A needlepunched nonwoven wipe containing a flowable product, activated by the addition of water, permits sustained release of the product.
SUSTAINED RELEASE WIPE

FIELD OF THE INVENTION

[0001] The present invention relates generally to a cleaning product. More specifically, this invention relates to a sustained release wipe containing a flowable product activated by the addition of a liquid.

BACKGROUND OF THE INVENTION

[0002] Traditional cleaning has involved the use of towels or rags to which products have been added. Unfortunately, the towels and rags required washing after each use, a process that is relatively inconvenient and that sometimes caused cross-contamination. Disposable wipes have been out of such inconvenience. The use of disposable wipes for many applications has proliferated. Such wipes have conventionally been formed from meltblown PPE (polypropylene) and saturated with a wide variety of products from germicides to cleaning products, etc. Unfortunately, such conventional wipes have a tendency to be fragile and have little or no absorptive properties. Loading conventional wipes with such products also typically results in low load levels, thereby necessitating the use of additional wipe to achieve the desired cleaning level.

[0003] In the automotive aftercare market, a wide variety of automobile treatment products are known. Such products are detergent-containing PPE wash wipes for washing cars. The user wets the wipe to activate the detergent while washing the car. As the wipe gets dirty, it is repeatedly rinsed with water. Unfortunately, the amount of detergent remaining in the wash wipe after one or two rinses is insufficient to complete the washing of a fully-sized car, requiring additional wash wipes to be used.

[0004] This problem has been addressed, for example, by improving the functionality of the products contained in the wipes. For example, U.S. Pat. No. 4,735,739 to Floyd et al. describes a polyolefin wash wipe containing a detergent composition which has an affinity for the polyolefin wash wipe. A long chain alkylamide in the detergent composition purportedly imparts the polyolefin affinity and the sustained release. Unfortunately, such invention is limited to the particular detergent composition in combination with a polyolefin wipe.

[0005] Accordingly, there exists a need for a novel improved sustained release wipe and method that are durable, convenient and easy to use with a wide variety of products. There is a further need for a novel improved sustained release wipe and method that are substantially absorbent. There is an additional need for a novel improved sustained release wipe and method whereby the wipe has increased loading capacity, thereby permitting treatment of a larger target surface area with fewer wipes. There is another need for a novel improved sustained release wipe and method that provide substantially the correct amount of product in each wipe for the desired application. There is a further need for a novel improved sustained release wipe and method that are particularly useful for washing automobiles. There is also a need for a novel improved sustained release wipe and method that are easy to use to apply the product over such large target surface area. The present invention fulfills these needs and provides further related advantages.

SUMMARY OF THE INVENTION

[0006] According to the present invention and exemplary embodiments described herein, an improved sustained release wipe and method is provided for use in cleaning target surfaces, including automobile and other target surfaces. The wipe in the form of a mitt is also provided. A method of using the wipe is also provided.

[0007] The sustained release wipe generally comprises at least one layer of a needlepunched nonwoven material and a product contained in the needlepunched nonwoven material that is activated by the addition of liquid, such as water or the like. The needlepunched nonwoven material is substantially porous, providing a greater surface area over traditional meltblown PPEs. Therefore, the material may be loaded with substantially more flowable product than with traditional nonwovens.

[0008] The sustained release wipe may be in the form of a sheet or pad. Preferably, it may be formed into a mitt. The mitt includes an interior surface contacting the user’s hand and an exterior surface for contacting the target surface. The interior surface of the mitt may be partially or fully covered with at least one layer of a substantially moisture impermeable film as a mitt liner, to separate the user’s hand from the product in the at least one layer of needlepunched nonwoven material. The at least one layer of a substantially moisture impermeable film comprises a film such as plastic or the like.

[0009] The exterior surface of the mitt may be partially or fully covered with at least one layer of a substrate material. The at least one layer of the substrate material may include a woven fabric, knit fabric, nonwoven fabric or web, foam and paper material. The substrate material on the top and bottom sides of the mitt may be the same or different.

[0010] The method of treating the target surface with the sustained release wipe is also provided. The method comprises providing a sustained release wipe containing a product; wetting the sustained release wipe to activate the product; wiping the target surface with the sustained release wipe to apply the product to the target surface; rinsing the sustained release wipe to activate more product; and repeating the wetting, wiping and rinsing steps until treatment of the target surface has been completed.

[0011] Other features and advantages of the invention will become apparent from the following more detailed description, taken in conjunction with the accompanying drawings which illustrate, by way of example, the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The accompanying drawings illustrate the invention. In such drawings:

[0013] FIG. 1 is a perspective view of a sustained release wipe, consistent with an embodiment of the invention;

[0014] FIG. 2 is a fragmented horizontal sectional view taken generally on the line 2-2 of FIG. 1;

[0015] FIG. 3 is a side view of the sustained release wipe of FIG. 1, illustrating foam production when water is added to the product in the sustained release wipe;
FIG. 4 is an environmental view, illustrating cleaning of an automobile using the sustained release wipe of FIG. 1;

FIG. 5 is a perspective view of the sustained release wipe in the form of a mitt, consistent with an embodiment of the invention;

FIG. 6 is a fragmental horizontal sectional view of the mitt taken generally on the line 6-6 of FIG. 5;

FIG. 7 is an enlarged view of an alternative embodiment of a mitt;

FIG. 8 is a fragmental horizontal sectional view taken generally on the line 8-8 of FIG. 7; and

FIG. 8A is an enlarged fragmental plan view of a bottom side of the mitt corresponding generally with the encircled region of FIG. 8.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

As shown in the drawings for purposes of illustration, an improved sustained release wipe referred to generally in FIG. 1 by the reference numeral 10 is provided for cleaning a target surface. The target surface may include that of an automobile, or any other target surface including, but not limited to, those in a kitchen, bathroom and in commercial environments.

The sustained release wipe is durable, convenient, easy to use, and substantially absorbent. The wipe has increased loading capacity, thereby permitting treatment of a larger target surface area with fewer wipes needed. The wipe provides substantially the correct amount of product in each wipe for the desired application and permits substantially localized application of the product to the surface without affecting other surfaces. Incorporating the wipe into the form of a mitt is particularly advantageous. The wipes sustain the product over a sufficient number of rinse cycles. In the case of an automobile, an entire automobile may be washed with just one sustained release wipe.

In accordance with the present invention, and as illustrated with respect to a preferred embodiment in FIGS. 1-8A, the sustained release wipe 10 generally comprises at least one layer of a needlepunched nonwoven material 12 and a product 14 contained in the needlepunched nonwoven material 12 that is activated by the addition of liquid 16, such as water or the like. The sustained release wipe 10 may be in the form of a sheet or pad as shown in FIGS. 1-4, or it may also be formed into a mitt 18 as shown in FIGS. 5-8.

Preferred needlepunched nonwoven material 12 preferably has substantially the following properties:

<table>
<thead>
<tr>
<th>Physical Properties</th>
<th>Approx. Value</th>
<th>Spec. Limits Min</th>
<th>Spec. Limits Max</th>
<th>Unit of measure Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry MD Tensile</td>
<td>&gt;20</td>
<td>NA</td>
<td>NA</td>
<td>ISO-9864</td>
</tr>
<tr>
<td>Strength</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dry MD Elongation</td>
<td>&lt;75</td>
<td>0.25</td>
<td>0.25</td>
<td>ISO-9073-3</td>
</tr>
<tr>
<td>Dry CD Tensile</td>
<td>&gt;20</td>
<td>NA</td>
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<td>ISO-9864</td>
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<tr>
<td>Strength</td>
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Suitable needlepunched nonwoven material 12 is available, for example, from GPMI Company, Gilbert, Ariz. As shown in FIG. 1, the preferred needlepunched nonwoven material 12 is substantially porous, providing a greater surface area over traditional meltblown PPEs. Therefore, the material may be loaded with substantially more flowable product 14 than with traditional nonwovens. The material may absorb or adsorb product 14. The material is substantially soft and spongy. Of course, it is to be understood that other needlepunched nonwoven materials 12 may be used having a base weight of about 50 to about 280 gsm, preferably about 10 gsm.

Throughout this application, the term “containing”, “contain” or the like includes both surface coating and impregnation. The needlepunched nonwoven material 12 is impregnated by any known methods by causing the product 14 to extend or penetrate into the material. The needlepunched nonwoven material 12 refers to the surface upon which the coating is formed.

The product 14 may be a flowable product. “Flowable” is defined for the purposes of the present invention as a material that is in a substantially liquid state, substantially liquid state with suspended particles/granules/foams, a non-packing power, granule or the like. For example, detergent or soap may be added to the sustained release wipe. The preferred quantity of detergent loaded into one sustained release wipe is about 13-17 gsm, preferably about 15 gsm for the washing of an automobile. Other exemplary automobile aftercare products include tire dressings, dash protectants, etc. Of course, it is to be understood that the wipes of this invention may contain other types of products for treating a wide variety of target surfaces. Colorings and fragrances may also be added to the sustained release wipe.

The at least one layer of the needlepunched nonwoven material 12 may be doubled over itself, or may include two or more pieces of material and sealed around three sides to form a mitt (See FIGS. 6 and 8) defining an opening 20 for the user’s hand. As shown in FIGS. 6 and 8, the mitt may include a cuff 22 to aid in retaining the mitt 18 on the hand. Of course, it is to be understood that the mitt may be cuffedless. Similarly, the mitt may have a thumb or be thumbless. It is to be understood that other forms and ways of making the mitt known by those skilled in the art are within the confines of the invention. The mitt 18 includes an interior surface 24 contacting the user’s hand and an exterior surface 26 for contacting the target surface. As used herein, the part of the mitt above the back of the user’s hand is
referred to herein as a top side of the mitt and the part of the mitt on the palm side of the user's hand is a bottom side of the mitt.

As shown in FIG. 8, the interior surface 24 of the mitt may be partially or fully covered with at least one layer of a substantially moisture impermeable film 32 as a mitt liner to separate the user's hand from the product 14 in the at least one layer of needlepunched nonwoven material 12. This may be desired when skin contact with the product 14 is to be avoided. The at least one layer of a substantially moisture impermeable film 32 may be attached to the interior surface of the mitt by ultrasonic welding, heat staking, glueing or sewing or the like. The at least one layer of a substantially moisture impermeable film comprises a film such as plastic or the like. Films may be a single material or a combination of materials that are co-extruded and/or laminated together. The preferred thickness for a plastic film is about 0.01 mm to about 0.10 mm, preferably about 0.05 mm. The film 32 may also be applied by other conventional means, such as spraying, coating, dipping and the like.

It is to be understood that although the substantially moisture impermeable film has been described in connection with the mitt embodiment, the substantially moisture impermeable film may also be used with the sustained release wipe as shown in FIGS. 1-4, as a top layer to separate the user's hand from the product in the wipe.

The exterior surface 26 of the mitt may be partially or fully covered with at least one layer of a substrate material 34. The at least one layer of the substrate material 34 may include a woven fabric, knit fabric, non-woven fabric or web, foam and paper material. The at least one layer of substrate material may be attached to the mitt by ultrasonic welding, heat staking, glueing, sewing or the like. The substrate material on the top and bottom sides 28 and 30 of the mitt may be the same or different. For example, either or both of the top or bottom exterior surfaces of the mitt may be covered with VICOTEX® textured nonwoven material available from GPMI Company, Gilbert, Ariz. and which is useful for scrubbing purposes. The opposite side may or may not be covered with the at least one layer of substrate material. The opposite side may include the at least one layer of substrate material suitable for polishing.

In using the sustained release wipe in either the form shown in FIGS. 1-4 or the mitt as shown in FIGS. 5-8, water or other liquid is added to the wipe to activate the product, i.e., the product is released. Depending upon the product, foam as shown in FIG. 3 may be formed, substantially increasing the cleansing ability of the wipe. For example, the presence of foam indicates the detergent has been released. As the wipe gets dirty, it is repeatedly rinsed with water, thereby activating more product in the wipe. The wipe may then be discarded.

The method of treating the target surface with the sustained release wipe is also provided. The method comprises providing a sustained release wipe containing a product; wetting the sustained release wipe to activate the product; wiping the target surface with the sustained release wipe to apply the product to the target surface; rinsing the sustained release wipe to activate more product; and repeating the wetting, wiping and rinsing steps until treatment of the target surface has been completed.

Although the treatment of automobiles surfaces has been particularly described and shown as in FIG. 4, it is to be understood that the wipes of this invention may be used in any number of surface treatment applications. For example, the wipes/mitts may be used for disinfecting, cleaning, scrubbing, stain removing, etc. in a household kitchen or bath or commercially in a multitude of other applications.

From the foregoing, it is to be appreciated that the sustained release wipe of the present invention takes convenience a step further by permitting its continued use over a large surface area, with continued release of the product without replacement.

Although a particular embodiment of the invention has been described in detail for purposes of illustration, various modifications may be made without departing from the spirit and scope of the invention. Accordingly, the invention is not to be limited, except as by the appended claims.

We claim:

1. A sustained release wipe comprising:

at least one layer of a needlepunched nonwoven material; and

a product contained in the at least one layer of the needlepunched nonwoven material.

2. The sustained release wipe of claim 1, wherein the at least one layer of the needlepunched nonwoven material is substantially porous.

3. The sustained release wipe of claim 1, wherein the at least one layer of the needlepunched nonwoven material has a base weight of about 50 to about 280 gsm.

4. The sustained release wipe of claim 1, wherein the sustained release wipe is in the form of a mitt.

5. The sustained release wipe of claim 1, wherein the at least one layer of the needlepunched nonwoven material has a dry MD and CD tensile strength of greater than about 20, a dry MD and CD elongation of greater than about 75%, a base weight of about 112 gsm to about 138 gsm, and a thickness of about two mm.

6. The sustained release wipe of claim 1, wherein the product comprises a flowable product.

7. The sustained release wipe of claim 1, wherein the product is contained in an amount from about 13 to about 17 gsm.

8. A sustained release wipe mitt comprising:

at least one layer of a needlepunched nonwoven material containing a product; whereby the at least one layer of the needlepunched nonwoven material is formed into a mitt for receiving a user's hand, the mitt having an interior surface contacting the user's hand and an exterior useful surface for contacting the target surface.

9. The sustained release wipe mitt of claim 8, further comprising:

at least one layer of a substantially moisture impermeable film covering at least a portion of the interior surface of the mitt to separate the user's hand from the product in the at least one layer of the needlepunched nonwoven material.

10. The sustained release wipe mitt of claim 9 wherein the at least one layer of a substantially moisture impermeable comprises a plastic film.
11. The sustained release wipe mitt of claim 10 wherein the thickness of the plastic film is about 0.01 mm to about 0.10 mm.

12. The sustained release wipe mitt of claim 8, wherein at least a portion of the exterior surface of the mitt is covered with at least one layer of one or more substrate materials.

13. The sustained release wipe mitt of claim 12, wherein the at least one layer of the one or more substrate materials comprises a nonwoven fabric or web.

14. The sustained release wipe mitt of claim 13, wherein the nonwoven fabric or web comprises VICOTEX®.

15. The sustained release wipe mitt of claim 14, wherein a bottom side of the mitt is at least partially covered with VICOTEX®.

16. The sustained release wipe of claim 8, wherein the at least one layer of the needlepunched nonwoven material is substantially porous.

17. The sustained release wipe of claim 8, wherein the at least one layer of the needlepunched nonwoven material has a base weight of about 50 to about 280 gsm.

18. The sustained release wipe of claim 8, wherein the at least one layer of the needlepunched nonwoven material has a dry MD and CD tensile strength of greater than about 20, a dry MD and CD elongation of greater than about 75%, a base weight of about 112 gsm to about 138 gsm, and a thickness of about two mm.

19. A method of treating a target surface with a sustained release wipe, comprising:
   - providing a sustained release wipe containing a product;
   - wetting the sustained release wipe to activate the product;
   - wiping the target surface with the sustained release wipe to apply the product to the target surface;
   - rinsing the sustained release wipe to activate more product; and
   - repeating the wetting, wiping and rinsing steps until treatment of the target surface has been completed.

20. The method of 19, wherein at least a portion of the product is released each time the wetting step is repeated.

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