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**WO-A-01/38480 WO-A-89/05114
US-A- 5 264 269**

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Description

[0001] The present invention relates to an improved general purpose cleaning wipe which comprises a wipe combined with a liquid solution comprising surfactant and a combination of water-miscible or soluble solvents. The improved wipe surprisingly accomplishes the desired but difficult-to-achieve goals of enhanced cleaning, with little or no filming or streaking, without buffing the surface cleaned with the wipe.

[0002] Cleaning wipes have been formulated for specific purposes. For example, cleaning wipes containing inverse emulsions (i.e., water-in-lipid) are particularly useful in removing perianal soils from infants. These baby wipes are claimed to be more aesthetically pleasant to use on skin, since they essentially contain a waxy coating which, among other characteristics, prevents premature release of the aqueous liquid cleaning composition contained in the inverse emulsion. Examples of these inverse emulsion impregnated wipes are depicted in Cabell et al., U.S. Patent 5,908,707, Mackey et al., WO 97/40814, Mackey et al., WO 96/14835 and Moore, EP 750063. It is quite clear that these types of wipes do not consider improved cleaning of hard surfaces as paramount.

[0003] Some other references teach the use of premoistened wipes as useful for cleaning surfaces. However, they have been lacking for one reason or another. In U.S. Patent 4,448,704, the use of using a premoistened or dry wiping article containing C2-C3 alcohol as the main solvent and pretreating the substrate to remove impurities which may cause streaking is presented. However, there is no teaching, disclosure or suggestion that the lower alkanol may be paired with a more hydrophobic solvent.

[0004] U.S. Patent 4,666,621, discloses a pre-moistened, streak-free, lint-free hard surface wiping article. However, the disclosed liquid formulation consists of a low (1-6) carbon chain length alcohol as the predominant solvent, the loading on the wipe to be 2.5-4.5 times the weight of the wipe.

[0005] WO 01/38840, of common assignment, discloses improved cleaning wipes in which a combination of a hydrophilic polymer and a nonionic surfactant, preferably a glycoside, improves filming/streaking performance.

[0006] Reference may also be made to WO-A-89/05114, which relates to disposable impregnated wipes for cleaning or maintaining hard surfaces, and to US-A-5,264,269, which relates to water-disintegratable cleaning articles in laminated sheet form.

[0007] However, none of the related art teaches, discloses or suggests an improved cleaning wipe impregnated with a liquid cleaner comprising a short chain alcohol and a more hydrophobic solvent, wherein the ratio of short chain alcohol to hydrophobic solvent is from 1.75:1 to 0.5:1, and wherein the liquid cleaner load on the wipe is less than 2.5:1. Additionally, such related art does not teach, disclose or suggest the advantages and benefits of the inventive cleaning wipe.

[0008] The present invention is directed to an improved cleaning wipe moistened/impregnated with a liquid cleaning composition in which a surfactant, a short chain alkanol combined with a more hydrophobic solvent, preferably a glycol ether, and water are combined to provide enhanced cleaning of hard surfaces, without the need for rinsing with water, and in which not only is complete cleaning effected, but done so without the leaving of a significant residue, which is typically called streaking/filming, wherein the ratio of short chain alkanol to hydrophobic solvent is from 1.75:1 to 0.5:1, and wherein the liquid cleaner load on the wipe is less than 2.5:1. Surfaces treated with the wipes, especially glossy hard surfaces, such as glass, mirrors, chrome, tile, shiny metallic surfaces, painted surfaces, porcelain (or other hard, glossy surfaces, whether made of natural or composite materials), and the like, are rendered brighter and shinier in appearance.

[0009] In one aspect, the invention is directed to a cleaning wipe which requires no scrubbing, buffing, polishing or rinsing, comprising:

(a) a wipe which preferably comprises at least one layer of nonwoven material;

(b) a liquid cleaner which comprises:

(i) an alkali metal alkyl diphenyl oxide disulfonyl surfactant;

(ii) a C₂₋₄ alkanol and a more hydrophobic solvent; and

(iii) the remainder, water,

said wipe used to clean surfaces without rinsing, streaking or filming, wherein the ratio of C₂₋₄ alkanol to hydrophobic solvent is from 1.75 : 1 to 0.5 : 1, and wherein the liquid cleaner load on the wipe is less than 2.5 : 1.

[0010] In yet another aspect, the invention is directed to a method for cleaning a hard surface, comprising the steps of:

applying to the surface a cleaning wipe combined with a discrete amount of liquid cleaner, said liquid cleaner comprising:

- (i) an alkali metal alkyl diphenyl oxide disulfonate surfactant;
- (ii) a C₂₋₄ alkanol and a more hydrophobic solvent; and
- (iii) the remainder, water,

whereby the surfaces are cleaned without the need for scrubbing, wiping, or immediate rinsing, and are free from streaking and filming, wherein the ratio of C₂₋₄ alkanol to hydrophobic solvent is from 1.75 : 1 to 0.5 : 1, and wherein the liquid cleaner load on the wipe is less than 2.5 : 1.

[0011] It is therefore an object and an advantage of the present invention to provide a cleaning wipe impregnated with a liquid cleaner which has greatly improve streaking and filming performance.

[0012] It is another object and another advantage of the present invention to provide a cleaning wipe impregnated with a liquid cleaner in which there is a combination of a short chain alkanol and a glycol ether, at least one of whose purposes is to promote improved streaking/filming on a surface cleaned with said wipe.

[0013] It is yet another object and yet another advantage of the present invention to provide a cleaning wipe which has low to no streaking and filming.

[0014] It is still a further object and still a further advantage of the present invention to provide a consumer convenient cleaning means which cleans surfaces without the need to rinse with water.

[0015] It is another object and a further advantage of the present invention to provide a cleaning wipe which cleans hard surfaces and, especially with respect to glossy surfaces, leaves the surface clean, bright and shiny, without buffing or polishing.

[0016] The invention provides an improved cleaning wipe comprising an absorbent/adsorbent wipe, preferably made of at least one layer of nonwoven material, the wipe being impregnated with a liquid cleaner. The wipe provides excellent cleaning with no or little streaking/filming and imparts resistance to soiling to the surface cleaned therewith.

[0017] The cleaning wipe is preferably impregnated with a liquid cleaner which preferably is a single phase solution or dispersion, having a viscosity generally less than about 1,000 Centipoise ("cps"). The liquid cleaner has the following ingredients:

- (i) an alkali metal alkyl diphenyl oxide disulfonate surfactant;
- (ii) a C₂₋₄ alkanol and a more hydrophobic solvent; and
- (iii) the remainder, water, wherein the ratio of C₂₋₄ alkanol to hydrophobic solvent is from 1.75 : 1 to 0.5 : 1, and wherein the liquid cleaner load on the wipe is less than 2.5 : 1.

[0018] Additional adjuncts in small amounts such as cosurfactants, chelating agents, buffers, fragrances, dyes, and the like can be included to provide desirable attributes of such adjuncts.

[0019] In the application, effective amounts are generally those amounts listed as the ranges or levels of ingredients in the descriptions which follow hereto. Unless otherwise stated, amounts listed in percentage ("%s") are in weight percent (based on 100% active) of the cleaning composition.

1. The Substrate

[0020] The substrate for the wipe is generally an absorbent or adsorbent material. Preferably, it is a nonwoven sheet, which is at least one layer, made of wood pulp; or a blend of wood pulp and a synthetic fiber, without limitation, such as polyester, rayon, nylon, polypropylene, polyethylene, other cellulose polymers; or a synthetic fiber or mixture of such fibers. The nonwovens may include nonwoven fibrous sheet materials which include meltblown, coform, air-laid, spun bond, wet laid, bonded-carded web materials, hydroentangled (also known as spunlaced) materials, and combinations thereof. These materials can comprise synthetic or natural fibers or combinations thereof. A binder may or may not be present. Manufacturers include Kimberly-Clark, E.I. du Pont de Nemours and Company, Dexter, American Nonwovens, James River, BBA Nonwovens and PGI. Examples of such substrates are depicted in: Bouchette et al., U.S. Patents 4,781,974 and 4,615,937, Clark et al., U.S. Patent 4,666,621, Amundson et al., WO 98/03713, and Cabell et al., U.S. Patent 5,908,707, Mackey et al., WO 97/40814, Mackey et al., WO 96/114835 and Moore, EP 750063.

[0021] Woven materials, such as cotton fibers, cotton/nylon blends, or other textiles may also be used herein- Regenerated cellulose, polyurethane foams, and the like, which are used in making sponges, may also be suitable for use herein.

[0022] The substrate's liquid loading capacity should be at least about 50%-240% of the dry weight thereof, more preferably at least about 100%-240%, and most preferably between about 150%-240%. This is expressed as loading ½ to less than 2.5 times the weight (or, more accurately, the mass) of the substrate. This loading of the substrate is very important to the invention, as it will predict greater or lesser streaking/filming performance, as demonstrated by the Experimental Section below.

[0023] The substrate varies without limitation from about .01 to about 1,000 grams per square meter, most preferably 25 to 120 grams/m² (referred to as "basis weight") and typically is produced as a sheet or web which is cut, die-cut, or

otherwise sized into the appropriate shape and size.

[0024] The substrates, which are now referred to simply as wipes, can be individually sealed with a heat-sealable or glueable thermoplastic overwrap (such as polyethylene, Mylar, and the like). More preferably the wipes can be packaged as numerous, individual sheets which are then impregnated or contacted with the liquid cleaning ingredients of the invention for more economical dispensing. Even more preferably, the wipes can be formed as a continuous web during the manufacturing process and loaded into a dispenser, such as a canister with a closure, a paper or other material carton with a closure or fold, or a tub with closure. The closure is to seal the moist wipes from the external environment and to prevent premature volatilization of the liquid ingredients. Without limitation, the dispenser may be formed of plastic, such as high density polyethylene, polypropylene, polycarbonate, polyethylene terephthalate (PET), polyvinyl chloride (PVC), or other rigid plastics; or, of paper, cartonboard, or other material. The continuous web of wipes could preferably be threaded through a thin opening in the top of the dispenser, most preferably, through the closure. A means of sizing the desired length or size of the wipe from the web would then be needed. A knife blade, serrated edge, or other means of cutting the web to desired size can be provided on the top of the dispenser, for non-limiting example, with the thin opening actually doubling in duty as a cutting edge. Alternatively, the continuous web of wipes could be scored, perforated, folded, segmented, or partially cut into uniform or non-uniform sizes or lengths, which would then obviate the need for a sharp cutting edge. Further, as in hand tissues, the wipes could be interleaved, so that the removal of one wipe advances the next, and so forth.

[0025] The wipes will preferably have a certain wet tensile strength which is without limitation about 25 to about 250 Newtons/m, more preferably about 75-170 Newtons/m.

2. The liquid cleaner

[0026] The liquid cleaner is impregnated, dosed, loaded, metered; or otherwise dispensed onto the wipe. This can be executed in numerous ways. For example, each individual wipe could be treated with a discrete amount of liquid cleaner. More preferably, a mass treatment of a continuous web of wipes with the liquid cleaner will ensue. In some cases, an entire web of wipes could be soaked in the cleaner. In other cases, while the web is being spooled, or even during the creation of the nonwoven material, the liquid cleaner could be sprayed or otherwise metered onto the web. A mass, such as a stack of individually cut and sized wipes could also be impregnated in its container by the manufacturer, or, even by the user. What follows is a description of the individual constituents of the liquid cleaner.

3. Surfactants

[0027] An essential part of the invention lies in the use of a low residue surfactant, which an alkali metal (sodium, potassium, lithium counterion; ammonium is also a possibility) alkyl diphenyl oxide disulfonate, as the major surfactant portion of the liquid cleaner used to impregnate the wipe. These alkali metal alkyl diphenyl oxide disulfonates are atypical surfactants and preferably include an alkyl chain group of C₆₋₂₀. The preferred alkali metal alkyl diphenyl oxide disulfonates are from Dow under the brand name Dowfax. Especially preferred is Dowfax 2A1, a sodium dodecyl diphenyl oxide disulfonate. Pilot Chemical, with Calfax, is another source of the alkyl diphenyl oxide sulfonate surfactant.

[0028] The amounts of surfactants present are to be somewhat minimized, for purposes of cost-savings and to generally restrict the dissolved actives which could contribute to leaving behind residues when the composition is applied to a surface. However, the amounts added are generally 0.001-6%, more preferably 0.002-4.00% surfactant. These are generally considered to be cleaning-effective amounts.

4. Solvents

[0029] A key to the invention is the use of a combination of solvents in the liquid cleaner: a C₂₋₄ alkanol with a more hydrophobic solvent, most preferably, a glycol ether. The two solvents should be in a ratio of short chain alkanol to hydrophobic solvent from 1.75 : 1 to 0.5 : 1. Further, in the invention, the completed liquid cleaner load on the wipe is less than 2.5 : 1. It may be possible to include a further water soluble or dispersible organic solvent having a vapor pressure of at least 0.001 mm Hg at 25°C, such as selected from C₁₋₆ alkanols, C₁₋₆ diols, C₁₋₆ alkyl ethers of alkylene glycols and polyalkylene glycols, and mixtures thereof.

[0030] The C₂₋₄ alkanol can be selected from ethanol, n-propanol, isopropanol, the various positional isomers of butanol, and mixtures of the foregoing. It is, however, most preferred to use isopropyl alcohol (also referred to as isopropanol) or 2-propanol (sometimes referred to hereinafter as "IPA").

[0031] The second, important solvent is a more hydrophobic solvent, preferably, an alkylene glycol ether solvent in this invention. These can include, for example, monoalkylene glycol ethers such as ethylene glycol monopropyl ether, ethylene glycol mono-n-butyl ether, propylene glycol monopropyl ether, and propylene glycol mono-n-butyl ether, and polyalkylene glycol ethers such as diethylene glycol monoethyl or monopropyl or monobutyl ether, di- or tri-polypropylene

glycol monomethyl or monoethyl or monopropyl or monobutyl ether, etc., and mixtures thereof. Additionally, acetate and propionate esters of glycol ethers may be used. The most preferred glycol ether is propylene glycol mono n-butyl ether, Dowanol PnB, from Dow Chemical Company.

[0032] Additional water insoluble solvents may be included in minor amounts (0-1%). These include isoparaffinic hydrocarbons, mineral spirits, alcyaromatics, and terpenes such as d-limonene. Additional water soluble solvents may be included in minor amounts (0-1%). These include pyrrolidones, such as N-methyl-2-pyrrolidone, N-octyl-2-pyrrolidone and N-dodecyl-2-pyrrolidone.

[0033] It is preferred to limit the total amount of solvents to preferably no more than about 20%, and more preferably, no more than about 10%, of the cleaner. A particularly preferred range is about 1-10%. These amounts of solvents are generally referred to as dispersion-effective or solubilizing-effective amounts. The solvents, especially the glycol ethers, are also important as cleaning materials on their own, helping to loosen and solubilize greasy or oily soils from surfaces cleaned. But the volatile solvents, such as IPA, are necessary to prevent the leaving of residues on the surface cleaned.

[0034] In the Experimental section below, the importance of the ratio between the short chain alkanol and the more hydrophobic solvent is demonstrated.

5. Cosurfactants

[0035] Although the disclosed surfactant and solvents of the invention provide excellent cleaning performance, it may sometimes be desired to add small amounts of cosurfactants to the formulations to obtain additional cleaning benefits. The surfactant may be used in conjunction with other nonionic or amphoteric surfactants, or mixtures thereof, such as are known in the art. Such surfactants are described, for example, in McCutcheon's Emulsifiers and Detergents (1997).

[0036] Illustrative nonionic surfactants are the ethylene oxide and mixed ethylene oxide propylene oxide adducts of alkylphenols, the ethylene oxide and mixed ethylene oxide / propylene oxide adducts of long chain alcohols or of fatty acids, mixed ethylene oxide / propylene oxide block copolymers, esters of fatty acids and hydrophilic alcohols, such as sorbitan monooleate, alkanolamides, and the like.

[0037] Illustrative amphoteric surfactants are those which have both acidic and basic groups in their structure, such as amino and carboxyl radicals or amino and sulfonic radicals, or amine oxides and the like. Suitable amphoteric surfactants include betaines, sulfobetaines, imidazolines, and the like.

[0038] The amounts of cosurfactants will generally be about less than the level of the primary low residue surfactant. It is probably less preferred to include either other anionic or cationic surfactants, because of their tendency to leave residues. However, judicious formulation with other dispersing aids may allow for the use of these latter surfactants.

6. Polymers

[0039] Polymers may or may not be added to the liquid formulations herein. A list of possibly appropriate polymers may be found in co-pending application Serial No. 09/448,703, filed November 24, 1999, of Malcolm A. Deleo et al., of common assignment herewith. Mixtures of any of the foregoing polymers may be possible or desirable. The hydrophilic polymer or polymers are present at a level of about 0.001-5%, more preferably, about 0.001-1 % of the liquid cleaner.

7. Chelating Agent

[0040] The chelating agent may also be an important part of the invention. Chelants useful herein include the various alkali metal, ammonium and substituted ammonium polyacetates, carboxylates, polycarboxylates and polyhydroxysulfonates. Non-limiting examples of polyacetate and polycarboxylate builders include the sodium, potassium, lithium, ammonium and substituted ammonium salts of ethylenediamine tetraacetic acid, ethylenediamine triacetic acid, ethylenediamine tetrapropionic acid, diethylenetriamine pentaacetic acid, nitrilotriacetic acid, oxydisuccinic acid, iminodisuccinic acid, mellitic acid, polyacrylic acid or polymethacrylic acid and copolymers, benzene polycarboxylic acids, gluconic acid, sulfamic acid, oxalic acid, phosphoric acid, phosphonic acid, organic phosphonic acids, acetic acid, and citric acid. These chelating agents may also exist either partially or totally in the hydrogen ion form, for example, citric acid or disodium dihydrogen ethylenediamine tetraacetate, depending upon the pH of the liquid formulation. The substituted ammonium salts include those from methylamine, dimethylamine, butylamine, butylenediamine, propylamine, triethylamine, trimethylamine, monoethanolamine, diethanolamine, triethanolamine, isopropanolamine, and propanolamine. Most preferred is monoethanolamine.

[0041] Other chelating agents, and dependent on the desired pH of the formulation (see below), are the mono-, di-, tri-, and tetrapotassium and ammonium salts of ethylenediamine tetraacetic acid. See, for example, Robbins et al., U.S. Patents 6,242,401, 6,159,916, 6,214,784, 5,972,876, Chang et al., U.S. Patent 5,948,742, Ochomogo et al., U.S. Patent 5,948,741, and Mills et al., U.S. 5,814,591.

[0042] The amount of chelant added should be in the range of 0.001-2%, more preferably 0.001-2%, by weight of the

cleaner.

8. Water

[0043] Since the cleaner is an aqueous cleaner with relatively low levels of actives, the principal ingredient is water, which should be present at a level of at least about 70%, more preferably at least about 80%, and most preferably, at least about 90%.

[0044] Distilled, deionized, or industrial soft water is preferred so as not to contribute to formation of a residue and to avoid the introduction of undesirable metal ions.

9. Miscellaneous Adjuncts

[0045] Buffering and pH adjusting agents may be desirable components. These would include minute amounts of inorganic agents such as alkali metal and alkaline earth salts of silicate, metasilicate, borate, carbonate, carbamate, phosphate, ammonia, and hydroxide. Organic buffering agents such as monoethanolamine, monopropanolamine, diethanolamine, dipropanolamine, triethanolamine, and 2-amino-2-methylpropanol are also desirable.

[0046] Small amounts of adjuncts can be added for improving aesthetic qualities of the invention. Aesthetic adjuncts include fragrances or perfumes, such as those available from Givaudan-Rohre, International Flavors and Fragrances, Quest, Sozio, Firmenich, Dragoco, Norda, Bush Boake and Allen and others, and dyes or colorants which can be solubilized or suspended in the formulation. Further solubilizing materials, such as hydrotropes (e.g., water soluble salts of low molecular weight organic acids such as the sodium or potassium salts of xylene sulfonic acid), may also be desirable. Adjuncts for cleaning include additional surfactants, such as those described in Kirk-Othmer, *Encyclopedia of Chemical Technology*, 3rd Ed., Volume 22, pp. 332-432 (Marcel-Dekker, 1983), and *McCutcheon's Soaps and Detergents* (N. Amer. 1984). Dyes or colorants which can be solubilized or suspended in the formulation, such as diaminoanthraquinones, may be added, although it is cautioned that since leaving little or no residue is an objective of the invention, that only minute amounts should be used. Thickeners, such as polyacrylic acid, xanthan gum, alginates, guar gum, methyl, ethyl and propylhydroxycelluloses, and the like, may be desired additives, although the use of such polymers is to be distinguished from the previously mentioned hydrophilic polymers in 6 above. Defoamers, such as, without limitation, silicones, aminosilicones, silicone blends, silicone/hydrocarbon blends, and the like, available from Dow Corning, Wacker, Witco, Ross and Hercules.

[0047] The amounts of these aesthetic adjuncts should be in the range of 0-2%, more preferably 0-1 %.

[0048] Other various adjuncts which are known in the art for detergent compositions can be added so long as they are not used at levels that cause unacceptable spotting/filming.

[0049] Additionally, because the surfactants in liquid systems are sometimes subject to attack from microorganisms, it may be advantageous to add a mildewstat or bacteriostat. Exemplary mildewstats (including non-isothiazolone compounds) include Kathon GC, a 5-chloro-2-methyl-4-isothiazolin-3-one, Kathon ICP, a 2-methyl-4-isothiazolin-3-one, and a blend thereof, and Kathon 886, a 5-chloro-2-methyl-4-isothiazolin-3-one, all available from Rohm and Haas Company; Bronopol, a 2-bromo-2-nitropropane 1,3-diol, from Boots Company Ltd.; Proxel CRL, a propyl-p-hydroxybenzoate, from ICI PLC; Nipasol M, an o-phenyl-phenol, Na⁺ salt, from Nipa Laboratories Ltd.; Dowicide A, a 1,2-benzisothiazolin-3-one, from Dow Chemical Co.; and Irgasan DP 200, a 2,4,4'-trichloro-2-hydroxydiphenylether, from Ciba-Geigy A.G. See also, Lewis et al., U.S. 4,252,694 and U.S. 4,105,431. Other suitable preservatives include methyl, ethyl and propyl parabens, short chain organic acids (such as acetic, lactic and glycolic acids), bisguanidine compounds (e.g., Dantagard or Glydant) and the short chain alkanols mentioned in 3. above can be bifunctional and also act as preservatives, such as IPA.

EXPERIMENTAL

[0050] In the following experiments, a base inventive liquid cleaner to be impregnated on wipes was established. The formulation of the liquid cleaner was:

TABLE I

Isopropyl Alcohol ¹	TBA
Glycol Ether ²	TBA
Dowfax 2A1 Surfactant ³	0.05%
Monoethanolamine ⁴	0.05%

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Table continued

Fragrance	0.02%
Deionized Water	(balance)
¹ C ₂₋₄ alkanol solvent ² More hydrophobic solvent: Dowanol PnB - propylene glycol n-butyl ether (Dow Chemical Company) ³ Alkyl diphenyloxidedisulfonate (Dow Chemical) ⁴ Buffer/solvent	

[0051] The liquid cleaner of Tables I is then iterated by varying the ratio of the short chain alkanol to the more hydrophobic solvent (glycol ether), then placed in differing loads onto wipes, which are then referred to as wet wipes. Wipes are typically made from fibrous sheet materials as described in 1 Substrate above. Examples of the substrates from which the wipes are made include:

TABLE II

Manufacturer and Item	Description
DuPont 8838 and 8892	Spunlaced Pulp-Polyester Blends
Kimberly Clark Hydroknit	Spunlaced Pulp-Polypropylene
Kimberly Clark Spunbond	Spun, Fine Fiber Polypropylene
Kimberly Clark Meltblown PP/EHRT	Meltblown Polypropylene
American Nonwovens, ANC 4297	Carded Nonwoven, 70/30 Rayon/Polyester
American Nonwovens, ANC 4297	Carded Nonwoven, 100 Rayon
James River	Pulp or Pulp Blends
Dexter 10180 Hydrospun	Spunlaced Pulp Blend
Dexter ZA-0155	Spunlaced Pulp-Polyester Blends
Dexter 8589	Rayon/Pulp Blend
Dexter 4459	Pulp/Polyethylene Blend

Examples 1-8: Evaporation Times on Mirror Tiles

[0052] In this test, the filming/streaking performance of wipes -- such as described in Table II, to which a discrete amount of the liquid cleaner described in Table I was added, typically in an amount exceeding 100% of the weight of the wipe on a gram/gram basis in various ratios of C₂₋₄ alkanol to more hydrophobic solvent, and also compared against current commercial formulas. The test surfaces were glass mirror tiles at different temperatures (35°F, or, 1.66°C; 70°F or 21°C; 100°F or 37.7°C) which were wiped for 3 strokes back and forth in a similar manner and evaporation times were measured. Unexpectedly, rapid evaporation times, particularly at 35°F, are predictive of good streaking/filming performance. The results are depicted in Table III:

TABLE III

IPA%:PnB%	Wipe/Load	Evaporation Time (sec)			Ratio
		35°F	70°F	100°F	
5.4:0	(ZA) x2	730±2	107±25	13±5	5.4:0
5 : 0.4	(ZA) x2	508±13	54±8	12±2	12.5:1
4: 1.4	(ZA) x2	469±91	45±14	7±1	2.85:1
3 : 2.4	(ZA) x2	332±10	42±10	5±0	1.25:1
2 : 3.4	(ZA) x2	347±4	42±9	6±2	0.588:1

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Table continued

IPA%:PnB%	Wipe/Load	Evaporation Time (sec)			Ratio
		35°F	70°F	100°F	
0.4:5.0	(ZA) x2	463±23	35±11	6±1	0.08:1
Current	(8589) x2.5	453±30	54±7	15±7	
Current	(8589) x2	363±10	43±12	13±3	

¹Formula matrix: 0.05% Dowfax 2A1, 0.05% MEA, IPA, PnB, 0.02% Fragrance, Water

² ZA = Dexter ZA 0155; 8589 = Dexter 8589

³ Load: x2 = twice weight of wipe; x2.5 = 2.5 times weight of wipe.

⁴ Current = commercially marked formulation which contains: 3.97% propylene glycol t-butyl ether, 0.1 % hexyloxyethanol, 1.88% IPA, 0.08% Na Lauryl-sarcosinate (about 0.47 : 1 ratio of short chain alkanol to more hydrophobic)

[0053] The data from Table III demonstrates the surprisingly improved performance wherein the inventive ratio of C₂₋₄ alcohol to hydrophobic solvent from 1.75 : 1 to 0.5 : 1, and wherein the liquid cleaner load on the wipe is less than 2.5 : 1.

[0054] In the next set of Examples, the actual streaking/filming performance after cleaning an artificial soil from mirrors was tested.

[0055] A panel study was coordinated with 26 panelists to grade the streaking caused by wiping soiled mirrors. A car soil (sebum, air borne soil, triethanolamine, carbon black) was developed and 0.2g of the soil sprayed on clean mirrors. A premoistened wipe wound over by a fixed weight was wiped 10 times in a circular motion on the soiled mirror, allowed to dry and visually graded. The controls were Clorox® Disinfecting Wipes (most streaking; most likely due to the presence of a germicide in the formula) and Windex® sprayed and buffed with a Kim-Wipe® (least streaking). This latter control sets a particularly tough standard, since it is comparing the performance of a spray cleaner with a dry, clean cloth, with repeated wiping (naturally, this control is very different from and not as convenient to use as a premoistened wipe). The test products and scores on a scale of 1-10 (where higher scores are desirable) are listed below in TABLE IV.

TABLE IV

Product	Score (1-10)
-CDW*	1.3±0.5
-Windex (buffed)*	8.1±1.1
-Current** (8589, x2.5) (duplicate)	5.4±1.6; 6.1±1.7
-Current** (ZA, x2) (duplicate)	5.1±2.0; 6.3±1.8
-012-AA [‡] (ZA, x2) (duplicate)	8.2±1.3; 7.7±1.4

*CDW and Windex (buffed) were used as test mirrors to check the visual grading ability of the panelists.

**Current is the currently marketed glass cleaner wipe.

[‡]012-AA is the new inventive formula with 2% IPA, 3.4% PnB and the formulation described above in Table III, fn 1.

[0056] The data in Table IV demonstrate the superior streaking/filming performance of the inventive wipes, wherein the ratio of C₂₋₄ alkanol to hydrophobic solvent is from 1.75 : 1 to 0.5 : 1, and wherein the liquid cleaner load on the wipe is less than 2.5 : 1.

Examples 14-20 (Streaking/Filming)

[0057] The next set of examples further confirms the use of evaporation rates at low temperatures as predictive of good streaking/filming performance, as well as confirming the need to maintain a cleaner/wipes load of less than 2.5. In this study, a larger panel of panelists graded the filming/streaking caused by wiping soiled mirrors. A car soil (sebum, airborne soil, triethanolamine, carbon black) was developed and a small amount (less than 0.5g) was sprayed onto clean mirrors. A premoistened wipe (containing the liquid cleaners depicted in Table V) was used to wipe 10 times in a circular motion on the soiled mirror, allowed to dry and visually graded by the panelists on a 1 to 10 scale (score of 10 meaning

"least soiled", a score of 1 meaning "most filming/streaking"). The controls were Clorox® Disinfecting Wipes ("CDW"; most streaking) and Windex® cleaner sprayed once/buffed with a Bounty® paper towel (least streaking; it is again observed that this compares the performance of a spray cleaner with a dry, clean cloth, with repeated wiping. Thus, this control is very different from and not as convenient to use as a premoistened wipe). The test products and scores on a scale of 1-10 are listed below in Table V.

TABLE V

Product	Score (1-10)
CDW ¹	1.3±0.5
Windex (buffed) ¹	8.1±1.1
Current ² (4459, x2)	4.7±1.9
2%IPA/3.4%PnB ³ (4459, x2)	8.8±1.4
2%IPA/3.4%PnB ⁴ (4459, x2)	6.5±1.9
3%IPA/2.4%PnB ³ (4459, x2)	7.6±2.2
3%IPA/2.4%PnB ⁴ (4459, x2)	7.1±1.8
¹ CDW and Windex (buffed) were used as test mirrors to check the visual grading ability of the panelists.	
² Current is the currently marketed glass cleaner wipe; 4459 = Dexter 4459.	
³ These formulations contain 0.02% fragrance.	
⁴ These formulations contain 0.03% fragrance.	

[0058] Review of the above Examples in Table V leads to the conclusions that evaporation rates at low temperatures (the invention is underscored) correlates with excellent streaking/filming performance, while a loading ratio of 2 (cleaner to substrate) provides superior S/F performance regardless of substrate.

Claims

1. A cleaning wipe having enhanced streaking/filming performance, **characterised in that** it comprises:

- (a) a wipe which preferably comprises at least one layer of nonwoven material;
- (b) a liquid cleaning comprising:
 - (i) an alkali metal alkyl diphenyl oxide disulfonate surfactant;
 - (ii) a C₂₋₄ alkanol and a more hydrophobic solvent;
 - and
 - (iii) the remainder, water;

the said wipe being used to clean surfaces without rinsing, streaking or filming, and the ratio of C₂₋₄ alkanol to hydrophobic solvent being from 1.75:1 to 0.5:1, and the liquid cleaner load on the wipe being less than 2.5:1.

2. A wipe as claimed in claim 1 wherein the said surfactant is 0.001 to 6% of the said liquid cleaner.

3. A wipe as claimed in claim 1 or claim 2 wherein the total amount of solvent(s) is no more than 20% of the said liquid cleaner.

4. A wipe as claimed in any of claims 1 to 3, wherein the said more hydrophobic solvent is a glycol ether.

5. A wipe as claimed in any of claims 1 to 4 wherein it further comprises at least one adjunct selected from additional surfactants, cosurfactants, chelating agents, buffers, thickeners, dyes, colorants, biocides, fragrances, defoamers and mixtures thereof.

6. A method for cleaning a surface **characterised in that** it comprises:

contacting the said surface with a wipe impregnated with a liquid cleaner comprising:

- (i) an alkali metal alkyl diphenyl oxide disulfonate surfactant;
- (ii) a C₂₋₄ alkanol; and a more hydrophobic solvent;
- and
- (iii) the remainder, water,

the said wipe being used to clean surfaces without rinsing, streaking or filming, the ratio of C₂₋₄ alkanol to hydrophobic solvent being from 1.75:1 to 0.5:1, and the liquid cleaner load on the wipe being less than 2.5:1.

7. A dispenser for cleaning wipes **characterised in that** it comprises a container with a plurality of the said wipes therein, the said wipes being treated with a liquid cleaner comprising:

- (i) an alkali metal alkyl diphenyl oxide disulfonate surfactant;
- (ii) a C₂₋₄ alkanol; and a more hydrophobic solvent;
- and
- (iii) the remainder, water,

the said wipe being used to clean surfaces without rinsing, streaking or filming, the ratio of C₂₋₄ alkanol to hydrophobic solvent being from 1.75:1 to 0.5:1, and the liquid cleaner load on the wipe being less than 2.5:1.

8. A dispenser as claimed in claim 7 wherein the said plurality of wipes comprises a continuous web of nonwoven material.

9. A dispenser as claimed in claim 8 wherein it further comprises means for sizing an individual wipe from the said continuous web.

10. A dispenser as claimed in claim 7 wherein the said plurality of wipes comprises a series of individual sheets of nonwoven material.

Patentansprüche

1. Reinigungswischtuch, mit verstärkter Streifen-/Filmbildungsleistung, **dadurch gekennzeichnet, dass** es umfasst:

- (a) ein Wischtuch, das vorzugsweise mindestens eine Schicht eines Vliesstoffmaterials umfasst;
- (b) ein flüssiges Reinigungsmittel, umfassend:

- (i) ein Alkalimetallalkyldiphenyloxiddissulfonat-Tensid
- (ii) ein C₂-C₄-Alkanol und ein stärker hydrophobes Lösungsmittel;
- und
- (iii) den Rest, Wasser;

wobei das Wischtuch dazu verwendet wird, Oberflächen ohne Spülen, Streifen- oder Filmbildung zu reinigen, und das Verhältnis von C₂-C₄-Alkanol zu hydrophobem Lösungsmittel von 1,75:1 bis 0,5:1 ist und die Beladung mit flüssigem Reinigungsmittel auf dem Reinigungstuch weniger als 2,5:1 ist.

2. Wischtuch nach Anspruch 1, wobei das Tensid 0,001 bis 6 % des flüssigen Reinigungsmittels ist.

3. Wischtuch nach Anspruch 1 oder 2, wobei die Gesamtmenge an Lösungsmittel(n) nicht mehr als 20 % des flüssigen Reinigungsmittels ist.

4. Wischtuch nach einem der Ansprüche 1 bis 3, wobei das stärker hydrophobe Lösungsmittel ein Glykolether ist.

5. Wischtuch nach einem der Ansprüche 1 bis 4, wobei es weiterhin mindestens einem Zusatz umfasst, ausgewählt aus zusätzlichen Tensiden, Co-Tensiden, chelatbildenden Mitteln, Puffern, Verdickungsmitteln, Farbstoffen, Färbemitteln, Bioziden, Parfümstoffen, Entschäumern und Mischungen davon.

6. Verfahren zum Reinigen einer Oberfläche, **dadurch gekennzeichnet, dass** es umfasst: In-Kontakt-Bringen der Oberfläche mit einem Wischtuch, das mit einem flüssigen Reinigungsmittel imprägniert bzw. durchtränkt ist, umfassend:

(i) ein Alkalimetallalkyldiphenyloxiddissulfonat-Tensid
(ii) ein C₂-C₄-Alkanol und ein stärker hydrophobes Lösungsmittel;
und
(iii) den Rest, Wasser;
wobei das Wischtuch dazu verwendet wird, Oberflächen ohne Spülen, Streifen- oder Filmbildung zu reinigen, und das Verhältnis von C₂-C₄-Alkanol zu hydrophobem Lösungsmittel von 1,75:1 bis 0,5:1 ist und die Beladung mit flüssigem Reinigungsmittel auf dem Reinigungstuch weniger als 2,5:1 ist.

7. Spender für Reinigungswischtücher, **dadurch gekennzeichnet, dass** er einen Behälter mit einer Vielzahl der Wischtücher darin umfasst, wobei die Wischtücher mit einem flüssigen Reinigungsmittel behandelt wurden, umfassend:

(i) ein Alkalimetallalkyldiphenyloxiddissulfonat-Tensid
(ii) ein C₂-C₄-Alkanol und ein stärker hydrophobes Lösungsmittel;
und
(iii) den Rest, Wasser;
wobei das Wischtuch dazu verwendet wird, Oberflächen ohne Spülen, Streifen- oder Filmbildung zu reinigen, und das Verhältnis von C₂-C₄-Alkanol zu hydrophobem Lösungsmittel von 1,75:1 bis 0,5:1 ist und die Beladung mit flüssigem Reinigungsmittel auf dem Reinigungstuch weniger als 2,5:1 ist.

8. Spender nach Anspruch 7, wobei die Vielzahl der Wischtücher eine kontinuierliche Bahn eines Vliesstoffmaterials umfasst.

9. Spender nach Anspruch 8, wobei er weiterhin Mittel zur Größenanpassung eines einzelnen Wischtuchs aus der kontinuierlichen Bahn umfasst.

10. Spender nach Anspruch 7, wobei die Vielzahl von Wischtüchern eine Reihe einzelner Blätter von Vliesstoffmaterial umfasst.

Revendications

1. Serviette nettoyante ayant des performances améliorées en ce qui concerne la formation de stries/film, **caractérisée en ce qu'elle comprend** :

(a) une serviette qui de préférence comprend au moins une couche de matière non tissée ;
(b) un nettoyant liquide qui comprend :
(i) un agent tensioactif de type alkyldiphényloxyde-disulfonate de métal alcalin ;
(ii) un alcanol en C₂₋₄ et un solvant plus hydrophobe ;
et
(iii) le reste étant de l'eau,
ladite serviette étant utilisée pour nettoyer des surfaces sans rinçage, formation de stries ou de film, et le rapport entre l'alcanol en C₂₋₄ et le solvant hydrophobe étant de 1,75/1 à 0,5/1 et la charge de nettoyant liquide sur la serviette étant inférieure à 2,5/1.

2. Serviette selon la revendication 1, dans laquelle ledit agent tensioactif représente de 0,001 à 6 % dudit nettoyant liquide.

3. Serviette selon la revendication 1 ou la revendication 2, dans laquelle la quantité totale de solvant(s) ne représente pas plus de 20 % dudit nettoyant liquide.

4. Serviette selon l'une quelconque des revendications 1 à 3, dans laquelle ledit solvant plus hydrophobe est un éther de glycol.

5. Serviette selon l'une quelconque des revendications 1 à 4, comprenant en outre au moins un additif choisi parmi les tensioactifs supplémentaires, les co-tensioactifs, les agents chélatants, les tampons, les épaississants, les teintures, les colorants, les biocides, les fragrances, les agents anti-mousse et les mélanges de ceux-ci.

- 5 6. Procédé de nettoyage d'une surface, **caractérisé en ce qu'il** comprend :

la mise en contact de ladite surface avec une serviette imprégnée d'un nettoyant liquide comprenant :

- 10 (i) un agent tensioactif de type alkylidiphényloxyde-disulfonate de métal alcalin ;
(ii) un alcanol C₂₋₄ et un solvant plus hydrophobe ;
et
(iii) le reste étant de l'eau,

15 ladite serviette étant utilisée pour nettoyer des surfaces sans rinçage, formation de stries ou de film, le rapport de l'alcanol en C₂₋₄ au solvant hydrophobe étant de 1,75/1 à 0,5/1 et la charge de nettoyant liquide sur la serviette étant inférieure à 2,5/1.

- 20 7. Distributeur de serviettes nettoyantes, **caractérisé en ce qu'il** comprend un réceptacle avec une pluralité desdites serviettes contenues dans celui-ci, lesdites serviettes étant traitées avec nettoyant liquide comprenant :

- 25 (i) un agent tensioactif de type alkylidiphényloxyde-disulfonate de métal alcalin ;
(ii) un alcanol C₂₋₄ et un solvant plus hydrophobe ;
et
(iii) le reste étant de l'eau,

ladite serviette étant utilisée pour nettoyer des surfaces sans rinçage, formation de stries ou de film, le rapport de l'alcanol en C₂₋₄ au solvant hydrophobe étant de 1,75/1 à 0,5/1 et la charge de nettoyant liquide sur la serviette étant inférieure à 2,5/1.

- 30 8. Distributeur selon la revendication 7, dans lequel ladite pluralité de serviettes comprend une toile continue de matière non tissée.

- 35 9. Distributeur selon la revendication 8, comprenant en outre un moyen pour couper une serviette individuelle à partir de ladite toile continue.

- 40 10. Distributeur selon la revendication 7, dans lequel ladite pluralité de serviettes comprend une série de feuilles individuelles de matière non tissée.