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(54) **DISHWASHING COMPOSITION**

GESCHIRRSPÜLZUSAMMENSETZUNG

COMPOSITION POUR LE LAVAGE DE LA VAISSELLE

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Description

Field of the invention

[0001] The present invention relates to cleaning compositions, to their preparation, to cleaning methods and to processes for enhancing the retention of cleaning agents into carriers. More specifically, the invention relates to cleaning compositions for use in hand dishwashing.

Background prior art

[0002] Liquid household cleaning products that provide thickening upon dilution are known in the art, as detailed in the following references:

US 5,922,664 describes a composition comprising a micellar dispersion of a mixture of at least two anionic surfactants having different resistance to electrolytic salting out, and alkali metal citrate. The attained viscosity upon dilution does not go beyond 1,400 mPas.

[0003] EP 314,232 mentions a composition of: (a) a primary surfactant chosen from amine, amine oxide, betaine or quaternary ammonium compounds, preferably an amine oxide, (b) a hydrotrope co-surfactant compound, e.g. ethanol, methanol or triethanolamine, and (c) a water-ionisable non-surfactant compound, e.g. inorganic acids, neutral salts or alkali.

[0004] WO 96/32464 discloses a kit comprising a sponge and a water-thickening surfactant composition based on electrolyte concentration. This document also shows the viscosity profile of the disclosed compositions, wherein the viscosity peak reaches 1,685 mPas, which is only 2.7 times higher than the initial viscosity of 620 mPas.

[0005] WO-93/03129 discloses liquid, stable, concentrated hand dishwashing compositions, comprising less than 30% water and a mixture of anionic and nonionic surfactants which comprise 9-18% of a 3-6 carbon alkane diol solvent having no more than 2 hydroxy groups.

[0006] WO-95/06108 discloses concentrated liquid or gel dishwasing detergent compositions containing high active levels of surfactant and calcium xylene sulfonate to stabilize the compositions.

[0007] WO-98/55572 discloses aqueous light duty cleaning compositions suitable for cleaning dishware, comprising ammonium lauryl sulphate, xylene sulphonate, CAP betaine and magnesium sulphate.

[0008] EP-A-181,212 discloses aqueous dishwashing compositions comprising alkyl benzene sulphonate, alkyl ethoxy sulphate, coconut amidopropyl betaine and nonionic alcohol ethoxylate.

[0009] WO-01/85896 discloses a manual dishwashing detergent concentrate, suitable for dilution with water while increasing its viscosity, said concentrated containing a combination of an aromatic carboxylic acid or salt thereof and an inorganic acid or salt thereof as electrolyte.

[0010] In short, prior art documents teach simple compositions that can reach high viscosities upon dilution, improving its use in situations similar to manual dishwashing.

[0011] In co-pending application WO-2007/028446, a dilution thickening system is disclosed, based on a surfactant mixture and electrolyte.

[0012] However, prior art compositions present technical and/or economical bottlenecks that are solved by the present invention, such as obtaining cleaning compositions having enhanced retention in a carrier and/or high viscosity upon dilution, even at high dilution rates. Enhanced retention in the carrier provides controlled release of the composition.

[0013] Thus it is an object to provide a cleaning composition with enhanced retention of its cleaning agents (such as surfactants) in a carrier when being diluted.

[0014] It is another object of the invention to provide a composition with a lower consumption rate in use, thus giving better yield, being more economical in use and being environmentally friendly, than the compositions of the prior art.

[0015] It is a further object to provide enhanced retention of cleaning agent in a carrier, thereby decreasing the time spent in refilling the carrier, so that the cleaning compositions are faster and more efficient in use.

[0016] It is yet another object of the invention to allow a more rational use of containers for cleaning compositions.

[0017] It has now been surprisingly found that an improved and economical dilution thickening system may be obtained by a dilution-thickening surfactant system.

Summary of the invention

[0018] Accordingly, the invention provides A dilution-thickening aqueous liquid cleaning composition comprising 5-50%w of dilution-thickening surfactant system comprising:

- 40-85%w Alkyl ether sulphate (0-4 EO)
- 0.01-50%w Linear alkylbenzene sulphonate; and
- 0.01-55%w Betaine; as further specified in claim 1.

[0019] The invention further provides a method to clean hard surfaces comprising the steps of:

- contacting a carrier with a composition according to the invention;
- treating the combination of carrier and composition with water; and
- performing a cleaning operation of a surface with the carrier.

[0020] The invention further provides a dilution-thickening surfactant system comprising:

- 40-85%w Alkyl ether sulphate (0-4 EO)
- 0.01-50%w Linear alkylbenzene sulphonate
- 0.01-55%w Betaine;

adding up to a 100%.

[0021] The invention also provides the use of the dilution thickening surfactant system of the invention in a dish washing composition.

[0022] These and other aspects, features and advantages will become apparent to those of ordinary skill in the art from a reading of the following detailed description and the appended claims. For the avoidance of doubt, any feature of one aspect of the present invention may be utilised in any other aspect of the invention. It is noted that the examples given in the description below are intended to clarify the invention and are not intended to limit the invention to those examples per se. Similarly, all percentages are weight/weight percentages unless otherwise indicated. Numerical ranges expressed in the format "from x to y" are understood to include x and y. When for a specific feature multiple preferred ranges are described in the format "from x to y", it is understood that all ranges combining the different endpoints are also contemplated.

Description of the figure

[0023] Figure 1 shows a ternary diagram of the dilution-thickening surfactant system of the invention. The shaded area shows the preferred concentrations of the three ingredients of the dilution-thickening surfactant system of the invention. The dashed line in the ternary diagram shows the approximate boundary for structured liquids on the bottom/right side of the dashed line and non-structured liquids on the top/left side of the dashed line. The double headed arrow shows performance vs cost; although the dilution thickening effect is obtained everywhere in the shaded area, the performance and cost increase towards the right side.

Detailed description of the invention

[0024] The invention provides a dilution-thickening surfactant system and cleaning compositions using the same.

[0025] The most suitable cleaning compositions have a low viscosity in concentrated form (i.e. in the bottle), and a high viscosity when diluted on the application device, such as a sponge; eventual the composition is released by application to a surface.

Dilution-thickening surfactant system

[0026] The thickening surfactant provides a surfactant system that has a low viscosity in concentrated form, and increasing viscosity when diluting up to a maximum viscosity (or a viscosity peak) and a decreasing viscosity upon further dilution.

[0027] The dilution-thickening surfactant system comprises alkyl ether sulphate (AES) optionally ethoxylated with 0-4 EO groups, linear alkyl benzene sulphonate (LAS) and betaine. Depending on the market a low-cost or premium dilution thickening system may be preferred as indicated herein below.

[0028] The dilution-thickening surfactant system is preferably not a structured liquid. It is also preferred that the composition is clear and transparent. Cloudy or hazy compositions are not preferred.

Alkyl ether sulphate

[0029] The alkyl ether sulphates as defined herein are alkali metal, ammonium or alkanolammonium salts of C_8-C_{18}

alkyl ether sulfates with 0 to 25 moles of alkylene oxide (thus also including C_8-C_{18} alkyl sulfates). The alkyl ether sulphates may be linear or branched. A common example of an alkyl ether sulphate is lauryl ether sulphate, preferably sodium lauryl ether sulphate (SLES).

[0030] The alkyl ether sulphate is present in the dilution-thickening surfactant system in a concentration of at least 40%, preferably at least 50%, more preferably at least 55% by weight, but not more than 85%, preferably not more than 70%.

Betaine

[0031] Betaines are a class of zwitterionic surfactants. The preferred betaines are carboxybetaines such as (dodecyldimethylammonium)acetate (lauryl betaine), (tetradecyldimethylammonium)acetate (myristyl betaine), (cocodimethylammonium)acetate (coconut betaine), (oleyldimethylammonium) acetate (oleyl betaine), (dodecyloxymethyldimethylammonium) acetate, (cocoamidopropyldimethylammonium)acetate (also known as cocoamido-propyl betaine or CAPB); the sulfoniumbetaines such as (dodecyldimethylsulfonium) acetate and 3-(cocodimethyl-sulfonium)-1-propane sulfonate and the phosphoniumbetaines such as 4-(trimethylphosphonium)-1-hexadecane sulfonate, 3-(dodecyldimethylphosphonium)-1-propanesulfonate, 2-(dodecyldimethylphosphonium)-1-ethane sulfate and mixtures thereof.

[0032] The betaine is present in the dilution-thickening surfactant system in a concentration of at least 0.01 %, preferably at least 5%, and for premium dilution-tickening compostions even at least 10%, but not more than 55%, preferably not more than 35%, or for low cost dilution-thickening compositions even not more than 20%.

LAS

[0033] The third ingredient of the dilution thickening is linear alkylbenzene sulphonate (LAS). LAS is present in the dilution-thickening surfactant system in a concentration of 0.01-50%w. In order to obtain the premium dilution-thickening effect, a LAS concentration of 0.1-35%w is preferred. In order to get an economical composition, with a good dilution thickening effect at lower cost, a concentration of 25-45%w is preferred. A balance between premium performance and cost is found at the intermediate range of 15-25%w of LAS.

Aqueous liquid cleaning composition

[0034] The aqueous liquid cleaning compositions according to the invention, comprise the dilution-thickening surfactant system of the invention in a concentration of 5 - 50%w, preferably at least 10%w, more preferably at least 15%w, still more preferably at least 20%w, most preferably 25%w, but preferably not more than 40%w, more preferably not more than 35%w, most preferably not more than 30%w.

[0035] When used in the cleaning composition, the dilution-thickening surfactant system provides a viscosity profile of the cleaning composition showing low viscosity at high concentration (towards 100%) as well as low viscosity on high dilution (towards 0%), but a viscosity peak somewhere in between. The profile normally has the shape of a bell-curve.

[0036] The dilution-thickening surfactant system of the invention provides the shape of the curve, and is very suitable for use in a liquid cleaning composition. However, to improve the versatility of the composition, it is preferred to be able to influence the position of the peak, dependent on the concentration. In other words, it is preferred to be able to influence the position of the peak on the concentration scale. Preferably the peak viscosity of the diluted composition is reached at a concentration of surfactant system in diluent (such as water) between 30% and 70%, more preferably between 30% and 50% surfactant system in diluent. Furthermore, it is preferred that the peak viscosity is at least 5 times the initial viscosity, preferably at least 10 times.

[0037] Thus, the aqueous liquid cleaning composition may further comprise viscosity modulating agents. The low viscosity in concentrated form helps the composition to easily penetrate a carrier, such as a sponge. The undiluted composition has a viscosity of 800-1250 mPas. Wherein the viscosity is determined at 25°C, using a Haake VT550/VT500 viscometer at 21 s^{-1} with an MVII spindle.

Electrolyte

[0038] In order to influence the position of the peak on the concentration scale, i.e, to move the peak between high and low concentration, the cleaning composition of the invention comprises an electrolyte.

[0039] Electrolytes are water-soluble organic and inorganic salts (other than anionic surfactants), wherein the cation is chosen from alkali metals, alkaline earth metals, ammonium and mixture thereof and the anion is chosen from chloride, sulfate, phosphate, acetate, nitrate and mixtures thereof. Particularly useful are Magnesium, potassium, sodium and ammonium chloride and/or sulphate.

[0040] The electrolyte is present in the cleaning composition in a concentration of 2.5-7.5%, more preferably 2.5-5%,

still more preferably 3-4% by weight.

Viscosity modifying agent

[0041] In order to influence the viscosity of the cleaning composition, without moving the position of the peak on the concentration scale, a viscosity modifying agent may be added.

[0042] One suitable class of viscosity modifying agents is the class of nonionic surfactants. Nonionic surfactants reduce the viscosity of the concentrated cleaning composition, without moving the peak on the concentration scale.

[0043] The nonionics of the invention preferably have a HLB value (the hydrophilic/lipophilic balance) of at least 8, preferably at least 10, more preferably at least 12, but preferably not more than 16.

[0044] Suitable nonionic surfactants include the condensation products of hydrophobic alkyl, alkenyl, or alkyl aromatic compounds bearing functional groups having free reactive hydrogen available for condensation with hydrophilic alkylene oxide, such as ethylene oxide, propylene oxide, butylene oxide, polyethylene oxide or polyethylene glycol to form nonionic surfactants. Examples of such functional groups include hydroxy, carboxy, mercapto, amino or amido groups.

[0045] Examples of useful hydrophobes of commercial nonionic surfactants include C_8-C_{18} alkyl fatty alcohols, C_8-C_{14} alkyl phenols, C_8-C_{18} alkyl fatty acids, C_8-C_{18} alkyl mercaptans, C_8-C_{18} alkyl fatty amines, C_8-C_{18} alkyl amides and C_8-C_{18} alkyl fatty alkanolamides. The polyoxyalkylene condensation products of such materials may comprise from 1 to 30 alkylene oxide groups, preferably from 5 to about 20 alkylene oxide groups, even more preferably from 8 to about 12 alkylene oxide groups. Accordingly, suitable ethoxylated fatty alcohols may be chosen from ethoxylated cetyl alcohol, ethoxylated ketostearyl alcohol, ethoxylated isotridecyl alcohol, ethoxylated lauric alcohol, ethoxylated oleyl alcohol and mixtures thereof.

[0046] Alternatively compounds from the group of propylene glycols, ethoxylated glycerols, and/or ethanol may be used as viscosity modifying agent. The most preferred propylene glycol is MPG (mono propylene glycol). The preferred ethoxylated glycerols have 3-15 ethylene oxide (EO) groups, more preferably 5-10 ethylene oxide groups.

[0047] Alternatively, this viscosity reducing effect may be obtained by the addition of other short chain organic alcohols. These solvents would have the same viscosity reducing effect as the nonionic surfactant, but are not preferred because they are considered "volatile organic compounds". Volatile organic compounds are not preferred in the context of the present invention.

[0048] Thus, nonionic surfactants are preferred in the cleaning compositions of the inventions, as they also have detergent properties.

[0049] Another commonly used ingredient in cleaning compositions are hydrotropes. Hydrotropes reduce the dilution thickening effect according to the invention. It is preferred to avoid hydroptropes such as sodium cumene sulphonate (SCS), sodium xylene sulphonate (SXS), anionic hydroptropes and polyethylene glycols.

[0050] Generally, the viscosity modifying agent reduces the viscosity of the composition over the entire concentration scale. The viscosity modifying agent is optionally present in the cleaning composition in a concentration of 0-5%, preferably 0.1-2%, more preferably 0.5-1.5%.

Further surfactants

[0051] The compositions my further comprise surfactants. However, such surfactant may have no or limited influence on the dilution thickening behaviour of the composition. Preferably said further surfactants do not move the peak more than 10% on the concentration scale and do not reduce or increase the peak viscosity by more than 20%. The cleaning compositions of this invention may further comprise selected from anionic, amphoteric, zwitterionic and nonionic surfactants and combinations thereof. Cationic surfactants are not preferred.

[0052] Suitable further surfactants are described in "Surface Active Agents" Vol. 1, by Schwartz & Perry, Interscience 1949, Vol. 2 by Schwartz, Perry & Berch, Interscience 1958, in the current edition of "McCutcheon's Emulsifiers and Detergents" published by Manufacturing Confectioners Company or in "Tenside-Taschenbuch", H. Stache, 2nd Edn., Carl Hauser Verlag, 1981.

Optional Ingredients

[0053] The compositions of the invention optionally comprise other ingredients, such as fragrances, preservatives and colorants. Particularly colorants are useful to indicate the presence of the compositions in an absorbent carrier. Examples of useful colorants are: Blue FDC (CI:42090); Patent blue (CI:42051); Blue ABL 80 (CI:61585); Red punzo No 7 (CI: 16255), Red Puricolor Are 14 (CI: 14720), Yellow Tartrazine CI 14190, Quinoline Yellow 47005, Brillant Black 28440,Sunset yellow CI 15985, and mixtures thereof.

[0054] The present invention also discloses a method for cleaning domestic surfaces, particularly hard surfaces, using the cleaning compositions according to the invention. The cleaning method of the invention has several advantages

over known methods. In one aspect, it provides less consumption of cleaning composition and is therefore more economical and environmentally friendly.

[0055] The cleaning method of the invention comprises the steps of:

i) contacting a carrier with the composition of the invention;
ii) treating the combination of carrier and composition with water; and
iii) performing a cleaning operation of a surface with the carrier.

[0056] In an alternative, but less preferred variation, water can be added to the absorbent carrier before the composition is added to it.

[0057] A cleaning operation is typically represented by pressing the absorbent carrier to the surface and scrubbing it with circular movements, or in any other way, to aid in the removal of soil, grease or dirt from the surface. Dish surfaces and crockery are particular examples of household surfaces that can be cleaned with the composition of the invention.

[0058] Useful absorbent or porous carriers are known, particularly the ones comprising voids where liquid can be stored, for instance, sponges (natural, polymeric, steel, etc), scouring pads, cloths. The composition is particularly suitable to be applied onto sponges in the cleaning method.

[0059] The ratio between the amount of water and the amount of cleaning composition to be used in the cleaning method according to the invention is preferably from about 0.5 to about 5, more preferably about 0.5-4, most preferably up to about 3.5.

[0060] The invention further provides a process for enhancing the retention of cleaning agents into a carrier comprising the steps of:

a) providing a solution of surfactants;
b) providing a solution of viscosity modulating agent;
c) mixing the solution of surfactants with the solution of viscosity modulating agent.

Application methods and use

[0061] For hand dishwashing application of the cleaning compositions, such compositions preferably have a low viscosity initially and only increase in viscosity after addition of a certain amount of diluent. This allows penetration of the composition through the pores of a porous carrier (e.g. a sponge), while at the same time keeping the composition within the carrier for a longer period. The selective way by which the composition of the invention behaves provides an advantageous balance between low initial viscosity, maximum viscosity and final viscosity, as well as provides an advantageous balance between viscosity increasing ratio (between minimum and maximum viscosity) and viscosity decreasing ratio (between maximum and final viscosity).

[0062] In a preferred embodiment, the cleaning compositions of the invention comprise a dilution-thickening surfactant system and viscosity modulating agents and other optional ingredients and provide:

- low initial viscosity so as to easily penetrate into a carrier;
- viscosity increase upon dilution after penetrating into said carrier, so that the cleaning compositions stay longer within the carrier, thus providing enhanced performance even after repeatedly rinsing;
- on dilution the cleaning composition becomes a stable and transparent gel; and
- controlled and sustained release of surfactants.

[0063] In another aspect there is provided a cleaning method for surfaces, particularly hard surfaces, which is more efficient and economic than the previously known cleaning methods.

[0064] In yet another aspect there is provided a process for enhancing the retention of cleaning agents into carriers such as sponges and the like.

[0065] The invention provides dilution-thickening aqueous liquid cleaning compositions comprising:

- one or more surfactants;
- one or more viscosity modulating agents.

[0066] More specifically, the invention provides dilution-thickening aqueous liquid cleaning compositions comprising:

- one or more surfactants;
- at least one electrolyte as a viscosity modulating agent.

[0067] The invention will now be illustrated by means of the following non limiting examples.

Examples

[0068] These examples show the performance the compositions of the invention vis-à-vis the prior art.

Example 1

[0069] In example 1, the controlled release of the composition according to the invention is compared to commercially available products.

[0070] The composition according to the invention is given in the table below

Ingredient	Trade name	Supplier	%w
Sodium lauryl ether sulphate C12-C13 2 EO (Ex Neodol 23)	Texapon S 70 Texapon S 70	Cognis	15.5
Fatty Alcohol Ethoxylated (C12-C13 8EO)	Neodol 91-8	Shell	1
Coco Amido Propyl Betaine	Empigen BS/FE	Huntsman	3
LAS (acid form)		in HOME	8.5
Magnesium Sulphate	$MgSO_4.7H_2O$	K&S	4.5
Minors *)			3
Demin Water			64.5
pH			5.5
Viscosity (as is, mPa.s @$20s^{-1}$			1000
*) Minors are pH adjustment materials, perfume, dye and preservative			

[0071] The commercial products tested are Dixan (ex Henkel, purchased in Italy 27 February 2006), Fairy (ex Procter&Gamble, purchased in UK 1 September 2005) Sole (ex Reckitt Benckizer, purchased in Italy 12 April 2006) and Last (ex Bolton Manitoba, purchased in Italy 20 April 2006), see table below for an analysis of the compositions.

Ingredient (%w) *)	Dixan gel	Fairy	Sole	Last
Linear alkylbenzone sulphonate			5.0	9.6
Secondary alkane sulphate	2.2			
C12-14 PAS		7.8		
Alkyl ether sulphate (C12-13, 1EO)	9.8	15.8	5.0	2.0
Alkyl amido-propyl betaine	2.0			
C12-16 Alkyl dimethyl amine oxide		5.6	0.1	
Alcohol ethoxylate (C9-C11, 8EO)		3.0		
Sodium chloride	2.0	1.1	1.6	1.3
Sodium sulphate	0.2	0.1	0.1	0.12
Magnesium sulphate				0.07
Minors	rest	rest	rest	rest
Water	83.4	62.3	87.6	86.3
pH (as is)	4.9	8.2	7.7	7.4

(continued)

Ingredient (%w) *)	Dixan gel	Fairy	Sole	Last
Viscosity (as is, mPa.s @20s^{-1})	345	475	312	234
*) Chain lengths and degree of ethoxylation are estimated; Minors include dye, perfume, solvents, preservatives etc				

[0072] To determine the active dosing of the material 1 g of one of the compositions was applied directly onto a wet sponge suitable for cleaning dishes. The sponge was then rinsed with 50 ml demin water aliquots, by method of adding 50 ml of water to the sponge, squeezing the sponge and collecting the water. This was repeated with several aliquots of 50 ml water until no more detergent was released from the sponge.

[0073] The collected water was analysed to determine the concentration of released detergent product. And the amount of remaining active was calculated by deducting the measured amount of detergent product in each rinse from the starting amount and calculating the remain amount on the sponge. The results are given in the table below.

	% active on sponge					
rinsing step	**water (ml)**	**Comp 1**	**Dixan**	**Fairy**	**Sole**	**Last**
0	0	100	100	100	100	100
1	50	90	37	74	42	8
2	100	83	19	56	13	2
3	150	75	8	38	4	2
4	200	66	3	27	2	1
5	250	54	1	19	1	1
6	300	42	1	12	0	1
7	350	31	1	7	0	0
8	400	23	1	5	0	0
9	450	16	0	3	0	0
10	500	10	0	2	0	0
11	550	8	0	1	0	0
12	600	6	0	1	0	0
13	650	4	0	0	0	0
14	700	2	0	0	0	0
15	750	1	0	0	0	0

[0074] As can be clearly seen from the results table above, the composition of the invention gives a much more controlled release of active during a greater number of rinse steps.

Example 2

[0075] In example 2, the viscosity profile of a number of compositions according to the invention is demonstrated.

[0076] The compositions of this example are given in the table below.

	Product Ingredients					
	total actives	LAS %	LES %	Betaine %	NI %	$MgSO_4.7H_2O$ %
Comp 2	32%	10.5	16.5	3	2	2

(continued)

	Product Ingredients					
	total actives	LAS %	LES %	Betaine %	NI %	$MgSO_4.7H_2O$ %
Comp 3	31%	10.5	16.5	3	1	2
Comp 4	32%	10.5	16.5	3	2	3
Comp 5	28.5%	9.15	15.4	3	0.95	2.5
Comp 6	25%	7.67	13.8	2.68	0.85	3
Comp 7	24.9%	8.75	13.75	2	0.4	4.5
*) Coco amidopropyl betaine						

[0077] In the table below, the viscosity of the product is given at different dilutions. In this table, 100% represents the neat undiluted product, while the other percentages represent the percentage of product in water.

	Viscosities un dilution (mPa.s @20 s^{-1})					
Composition	30%	40%	50%	60%	70%	100%
Comp 2	50	300	2880	5350	4350	1030
Comp 3	350	1750	4800	6150	4850	1150
Comp 4	100	420	2600	4650	2650	1090
Comp 5	100	560	3600	6100	6250	1000
Comp 6	100	640	3223	5390	4950	997
Comp 7	220	1730	5560	8350	6350	1130

[0078] The results clearly show that the viscosity of the product is relatively low in undiluted form and also low when diluted down to about 30%, but that the viscosity between the neat composition and the highly dilution form of the composition is very high.

Example 3

[0079] In example 3, the effect of an additional viscosity modifying agent (MPG, composition 10) on the controlled release of the composition is demonstrated and compared with a similar composition without the additional viscosity modifying agent (composition 9) and a commercially available hand dish washing liquid (Lux Lemon). The compositions are given in the table below.

Chemical name	**Comp 8**	**Comp 9**	**Comp 10**
	[%]	**[%]**	**[%]**
Sodium lauryl ether sulphate C12-C14 1EO		15.4	20
Sodium lauryl ether sulphate C12-C14 2EO	12		
acid LAS (MW 321)	20.7	8.56	8
alcohol ethoxylate 8 EO		0.95	
alcohol ethoxylate 10 EO (Lialet 111-10EO)			1
Coco Amido Propyl Betaine	0.75	3	5
Sodium Hydroxide	2.2	1.3	0.95
MPG (mono propylene glycol)			5

(continued)

Chemical name	Comp 8	Comp 9	Comp 10
	[%]	[%]	[%]
Ethanol	4.3		
Magnesium sulphate $7H_2O$		4.5	5
Water	57	66.3	54.8
Minors (dye, perfume, preservative, etc)	rest	rest	rest
pH (as is)	5.5	5.5	5.5
Viscosity (as is, mPa.s @$20s^{-1}$)	Ca 1000	1000	1150

[0080] The product release was tested with the method as given in example 1. The release results are given in the table below

rinsing step	water (ml)	Comp 8	Comp 9	Comp 10
0	0	100	100	100
1	50	73	90	96
2	100	49	83	92
3	150	30	75	87
4	200	19	66	80
5	250	11	54	73
6	300	8	42	65
7	350	6	31	58
8	400	4	23	49
9	450	2	16	39
10	500	2	10	31
11	550	1	8	24
12	600	1	6	17
13	650	1	4	11
14	700	0	2	5
15	750	0	1	0

[0081] As can be clearly seen from the results in the table above, the composition with the additional viscosity modifying agent gives an even more controlled release of active during a greater number of rinse steps.

Claims

1. A dilution-thickening aqueous liquid cleaning composition comprising

(a) 5-50%w of dilution-thickening surfactant system comprising:

i) 40-85%w Alkyl ether sulphate (0-4 EO);
ii) 0.01-50%w Linear alkylbenzene sulphonate; and
iii) 0.01-55%w Betaine;

adding up to 100%,
and wherein the composition further comprises
(b) 2.5-7.5%w of an electrolyte, selected from water-soluble organic and inorganic salts other than anionic surfactants, wherein the cation is chosen from alkali metals, alkaline earth metals, ammonium and mixtures thereof and the anion is chosen from chloride, sulfate, phosphate, acetate, nitrate and mixtures thereof;

and wherein the initial viscosity of the composition is 800 - 1250 mPa.s, wherein the viscosity is determined at 25°C, using a Haake VT 550/VT 500 viscometer at 215^{-1} with an MVII spindle.

2. A composition according to claim 1, wherein the composition does not contain sodium xylene sulfonate hydroptrope.

3. A cleaning composition according to any one of claims 1 or 2 wherein the composition further comprises 0-5%w a viscosity modifying agent selected from nonionic surfactant, propylene glycols, ethoxylated glycerols, and/or ethanol.

4. A Cleaning compositions according claim 3 wherein the electrolyte is magnesium sulfate.

5. A cleaning composition according to any one of claims 1 to 4 wherein the alkyl ether sulphate is a C_{10}-C_{18} alkylether sulfate salt with 1-4 EO groups.

6. A cleaning composition according to any one of claims 1 to 5 wherein the betaine is C_{10}-C_{18} alkylamidopropyl betaine.

7. A cleaning composition according to any one of claims 1 to 6 wherein the initial viscosity is between below 1500mPas and which on dilution to 30-70% reach a peak viscosity of at least 5 times the initial viscosity.

8. Method to clean hard surfaces comprising the steps of:

(a) contacting a carrier with a composition according to any one of claims 1 to 7;
(b) treating the combination of carrier and composition with water; and
(c) performing a cleaning operation of a surface with the carrier.

9. A dilution-thickening surfactant system comprising:

(a) 40-85%w Alkyl ether sulphate (0-4 EO)
(b) 0.01-50%w Linear alkylbenzene sulphonate
(c) 0.01-55%w Betaine;

adding up to 100%

10. Use of the dilution thickening surfactant system according to claim 9 in a dish washing composition.

Patentansprüche

1. Durch Verdünnung verdickende wässrige flüssige Reinigungszusammensetzung, umfassend

(a) 5-50 Gewichts-% eines durch Verdünnung verdickenden Tensidsystems, umfassend:

(i) 40-85 Gewichts-% Alkylethersulfat (0-4 EO);
(ii) 0,01-50 Gewichts-% lineares Alkylbenzolsulfonat und
(iii) 0,01-55 Gewichts-% Betain;

wobei eine Zugabe auf 100 % erfolgt,
wobei die Zusammensetzung außerdem umfasst:
(b) 2,5-7,5 Gewichts-% eines Elektrolyten, ausgewählt aus anderen wasserlöslichen organischen und anorganischen Salzen als anionische Tenside, wobei das Kation aus Alkalimetallen, Erdalkalimetallen, Ammonium und Gemischen davon ausgewählt ist und das Anion aus Chlorid, Sulfat, Phosphat, Acetat, Nitrat und Gemischen davon ausgewählt ist;

und wobei die Anfangsviskosität der Zusammensetzung 800-1250 mPa.s ist, wobei die Viskosität bei 25 °C unter Verwendung eines Haake-VT 550/VT 500-Viskometers bei 21 s^{-1} mit einer MVII-Spindel gemessen wird.

2. Zusammensetzung nach Anspruch 1, wobei die Zusammensetzung ein Natriumxylolsulfonat-Hydroptrop enthält.

3. Reinigungszusammensetzung nach einem der Ansprüche 1 oder 2, wobei die Zusammensetzung außerdem 0-5

Gewichts-% eines die Viskosität modifizierenden Mittels umfasst, das aus nicht-ionischem Tensid, Propylenglykolen, ethoxylierten Glycerinen und/oder Ethanol ausgewählt ist.

4. Reinigungszusammensetzungen nach Anspruch 3, wobei der Elektrolyt Magnesiumsulfat ist.

5. Reinigungszusammensetzung nach einem der Ansprüche 1 bis 4, wobei das Alkylethersulfat ein C_{10}-C_{18}-Alkylethersulfatsalz mit 1-4 EO-Gruppen ist.

6. Reinigungszusammensetzung nach einem der Ansprüche 1 bis 5, wobei das Betain C_{10}-C_{18}-Alkylamidopropylbetain ist.

7. Reinigungszusammensetzung nach einem der Ansprüche 1 bis 6, wobei die Anfangs-Viskosität unter 1500 mPas ist und bei Verdünnung bis 30-70 % eine Peak-Viskosität des wenigstens 5-fachen der Anfangs-Viskosität erreicht wird.

8. Verfahren zur Reinigung harter Oberflächen, umfassend die Schritte:

(a) In-Kontakt-Bringen eines Trägers mit einer Zusammensetzung nach einem der Ansprüche 1 bis 7;
(b) Behandeln der Kombination aus Träger und Zusammensetzung mit Wasser und
(c) Durchführen eines Reinigungsvorgangs einer Oberfläche mit dem Träger.

9. Durch Verdünnung verdickendes Tensid-System, umfassend:

(a) 40-85 Gewichts-% Alkylethersulfat (0-4 EO),
(b) 0,01-50 Gewichts-% lineares Alkylbenzolsulfonat,
(c) 0,01-55 Gewichts-% Betain,

wobei eine Zugabe auf 100 % erfolgt.

10. Verwendung des durch Verdünnung verdickenden Tensid-Systems nach Anspruch 9 in einer Geschirrspül-Zusammensetzung.

Revendications

1. Composition nettoyante aqueuse liquide épaississant par dilution comprenant :

(a) de 5 à 50 % en poids d'un système de tensioactifs épaississant par dilution comprenant :

i) de 40 à 85 % en poids de sulfate d'éther alkylique (0 à 4 EO) ;
ii) de 0,01 à 50 % en poids de sulfonate d'alkylbenzène linéaire ; et
iii) de 0,01 à 55 % en poids de bétaïne;

totalisant jusqu'à 100 %,
et dans laquelle la composition comprend en outre
(b) de 2,5 à 7,5 % en poids d'un électrolyte choisi parmi les sels organiques et inorganiques solubles dans l'eau autres que les tensioactifs anioniques, le cation étant choisi parmi les métaux alcalins, les métaux alcalino-terreux, l'ammonium et des mélanges de ceux-ci et l'anion étant choisi parmi le chlorure, le sulfate, le phosphate, l'acétate, le nitrate et des mélanges de ceux-ci ;

et dans laquelle la viscosité initiale de la composition est de 800 à 1250 mPa.s, la viscosité étant déterminée à 25 C en utilisant un viscosimètre de Haake VT 550/VT 500 à 21 s^{-1} avec un rotor MVII.

2. Composition selon la revendication 1, dans laquelle la composition ne contient pas de sulfonate de xylène sodique hydroptropique.

3. Composition nettoyante selon la revendication 1 ou la revendication 2, dans laquelle la composition comprend en outre de 0 à 5 % en poids d'un agent modificateur de viscosité choisi parmi les tensioactifs non ioniques, les propylène

glycols, les glycérols éthoxylés et/ou l'éthanol.

4. Composition nettoyante selon la revendication 3, dans laquelle l'électrolyte est le sulfate de magnésium.

5. Composition nettoyante selon l'une quelconque des revendications 1 à 4, dans laquelle le sulfate d'éther alkylique est un sel de sulfate d'éther alkylique en C_{10}-C_{18} ayant de 1 à 4 groupes EO.

6. Composition nettoyante selon l'une quelconque des revendications 1 à 5, dans laquelle la bétaïne est une (alkyle en C_{10}-C_{18}) amidopropyl-bétaïne.

7. Composition nettoyante selon l'une quelconque des revendications 1 à 6, dans laquelle la viscosité initiale est inférieure à 1500 mPa.s et qui lors de sa dilution à 30 à 70% atteint une viscosité maximale au moins 5 fois supérieure à la viscosité initiale.

8. Procédé de nettoyage de surfaces dures comprenant les étapes consistant à :

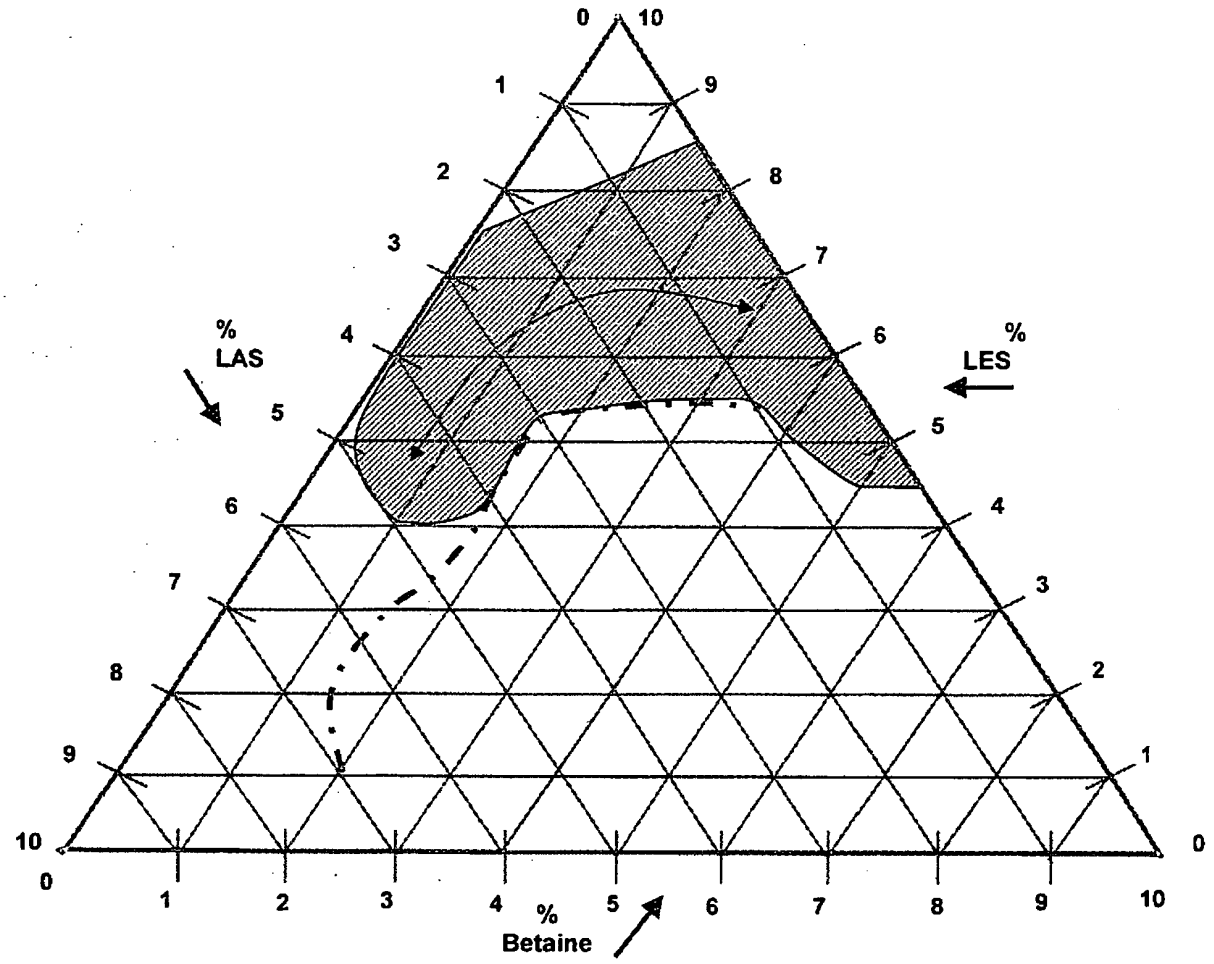
(a) mettre en contact un support avec une composition selon l'une quelconque des revendications 1 à 7 ;
(b) traiter la combinaison du support et de la composition avec de l'eau ; et
(c) réaliser une opération de nettoyage d'une surface avec le support.

9. Système de tensioactifs épaississant par dilution comprenant :

(a) de 40 à 85 % en poids de sulfate d'éther alkylique (0 à 4 EO) ;
(b) de 0,01 à 50 % en poids de sulfonate d'alkyl-benzène linéaire ; et
(c) de 0,01 à 55 % en poids de bétaïne ; totalisant jusqu'à 100 %.

10. Utilisation du système de tensioactifs épaississant par dilution selon la revendication 9 dans une composition de lavage de vaisselle.

Figure 1



REFERENCES CITED IN THE DESCRIPTION

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