the nature of the specific fragrancing substrate desired to be produced, and/or the chemical nature of the air treatment material
20 to be contained within said fragrancing substrate, and/or the desired release rates of the air treatment material contained within the said fragrancing substrate, a specific average particle size or range of average particle sizes within, or even outside of the above specified ranges may be utilized. The proportion of the inorganic materials present within the fragrancing substrate may vary significantly, and typically comprises between
25 5 – 95%wt, preferably 10-90%wt., more preferably between 25-80%wt. and still more preferably between 40-70%wt. of the mass of the fragrance substrate, prior to the addition of or incorporation into, of any air treatment composition thereto.

The polymer materials may also include one or more for the additive constituents thereto in effective amounts. By way of nonlimiting example these include one or more
30 of: fillers, plasticizers, antioxidants, lubricants, antistatic agents, pigments, dyes, stabilizers, light stabilizers, and the like.

By way of non-limiting examples, suitable polymer materials include those described in US Patent 3351495, and US Patent 6139795 the contents of which are herein incorporated by reference. Further examples of suitable polymer materials are disclosed in WO 03/086490 A1. Particularly preferred suitable polymer materials for use in the
5 fragrancing substrate are those currently marketed as "DARAMIC polyethylene battery separator material", which is described to be a porous filled polymer comprising 54-67%wt. of an amorphous silica, 8 – 22%wt. of an oil, and 20-26%wt. of a polyethylene polymer, which is currently commercially available from Daramic LLC (Owensboro, Kentucky, USA).

10 The thickness of the fragrancing substrate, is preferably on the order of between 0.01 mm and 10 mm, more preferably between 0.05 – 5 mm, still more preferably between 0.1 - 3 mm, yet more preferably between 0.1 – 2 mm. The fragrancing substrate may be formed of a single piece or layer of material, or may be formed by lamination of two or more materials, one of which is necessarily the fragrancing substrate which he is
15 capable of containing and releasing an air treatment composition therefrom for example, it is contemplated that a laminated form of a fragrancing substrate may be formed of two or more layers each of which are materials which are capable of containing and releasing an air treatment composition therefrom. Alternately, is contemplated that a laminated form of a fragrancing substrate can be formed of two or more layers, at least one of which
20 are materials which are capable of containing and releasing an air treatment composition therefrom, with a least one further layer which does not provide such a function, i.e., can be a barrier layer such as an impervious foil layer, metallized plastic layer, or any other material which retards or denies absorption off the air treatment material within. In the case of the latter, such provides for a contraction of the fragrancing substrate which
25 essentially emanates the air treatment composition substantially from one surface face.

 The fragrancing substrate of the invention includes a porous material which provides for both the retention of, as well as the diffusion of an air treatment composition from within said material. This porous material is advantageously and most preferably the polymer material containing one or inorganic materials in particulate form. The
30 porous material may absorb and/or adsorb the air treatment composition, desirably provided as a fluid or liquid, e.g., a fragrancing oil, in a relatively high weight proportion

relative to the weight (mass) of the porous material itself. Advantageously the weight (mass) ratio of the porous material of the fragrancing substrate to the absorbed or adsorbed fluid or liquid is 1:0.75 – 2.5; preferably 1:0.8 – 2, and still more preferably 1:1 – 1.6 on a weight:weight basis.

5 While the term fragrancing substrate has been utilized in this specification, it is to be understood that such is for purposes of convenient reference and not by way of limitation. It is to be understood that virtually any material which can be dispensed from the fragrancing substrate into the ambient environment can be utilized and still be considered a fragrancing substrate for the purposes of the present invention. 10 Such are also referred to as air treatment materials or air treatment compositions. Thus, a wide variety of volatile materials can be utilized including but not limited to: fragrance materials, air treatment materials which provide an air sanitization benefit, air treatment materials which provide an odor masking or odor counteracting benefit, fragrances, disinfectants, bactericides, fungicides, medicaments, as well as details which provide an 15 insecticidal or other insect controlling benefit. Such volatile materials can be used singly, or in combinations of two or more of the above.

In a particularly preferred embodiment, the fragrancing substrate is used in an air freshener or air fragrancing application, and includes a fragrance. Preferably, the fragrance or air freshener is a fragrance comprising one or more volatile organic 20 compounds which are available from perfumery suppliers such as Firmenich Inc., Takasago Inc., Noville Inc., Quest Co., International Flavors & Fragrances, and Givaudan Corp.

A wide variety of chemicals are known for perfumery, such as aldehydes, ketones, esters, alcohols, terpenes, and the like. Most conventional fragrance materials 25 are volatile essential oils. A fragrance can be relatively simple in composition, or can be a complex mixture of natural and synthetic chemical components.

Natural fragrances include naturally derived oils such as oil of Bergamot, Bitter Orange, Lemon, Mandarin, Caraway, Cedar Leaf, Clove Leaf, Cedar Wood, Geranium, Lavender, Orange, Origanum, Petitgrain, White Cedar, Patchouli, Lavandin, Neroli, Rose 30 absolute, and the like. Natural perfumes include the extracts of blossoms, stems and leaves, fruits, fruit peel, roots, woods, herbs and grasses, needles and branches, resins and

balsams. Other suitable perfume oils are essential oils of relatively low volatility which are mostly used as aroma components. Examples are sage oil, camomile oil, clove oil, melissa oil, mint oil, cinnamon leaf oil, lime-blossom oil, juniper berry oil, vetivert oil, olibanum oil, galbanum oil, ladanum oil and lavandin oil.

5 Typical synthetic perfume compounds are products of the ester, ether, aldehyde, ketone, alcohol and hydrocarbon type. Examples of perfume compounds of the ester type are benzyl acetate, p-tert.butyl cyclohexylacetate, linalyl acetate, phenyl ethyl acetate, linalyl benzoate, benzyl formate, allyl cyclohexyl propionate, styryl propionate and benzyl salicylate. Ethers include, for example, benzyl ethyl ether while aldehydes
10 include, for example, the linear alkanals containing 8 to 18 carbon atoms, citral, citronellal, citronellyloxyacetaldehyde, cyclamen aldehyde, hydroxycitronellal, linal and bourgeonal. Examples of suitable ketones are the ionones and methyl cedryl ketone. Suitable alcohols are anethol, citronellol, eugenol, isoeugenol, geraniol, linalool, phenylethyl alcohol and terpineol. The hydrocarbons mainly include the terpenes and
15 balsams.

Synthetic types of fragrance compositions either alone or in combination with natural oils are described in U.S. Pat. Nos. 4,324,915; 4,411,829; and 4,434,306; incorporated herein by reference. Other artificial liquid fragrances include geraniol, geranyl acetate, eugenol, isoeugenol, linalool, linalyl acetate, phenethyl alcohol, methyl
20 ethyl ketone, methylionone, isobomyl acetate, and the like.

It is, however, preferred to use mixtures of different perfume compounds which, together, produce an agreeable fragrance.

The following are also preferably used either individually or in the form of mixtures: dihydromyrcenol, linal, lylal, citronellol, phenylethyl alcohol, α -
25 hexylcinnamaldehyde, benzyl acetone, cyclamen aldehyde, linalool, Boisambrene Forte, Ambroxan, indole, hedione, sandelice, citrus oil, mandarin oil, orange oil, allylamyl glycolate, cyclovertal, lavandin oil, clary oil, β -damascone, geranium oil bourbon, cyclohexyl salicylate, Vertofix Coeur, Iso-E-Super, Fixolide NP, evernyl, iraldein gamma, phenylacetic acid, benzyl acetate, rose oxide, romillat, irotyl and floramat.
30 Advantageously, the volatile materials are in a liquid form when provided to the polymer materials in order to form the fragrancing substrate.

When the a fragrancng substrate in intended to provide an insect controlling or insecticidal benefit, the volatile material and tediously contains a natural or synthetic insecticides such as one or more of: pyrethoid, nicotinoid, rotenoid, Metofluthrin®, Transfluthrin®, Tetramethrin®, Bicallethrin®, Allethrin®, phenthrin, one or more
5 dinitrophenols, one or more organothiocyanate, benzene hexachloride, one or more polychlorinaged cyclic hydrocarbons, e.g., Hepatachlor®, Aldrin®, Telodrin®, or one or more organophosphorous compounds, e.g., tetraethyl pyrophosphate.

Fragrancng substrates according to the invention are readily easily formed merely by at least partially, but preferably wholly immersing the polymer material within an air
10 treatment composition, typically in a liquid form at room temperature and atmospheric pressure, such that a quantity of the air treatement composition is absorbed or impregnated into the interior of the polymer material. Advantageously, the fragrancng material is retained within the air treatment composition for sufficient time such that it is at least 85% saturated, preferably at least 90% by weight saturated, still more preferably
15 is at least 95% by weight saturated and most preferably is completely saturated. Higher degrees of saturation provide for more effective loading of the air treatment composition within the fragrancng substrates, and are believed also to provide for a maximum useful service life of the fragrancng substrate.

Conveniently, the polymer material may be provided to a bath containing a
20 quantity of the air treatment composition, typically in liquid form, and is retained immersed therein until a desired degree of saturation of the polymer material is achieved. Such may be practiced by using, for example, a roll or sheet(s) of the polymer material which is, subsequent to the immersion and later withdrawal from the quantity of the air treatment composition, is subsequently formed such as by cutting or stamping into the
25 ultimately desired shape of the fragrancng substrate. Alternately, the polymer material can be formed into the ultimately desired shape of the fragrancng substrate prior to the immersion into or contact with the air treatment composition, typically in liquid form part again, such a process can be performed via dipping, or immersing the polymer material into the air treatment composition for sufficient time such that a desired degree of
30 saturation of the polymer material is attained.

Thereafter, of the fragrancing substrate can be used such as for example by insertion into an appropriately shaped cavity of a further article intended to receive the air treatment composition from whence the air treatment composition can be delivered from within the fragrancing substrate into the ambient environment. Alternately, the
5 fragrancing substrate can be used without any further device, such as by simply exposing a fragrancing substrate to the ambient environment into which the air treatment composition contained within the fragrancing substrate is delivered.

An important technical feature of the fragrancing substrates according to the present invention resides in the fact that it has been surprisingly and unexpectedly
10 observed to that the fragrancing substrates are effective in providing a satisfactory amount of an air treatment composition, especially where such as a fragrancing composition such as a fragrance oil, to an ambient environment for a period of several weeks without a significant reduction in the perceived levels of the air treatment benefit, viz., fragrancing benefit provided over several weeks by an ordinary consumer. This is
15 particularly surprising as not withstanding ever increasing depletion of the air treatment composition from within the fragrancing substrate, that, a satisfactory level of perceived delivery of said air treatment composition occurs, with less than a 75% degree of diminishment, preferably less than a 50% degree of diminishment of the perceived level of delivery of the air treatment composition, especially where such as a fragrance,
20 between the perceived level of delivery said air treatment composition following one week of use, and the fourth or fifth successive week of use of the fragrancing substrate.

A further surprising technical effect discovered by the inventor was that the fragrancing substrates, in certain embodiments, exhibited a reduced level of loss of the air treatment material, e.g., fragrance oil, between the 1st week of use of the fragrancing
25 substrate, and later weeks of use of the fragrancing substrate, especially in the 3rd and/or 4th and/or 5th week of use of the fragrancing substrate. Such may be responsible for the perceived satisfactory fragrancing benefit provided over several weeks by an ordinary consumer.

This particular feature is particularly surprising considering also that the
30 fragrancing substrate according to the invention is advantageously used without any replenishing source, such as being periodically contacted with a further amount of an air

treatment composition, such as by inversion of a vessel containing a quantity of the same where it comes into contact with the polymer material of the fragrancing substrate, or by direct application of a further quantity of the air treatment composition to a part of the fragrancing substrate, or by the transmission of a quantity of an air treatment composition
5 from a supply source such as a vessel or bottle, via a wick, to a part of the fragrancing substrate.

Advantageously, also the fragrancing substrates operate without the need of any power, viz., may operate without the need of an electric fan, electric blower, heating element such as the heating plate or mantle.

10 The fragrancing substrates may take any of variety of forms, and may be essentially two-dimensional in configuration, e.g., in the form of a flat plate, sheet, film, ribbon or tape, or may be formed into a three-dimensional configuration such as by folding into a shape or form which has three dimensions, e.g., providing a series of folds or bends such as to provide a corrugated shape or configuration, or wherein the
15 fragrancing substrate may be formed into a three-dimensional article, such as a cube, coil or virtually any other shape. The fragrancing substrates may also be thermoformed as well.

The fragrancing substrates may be included as a part of device, e.g., may be included in a cavity, cage or holder of a device; it is required only that ambient air be
20 permitted to come into contact with one or more surfaces of the fragrancing substrates in order that they may release their air treatment composition to the ambient environment of the device. By way of non-limiting example such devices may include air treatment devices, e.g., air freshener devices, or lavatory devices, such as devices which also provide a cleaning and/or sanitizing composition to a lavatory appliance, e.g., a toilet
25 bowl.

Certain preferred embodiments of the invention are described with reference to one or more of the following examples.

Examples:

30 A number of sample fragrancing substrates according to the invention were produced in accordance with the following general protocol.

Two types of substrate films were utilized. The first type of substrate film which was white in color and opaque when dry was used, of two different thicknesses, a first substrate film having a thickness of 0.6 mm, and a second substrate film having a thickness of 1.0 mm were used. Both the first and second substrate films consisted of filled polyolefin (polyethylene) polymers which comprised 60%wt. of the polyolefin and 40%wt. of silica particles. A second type of substrate film was used, which was medium grey in color and opaque when dry was used, namely a third substrate film having a thickness of 1.0 mm. This third substrate film consisted of filled polyolefin (polyethylene) polymers which comprised 60%wt. of the polyolefin, 35-38 %wt. of silica particles and 2 – 5%wt. carbon black particles.

A plurality of fragrancing substrates was formed by first cutting circles of each of the second substrate film (polymer material), and third substrate films (polymer material) into circular pieces having approximately 50 mm diameters. Next, each of the circular pieces were immersed for between 6-8 minutes in individual laboratory trays having 50 mL of a fragrance oil contained therein, such that the individual circular pieces were fully immersed and upon removal from the trays, each of the circular pieces were fully saturated by the fragrance oil. Thereafter, each of the saturated circular pieces were allowed to air dry in a vertical position over a laboratory tray which could catch any runoff of the fragrancing oil, thereafter each of the saturated circular pieces were blotted so that their surfaces were dry with a laboratory paper towel, and subsequently the saturated circular pieces thus prepared were used to produce a first test article, a second test article. The first test articles were produced by inserting the saturated circular pieces to lay flat against the bottom surface of a molded polyolefin article, which was circular in cross section, and had a continuous sidewall having a height of 10 mm and an open end opposite to the flat bottom surface of the said article; such defined the cavity of the said article. Three replicate samples of first test articles were made in this manner for each type of the first substrate film, second substrate film, and the third substrate film will which were saturated in the manner described above. A series of second test articles were made in a manner identical to that used to form the series of first test article, but, after insertion of the saturated circular pieces to the flat bottom surface, a circular perforated cover was provided to span across the open end of the continuous sidewall of

the molded polyolefin article and thus cover the cavity; the circular perforated cover had a plurality of passages extending through which limited the surface area to 4 cm². Because, the first test articles and the second test articles differed only by the presence of the circular perforated cover present in the second test articles which acted as a baffle to limit the airflow into the interior of the molded polyolefin article and it which would come into contact with the saturated circular piece contained therein, in contrast to the open end of the molded polyolefin article according to the first test articles which did not impede airflow into the interior of the molded polyolefin article and the saturated circular piece contained therein.

As a third type of test article, a further series of fragrancing substrates were formed in the same manner as described above however, the saturated circular pieces were formed from the first substrate film, and after being immersed and saturated were not introduced into the interior of a molded polyolefin article but rather were introduced into a resealable foil envelope. Three replicate samples were made of this further series of fragrancing substrates, which were used as a benchmark in the following sensory evaluation tests.

It was observed that the weight:weight ratio of the polymer film:fragrance oil was approximately 1:1.

All of the replicates of the molded polyolefin articles containing the saturated circular pieces of the second substrate films and the third substrate films were placed into a controlled storage chamber which maintained an ambient temperature of 25°C and 50% relative humidity within the chamber of the route the duration of the test. Similarly the replicates of the fragrancing substrates formed from the first substrate film and contained in resealable foil envelopes are subjected to the same test conditions. At intervals of one week, two weeks, three weeks, for weeks, and five weeks each of the replicates were removed from the controlled storage chamber and were evaluated both for the actual weight loss observed in each of the samples, which indicated the amount of the fragrance oil volatilized since the prior sampling interval. Further, a series of 21 (human) panelists were asked to evaluate the relative perceived fragrance strength of the replicates of the fragrancing samples in a blind study. One of each of the types of replicates were placed into a sensory booth where in the actual replicate was not visible to the panelist. A further

“control” sample, which was unfragranced was also used and similarly was not visible to the panelist. The panelists were asked to provide a numerical rating of between “0” indicating no perceived fragrance, to “10” indicating a strong perceived fragrance at each weekly interval for each of the tested samples of the fragrancing substrates.

- 5 The results of these tests were averaged for each of the three replicates of each type of fragrancing substrate and/or test article; the results of the actual % weight loss of the volatile oil from each type of fragrancing substrate and/or test article relative to the initial amount (mass) of volatile oil present in each of the saturated circular pieces is indicated on the following Table 1.

10

Table 1					
	%wt. loss of fragrance oil				
	week 1	week 2	week 3	week 4	week 5
1 st test article (saturated 1mm white film, open polyolefin article cavity)	78.2	85.7	90.8	94.7	94.7
2 nd test article (saturated 1mm white film, covered polyolefin article cavity)	31.6	41.9	62.5	69.9	71.3
1 st test article (saturated 1mm grey film, open polyolefin article cavity)	79.7	88.1	95.1	95.1	95.1
3 rd test article (saturated 1 mm white film, retained in resealable foil pouch)	6	13.2	24.5	27.6	29.6
control (unfragranced article)	--	--	--	--	--

The average results for the 21 panelists who participated in the relative perceived fragrance strength of the replicates of the fragrancing samples in the blind study are indicated on Table 2.

Table 2					
	relative perceived fragrance strength				
	week 1	week 2	week 3	week 4	week 5
1 st test article (saturated 1mm white film, open polyolefin article cavity)	4.1	2.85	2.2	1.8	2.1
2 nd test article (saturated 1mm white film, covered polyolefin article cavity)	3.95	4.0	3.05	2.85	3.7
1 st test article (saturated 1mm grey film, open polyolefin article cavity)	4.0	3.4	2.25	2.05	1.9
3 rd test article (saturated 1 mm	6.05	5.5	5.15	5.05	5.7

white film, retained in resealable foil pouch)					
control (unfragranced article)	1.57	1.15	1.35	1.15	1.2

Surprisingly notwithstanding the actual amount of volatile oil present at each of weeks 1, 2, 3, 4, and 5 of the tests, the diminishment of the perceived relative fragrance strength did not diminish as quickly as might be initially expected, which demonstrates the long-lasting service life of the test articles. This is particularly true for the 2nd test with a baffled cover which somewhat limited the amount of volatilization of the volatile oil over the 5 week period of the test. As noted on Table 2, the perceived fragrance strength remained relatively similar at both the 1st and 5th weeks of the test.

While described in terms of the presently preferred embodiments, it is to be understood that the present disclosure is to be interpreted as by way of illustration, and not by way of limitation, and that various modifications and alterations apparent to one skilled in the art may be made without departing from the scope and spirit of the present invention.

Claims:

1. A fragrancing substrate comprising a porous polymer material which comprises
5 one or inorganic materials in particulate form, and having absorbed or adsorbed
an air treatment composition, which fragrancing substrate does not require a
reservoir or quantity of a liquid or gel of a fragrancing composition, such as a
fragrancing oil as a supply source for the fragrancing substrate or to replenish the
fragrancing substrate.
10
2. A fragrancing substrate according to claim 1 wherein the inorganic material is
comminuted silica and/or carbon.
3. A fragrancing substrate according to claim 2 wherein the inorganic material is
15 silica.
4. A fragrancing substrate wherein the porous polymer material is a polyolefin.
5. An improved method for delivering an inner treatment composition to an ambient
20 environment, which method includes the use of the fragrancing substrate
according to claim 1.
6. A method for the manufacture of the fragrancing substrate according to claim 1.
- 25 7. A device which comprises the fragrancing substrate according to claim 1.

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2009/001945

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61L9/04 A61L9/12

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A61L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 071 645 A (JOHNSON HARLAN B [US] ET AL) 10 December 1991 (1991-12-10) column 1, line 14 - column 2, line 33 column 3, line 53 - column 4, line 15 column 4, lines 37-60 column 6, lines 39-51 column 7, line 51 - column 8, line 18 column 9, lines 24-26 column 19, lines 23-45	1-7
X	US 4 824 707 A (SPECTOR DONALD [US]) 25 April 1989 (1989-04-25) column 1, line 63 - column 2, line 31 column 2, line 62 - column 3, line 22 column 3, lines 37-55 column 4, lines 4-22	1-7

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☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

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Date of the actual completion of the international search

20 October 2009

Date of mailing of the international search report

21/12/2009

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INTERNATIONAL SEARCH REPORT

International application No

PCT/GB2009/001945

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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X	GB 1 169 656 A (ENOMOTO FUMIO [JP]) 5 November 1969 (1969-11-05) page 1, lines 8-15 page 2, lines 35-94 page 3, lines 24-75 page 3, lines 93-108 page 3, line 125 - page 4, line 18 -----	1-7 -
X	EP 0 582 823 A1 (SUMITOMO CHEMICAL CO [JP]) 16 February 1994 (1994-02-16) page 2, lines 44-48 page 3, lines 6-39 page 3, lines 51-53 page 5, lines 1-8 -----	1-7

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2009/001945

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