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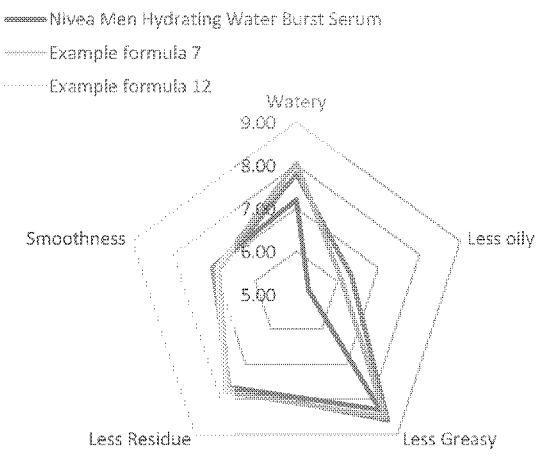

Fig. 1

(57) Abstract: A quick breaking W/O-emulsion free from cyclomethicones contains at least one non-polar oil having an IOB value of 0 and at least one polar oil which has an IOB value > 0, the molecular weight less than 600 and the boiling point < 500°C.The W/O-emulsion provides a pleasant fresh feeling and does not leave an impression of distinct greasiness or oiliness on the skin.

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QUICK BREAKING W/O-EMULSION FREE FROM CYCLOMETHICONES

Technical field

The present invention belongs to the cosmetic field, and specifically relates to a quick breaking W/O-emulsion free from cyclomethicones.

Background art

In general, emulsions are understood as heterogeneous systems, which consist of at least two liquids, which are immiscible or have only a limited miscibility with one another and which are usually referred to as phases. In an emulsion, one of the two liquids (water or oil) is dispersed in the form of very fine droplets in the other liquid (oil or water, respectively). In an emulsion the droplets (pure liquids or as solutions) are present in a more or less fine distribution. In general, without an emulsifier an emulsion is only of a limited stability.

W/O-emulsions are characterized in that watery droplets are dispersed in a continuous oil phase. “Quick-breaking” means that by shear forces acting upon said emulsion by distributing a suitable amount of the respective emulsion preparation on the skin and/or massaging the preparation in the skin, the emulsion will decompose or “break” and release watery or milky droplets. The release of such droplets results in a refreshing and/or cooling effect.

Prior art already discloses W/O-emulsions being described as “quick-breaking”. W/O emulsions according to CN 104968318 A contain specific emulsifiers, namely Amodimethicone Glycerocarbamat and/or Diisostearoyl Polyglyceryl-3 Dimer Dilinoleat. Said emulsions are free from polyethylene glycols or derivatives of polyethylene glycols.

The product Nivea Men Hydration Water Burst Serum (Mintel number 3478277) is a W/O-emulsion characterized by “quick-breaking” upon usage. The product contains the emulsifier Lauryl-PEG-9 Polymethylsiloxyethyl dimethicone and the cyclomethiconecyclohexasiloxane. The product is available in China since September 2015.

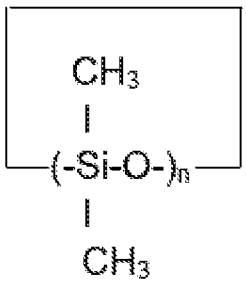
The product Skin Nutrient Goat’s Milk Magic Touch produced by the company Australia Health Research & Development Group contains the emulsifier PEG/PPG-10/1 dimethicone and the cyclomethicone cyclopentasiloxane and is a quick-breaking emulsion.

An analysis of quick-breaking W/O-emulsions was published in 2008 (Personal Care, Hai Zhou Zhang, et. al., March 2008, page 45). All example formulations disclosed therein

contain the emulsifier ABIL EM 90 (cetyl PEG/PPG-10/1 dimethicone) and the cyclomethicones, e.g.,cyclopentasiloxane and cyclohexasiloxane.

Concluding from prior art there is a considerable preference for including cyclomethiones in quick-breaking W/O-emulsions.

Cyclomethicones may be characterized by the following formula:



wherein n is from 3 to 30.

In cosmetic preparations cyclomethicones with n representing 4 to 6 are mainly used. These components have the property to reduce the stickiness of cosmetic preparations. They are colorless and thin fluid.

According to new evaluations cyclotetrasiloxane (D4) is considered as presumably affecting fertility and being harmful for aquatic organisms. Furthermore, the degradability is slow and therefore this substance may be accumulated in living organisms.

Cyclopentasiloxane (D5) may be absorbed and resorbed by the human organism because of its high volatility.

Hence, it is desirable to replace cyclomethicones in cosmetic preparations.

Moreover, the preparations without cyclomethicones should have at least the same stability as the formulas containing cyclomethicones.

Cyclomethicones may be replaced by hydrocarbons. But the incorporation of hydrocarbons may result in an oily and/or greasy feeling of the preparation when being applied.

Therefore, there is also a need to make quick-breaking W/O-emulsions available providing a pleasant fresh feeling and without leaving an impression of distinct greasiness or oiliness on the skin.

Summary of the invention

Surprisingly, the above mentioned problems could be solved by a quick-breaking W/O-emulsion free from cyclomethicones, containing besides water

- at least one emulsifier,
- an oily phase, containing
  - at least one non-polar oil, wherein the non-polar oil has an IOB value of 0, and
  - at least one polar oil, wherein the polar oil has an IOB value of > 0, wherein the molecular weight of the at least one polar oil is less than 600 and wherein the boiling point of the at least one polar oil is < 500°C.

As described above, the preparation of the present invention is a quick-breaking W/O-emulsion. The preparation, the composition and the emulsion are used interchangeably in this application. By shear forces acting on said emulsion, the emulsion breaks (decomposes) and releases watery or milky droplets. For achieving this, the preparation according to the invention contains a considerable amount of water, namely from 50 to 95 % by weight, in relation to the total weight of the preparation.

Preferably, the preparation according to the present invention is a cosmetic preparation, more preferably intended to stay on the skin (leave-on).

According to the present invention the oily phase consists of components, which are described as hydrophobic. The hydrophobic substances are characterized by the fact that they do not comprise any cyclomethicone as described above. This holds also true for the complete W/O-emulsion, being free from cyclomethicones. The hydrophobic substances are further characterized by the fact that they contain at least two components, preferably oils, which are differing in polarity.

The term oil is derived from Latin word “oleum”. The term oil is used for water-insoluble, at 20°C liquid, organic compounds with a relatively low vapor pressure. They are not characterized by a similar chemical composition, but rather by common physical properties. Oils have a relatively high viscosity and they are soluble in almost all organic solvents.

The polarity is determined by calculating IOB values.

The IOB value is an inorganic (I) - organic (O) balance value. For all substances with definite chemical structures, the IOB value can be calculated. Each IOB value contains 2 values: the I value and the O value. The I value is used to define the inorganic property of the substance and the O value is used to define the organic property of the substance.

Each chemical group in the molecular structure of the respective substance has its I or O value, which is defined in below table. The sum of the I or O values of each group in the molecule is the I or O value of the respective molecule.

Group	I value	O value
C	0	20
Light Metal Salt	500	0
Heavy Metal Salt	400	0
NH_4 Salt	400	0
-SO_2-NH-CO-	260	0
-SO_2-NH-	240	0
-CO-NH-CO-	230	40
=N-OH	220	0
=N-NH-	200	20
-COOH	150	20
-CO-O-CO-	110	40
-OH	100	0
-NH-NH-	80	0
-O-CO-O-	80	20
-C=O	65	20
-NO_2	70	70
-CN-	70	40
-NO	50	50
-NCO	30	30
-I	10	80
-Br	10	60
-Cl	10	40
-F	5	5
C=NH	50	20
-N=N-	30	0
-O-	20	0
Naphthalene	60	200
Benzene	15	120
Carbon cycle	10	CX20
Alkylene	3	0
-C=C (Alkene)	2	0
-O-O-	40	0
GLU-O-	75	0
(-O-CH_2-CH_2-)	75	40
Iso Branch	0	-10
TertBranch	0	-20
-Si-	0	20

For illustration, the determination of the IOB value for isohexadecane is shown:

Isohexadecane having the following structure:

There is no group providing an I value, hencethe I value is 0.

The O value of each carbon is 20, isohexadecane having 16 carbon atoms, thus 20*16=320, there is one iso-branch, having an O value of -10, in sum, the total O value is 20*16-10=310. Calculating the ratio, 0/310 = 0, an IOB value of 0 results.

Dicaprylyl carbonate having the following structure:

Calculation of the I value:

-C_8H_{17}: 0

-O-CO-O-: 80

Total I value is 80.

Calculation of the O value:

-C_8H_{17}: 160

-O-CO-O-:20

Total O value: 160*2+20=340, calculating the ratio (IOB value) 80 / 340 = 0,235.

According the calculation method shown above, the IOB values of the selected oils can be determined as shown below:

Non-polar oils:	**IOB value**
C15-19 Alkane	I/O=0/300 to 0/480=0
Isohexadecane	I/O=0/310=0
Isododecane	I/O=0/230=0
Polar oils:	
Dicaprylyl Carbonate	I/O=80/340=0.24
Dicaprylyl Ether	I/O=20/320=0.06
Isopropyl Palmitate	I/O= 85/390=0.22
C12-15 Alkyl Benzoate	I/O=140/340 to 140/400=0.41 to 0.35
Methyl Palmitate	I/O=85/360=0.24
Butylene Glycol Dicaprylate/Dicaprate	I/O=170/440=0.39
DiisopropylAdipate	I/O= 170/230=0.74
Dimethicone (n≥10)	I/O=240/520 to 20n/40n* = 0,35 to 0,5

* If n is a high number, the end groups of dimethicone may be ignored, so that the ratio of 20n/40n defines the IOB value.

According to the present invention at least one non-polar oil, having IOB values of 0, is contained in the preparation of the present invention. Non-polar oils according to the given specification comprise aliphatic, unbranched hydrocarbons having 12 to 40 carbon atoms, preferably 15 to 19 carbon atoms. Said hydrocarbons may be contained as components being characterized by one specific number of carbon atoms. However, it is preferred, if blends of hydrocarbons having 15 to 19 carbon atoms (e.g. C15-19 alkane) are contained. For example, such a blend may be purchased from Total as Gemseal 40.

Furthermore, non-polar oils according to the given specification comprise branched hydrocarbons having in total 12 to 40 carbon atoms, preferably 12 to 16 carbon atoms. It is preferred, if isohexadecane and/or isododecane are contained in the preparation according to the present invention.

It is more preferred, if combinations of one or more aliphatic, unbranched hydrocarbon(s) having 15 to 16 carbon atoms, especially as a blend, and one or more branched hydrocarbon(s) having in total 12 to 14 carbon atoms are contained in the preparation according to the invention.

Advantageously, in the preparation according to the present invention the at least one non-polar oil is contained in a total amount of 0.10 to 10 % by weight, preferably 2.0 to 6.0 % by weight, in relation to the total weight of the preparation.

According to the present invention at least one polar oil, having an IOB value > 0, a molecular weight of less than 600 and a boiling point of < 500°C, is contained in the preparation of the present invention.

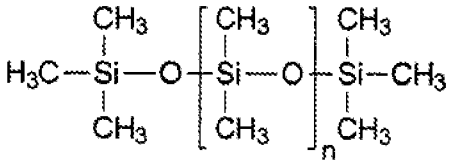
The at least one polar oil according to the given specification comprises esters of saturated and/or unsaturated, branched and/or unbranched alkane carboxylic acids with a chain length of from 3 to 20 carbon atoms and saturated and/or unsaturated, branched and/or unbranched alcohols with a chain length of from 1 to 20 carbon atoms, and esters of aromatic carboxylic acids and saturated and/or unsaturated, branched and/or unbranched alcohols with a chain length of from 3 to 20 carbon atoms. Examples for such ester oils aremethyl palmitate, isopropyl myristate, isopropyl palmitate and/or C12-15 alkyl benzoate.

Furthermore, the at least one polar oil according to the given specification comprises components of the group of neopentyl glycol diheptanoate, propylene glycol dicaprylate/dicaprate, butylene glycol dicaprylate/dicaprate, C12-13 alkyl lactate, di-C12-13 alkyl tartrate, propylene glycol monoisostearate, tricaprylin, dimethylisosorbideand/ordiisopropyladipate.

Still furthermore, the at least one polar oil according to the given specification comprises components of the group of dialkyl ethers and dialkyl carbonates, advantageous examples being dicaprylyl ether (for example available under the trade name Cetiol OE from BASF) and/or dicaprylyl carbonate (for example available under the trade name Cetiol CC from BASF).

Even still furthermore, the at least one polar oil according to the given specification comprises dimethicones.

Dimethicones are methyl-substituted polyorganosiloxanes and may be characterized by the following structural formula:



wherein n is 2 to about 2000. The structure shown in brackets is referred to as a siloxane unit.

Dimethicones have various chain lengths and various molecular weights.

According to the invention the at least one dimethicone is chosen from dimethicones, where n is 10 or more.

A suitable dimethicone may be purchased as DM 20 from BRB, or Xiameter PMX-200 Silicone Fluid 20cSt from Dow Corning, or Edlement14 PDMS 100 from Momentive.

Advantageously, one polar oil is chosen from one of the groups described above, but likewise advantageously, combinations of two or more polar oils chosen from the groups described above are contained in the preparation according to the present invention.

Advantageously, in the preparation according to the present invention the at least one polar oil according to the given specification is contained in a total amount of 0.10 to 10 % by weight, preferably 0.5 to 5 % by weight, in relation to the total weight of the preparation.

Advantageously, the weight ratio of the at least one polar oil to the at least one non-polar oil is from 0.05 : 1 to 3 : 1.

Advantageously, the preparation according to the invention only contains one or more non-polar oil(s) and one or more polar oil(s) according to the given specifications, respectively.

Advantageously, the total oil content of the preparation according to the invention is less than 20 % by weight, preferably less than 10 % by weight, in relation to the total weight of the preparation. In the meaning of the present invention, the content of the emulsifiers is not included in the total oil content.

The comparative example contains at least one cyclomethicone.

To stabilize an emulsion, one or more emulsifier(s) is/are contained in general.

Emulsifiers help to combine two immiscible liquids (for example oil in water) in a way to result in a stable preparation, an emulsion. For that reason emulsifiers have to have an amphiphilic character, the hydrophobic part interacts with the oily or lipid phase and the hydrophilic part interacts with the aqueous phase. By stirring or homogenizing the generated droplets are dispersed in the respective environment, namely aqueous droplets in a lipid environment or lipid droplets in an aqueous environment. Primarily, emulsifiers do not have a detersive, surfactant character. Emulsifiers reduce the interfacial tension between the two phases and, besides reducing the interfacial work, also achieve a stabilization of the emulsion formed. They stabilize the formed emulsion by means of interfacial films, as well as by forming steric or electrical barriers, as a result of which the merging (coalescence) of the emulsified particles is prevented.

HLB values are suitable to characterize emulsifiers, said values specify the hydrophilicity of a given emulsifier. The HLB value may be determined by the following formula:

$$HLB=20\times(1-M_{lipophile}/M),$$

Where $M_{lipophile}$ represents the molar mass of the lipophilic fraction of a given emulsifier and M represents the molar mass of the total emulsifier.

In general, emulsifiers with an HLB value up to about 8 are considered to be W/O-emulsifiers. By contrast, O/W-emulsifiers have HLB values of greater than 8 to 15. Substances with HLB values greater than 15 are often referred to as solubilizers.

Advantageously, according to the invention the emulsifier is a W/O-emulsifier, especially one, which is dimethicone based.

A preferred dimethicone based emulsifier is Lauryl PEG-10 Tris(Trimethylsiloxy)silylethyl Dimethicone, which may be purchased from Dow Corning as Dowsil ES 5300 Formulation Aid.

It is likewise preferred, if the dimethicone based emulsifier is Cetyl PEG/PPG-10/1 Dimethicone, which may be purchased from Evonic as AbilEM 90 orAbil EM 180.

Advantageously, in the preparation according to the present invention the at least one emulsifier is contained in a total amount of 0.1 to 5.0 % by weight, preferably 0.2 to 2 % by weight, in relation to the total weight of the preparation.

Advantageously, according to the invention additionally at least one moisturizer is contained in the composition of the present invention. Moisturizers are hygroscopic substances which bind water and thereby provide moisture. The hygroscopic quality is due to hydrophilic substituents of the molecule, in many cases hydroxyl groups, but other functional groups as

for instance, amine or carboxyl groups may act in the same way. Examples of moisturizers are propylene glycol, hexylene glycol, and butylene glycol, glyceryl triacetate, glycerol, sorbitol, xylitol, maltitol, polydextrose, hydrogenated starch hydrolysate, urea, Aloe vera gel, alpha hydroxy acids such as lactic acid, honey. Preferred moisturizers are glycerol, butylene glycol and/or propylene glycol.

If at least one moisturizer is contained in the composition of the present invention, the at least one moisturizer is preferably contained in a total amount of 1.0 to 30.0 % by weight, more preferably 5.0 to 10.0 % by weight, in relation to the total weight of the composition.

Advantageously, according to the invention additionally at least one preservative is contained in the composition of the present invention. All preservatives, which are allowed and suitable for cosmetic preparations may be contained. However, it is preferred, if methylparaben, ethylparaben, and Phenoxyethanol, or mixtures thereof are contained. Other preservatives may also be used, for example Benzyl Alcohol, Methylisothiazolinone, Methylchloroisothiazolinone and/or DMDM Hydantoin. These preservatives may be used alone or in combination or in combination with the above mentioned preferred preservatives.

If at least one preservative is contained in the composition of the present invention, the at least one preservative is preferably contained in a total amount of 0.01 to 3.0 % by weight, more preferably 0.1 to 1.0 % by weight, relative to the total weight of the composition. The values are referring to the active content of the preservatives.

Additionally, ethanol may be contained. Ethanol has a preservative effect and is often classified as a preservative. Ethanol may be contained as denatured alcohol. If ethanol is contained in the preparation of the present invention, the amount of ethanol ranges from 0.5 to 20 % by weight, preferably 0.7 to 10 % by weight, in relation to the total weight of the preparation.

Advantageously, according to the invention additionally at least one substance is contained, which is not classified as a preservative itself, but, however may support or increase the effect of the preservative(s) contained in the composition of the invention. Such substances are propylene glycol, ethylhexylglycerine, 1,2-hexanediole, methylpropanediole, butylene glycole, caprylylglycol, pentyleneglycol and/or hydroxyacetophenone.

If said substance(s) is/are contained in the composition of the present invention, the substance(s) is/are preferably contained in a total amount of 1 to 30 % by weight, more preferably 5 to 10 % by weight, relative to the total weight of the composition. The values are referring to the active content of the substances.

Advantageously, according to the invention additionally complexing components may be contained. Preferably, the complexing components are chosen from EDTA, [S,S]-ethylenediaminedisuccinate (EDDS), pentasodiumethylenediaminetetramethylenephosphonate and/or iminodisuccinic acid. If at least one complexing component is contained in the preparation of the present invention, the at least one complexing component is present in an amount of 0.1 to 5 % by weight, preferably 0.5 to 2 % by weight, in relation to the total weight of the preparation.

Advantageously, according to the invention additionally components stabilizing the preparation may be contained. Preferably, physiologically compatible salts may be contained, more preferably sodium chloride is contained.

If at least one stabilizing component, especially sodium chloride is contained in the composition of the present invention, the at least one stabilizing component, especially sodium chloride is preferably contained in a total amount of 0.1 to 5.0 % by weight, more preferably 0.5 to 1.5 % by weight, relative to the total weight of the composition.

The cosmetic preparation according to the invention may comprise cosmetic auxiliaries being in general contained in such preparations, e.g. perfumes, dyes, pigments which have a coloring action, fillers, which improve the feel on the skin, and other customary constituents of a cosmetic formulation.

Advantageously, the preparation according to the invention is free from cyclomethicones. In the meaning of the present invention “free from” means that less than 0.1 % by weight, preferably less than 0.01 % by weight, and most preferably 0 % by weight of the respective substance is contained, in relation to the total weight of the composition.

Unless otherwise stated, all tests and measurements were performed under “normal conditions”. The term "normal conditions" refers to 20°C, 1013 hPa and a relative humidity of 50%.

Brief description of the Drawings

Fig.1 shows the results of the evaluation.

Examples

The examples below are intended to illustrate the present invention without limiting it. The numerical values in the examples are percentages by weight, based on the total weight of the particular preparations, given as active content.

Preparation method

The composition of the present invention may be prepared by any technique known or effective to prepare a "quick-breaking" W/O-emulsion. The process to prepare the composition of the present invention comprises conventional formulating and mixing techniques. However, it is preferred, if the preparation according to the present invention is prepared by the following method:

1. Mix and dissolve the polar oil(s), non-polar oil(s) and emulsifier(s) and other oil soluble components.
2. Mix and dissolve the water soluble components well.
3. Add the water soluble components slowly to oil soluble components while stirring to form the W/O emulsion.

Test method

Preparations according to Examples 7 and 12 were prepared and compared to Nivea Men Hydrating Water Burst Serum. The INCI listing of Nivea Men Hydrating Water Burst Serum discloses the following components: Aqua, Glycerin, Cyclomethicone, Dimethicone, Propylene Glycol, Sodium Chloride, Sodium Hyaluronate, Sodium Ascorbyl Phosphate, Tocopheryl Acetate, Caprylic/Capric Triglyceride, Glyceryl Glucoside, Dimethicone Crosspolymer, PEG/PPG-18/18 Dimethicone, GlycyrrhizaGlabra Root Extract, FucusVesiculosus Extract, Maris Limus Extract, Ostrea Shell Extract, Phenoxyethanol, Ethylhexylglycerin, Perfume.

The preparations were used to conduct a Sensory Panel Evaluation. The evaluation was performed according to the following method:

- Panelists: 10 trained panelists joined the evaluation. The skin of the panelists was characterized as normal, the test was performed on their arms.
- Panel Room: Temperature: 23-27°C, humidity: 50-60%,
- Process:
  - Panelists are sitting at a desk for 10 minutes (acclimation time).
  - The skin area of applying the respective product is marked by using a stamp. Maximal 3 areas are marked on each arm, and on each area one product will be applied. In total, 6 products may be evaluated in one panel (including 1 standard product, which is used for providing the score for calibration).

- The panel organizer dispenses one product on each marked area and starts the beeper for massaging the product with a certain frequency.
- The panelists start a timer and massage the product, meanwhile evaluating the sensory criteria during application. Touch the skin and evaluate the sensory criteria immediately after absorption.

– Scale:

- Watery: 0: Extremely dry, 10: Extremely watery.
- Less oily: 0: Extremely oily, 10: Not oily at all.
- Less Greasy: 0: Extremely greasy, 10: Not greasy at all.
- Less Residue: 0: High amount of residues, 10: Clean and no residues.
- Smoothness: 0: Rough and not smooth, 10: Extremely smooth.

The results of the evaluation are shown in the table below and illustrated by Fig. 1.

Preparations	Watery	Lessoily	LessGreasy	LessResidue	Smoothness
Nivea Men Hydrating Water Burst Serum	7.20	5.30	8.30	7.65	7.05
Example 7	7.80	6.35	8.60	7.70	6.90
Example 12	8.05	6.10	8.50	7.80	6.95

It becomes apparent that referring to smoothness, residues left on the skin, and greasiness, the products of the invention are evaluated in about the same range as the comparative product. Looking at the oiliness and the providing of water (droplets) the products according to the invention are evaluated better than the comparative product. The results show that products according to the invention solve the above mentioned problem.

Furthermore, the stability was analyzed.

To evaluate long-term storage, the example preparations (Examples 1 to 12) were prepared and filled into 50ml transparent glass bottle with plastic cap. The comparative product (Nivea Men Hydrating Water Burst Serum) was filled in the same glass bottles. The test samples were stored as indicated below.

Preparations	Storage		
	50°C, 30 days	-10°C, 30 days	-18°C, 30 days
Nivea Men Hydrating Water Burst Serum	OK	OK	OK
Example 1	OK	OK	OK
Example 2	OK	OK	OK
Example 3	OK	OK	OK

Example 4	OK	OK	OK
Example 5	OK	OK	OK
Example 6	OK	OK	OK
Example 7	OK	OK	OK
Example 8	OK	OK	OK
Example 9	OK	OK	OK
Example 10	OK	OK	OK
Example 11	OK	OK	OK
Example 12	OK	OK	OK

OK means no obvious water or oil separation, no color change.

To evaluate the consistency and also stability, viscosity values were determined.

The preparation according to Example 7 and Nivea Men Hydrating Water Burst Serum were filled into 200ml glass bottles with plastic cap and stored at 50°C and at -18°C for 30 days, then stored at 25°C for 24 hours to restore the temperature of 25°C. Then the viscosity was determined using the viscosimeter ProRheo R123 (measuring bob 1; if higher viscosity values were to be determined (higher than 10,000 mPa·s), measuring bob 2 was used) at 25°C. The results are shown below:

Preparations	**25°C**, 1 day after preparation	**50°C**, 30 days, restore to 25°C	**-18°C**, 30 days, restore to 25°C
Nivea Men Hydrating Water Burst Serum	8,150	5,600 (69%)	5,200 (64%)
Example 7	12,100	6,950 (57%)	9,950 (82%)

The results show that after having been stored at a hot and a very cold temperature, the test samples were not decomposed, as the viscosity measurement shows. Moreover, the viscosity values are varying only in a range that is expected.

Examples:

INCI / Example	1	2	3	4	5	6	7	8	9	10	11	12	13
*Cyclomethicone (*n=1-10)*													*4*
C15-19 Alkane									4	3	3		
Isohexadecane	3	4											
Isododecane	2,5	2	2	2	2	2,3	2	2				2	
Dimethicone (**n>10)	0,5				1	0,5	0,5	0,5	0,5	0,5	0,5	0,5	2
Dicaprylyl Carbonate			4	4									
Dicaprylyl Ether					4								
IsopropylPalmitate						3,7							
C12-15 Alkyl Benzoate	0,5	0,5	0,5	0,5									0,5
Methyl Palmitate								4					
ButyleneGlycolDicaprylate/Dicaprate							4					4	
DiisopropylAdipate									2	3	3		
Lauryl PEG-10 Tris(Trimethylsiloxy)silylethyl Dimethicone	0,8	0,8	0,8		0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8
Cetyl PEG/PPG-10/1 Dimethicone				0,8									
Parfum	0,1	0,05	0,1	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2
Glycerin	3	3	3	3	3	3	3	3	3	3	3	3	3
ButyleneGlycol	2	2	2	2	2	2	2	2	2	2	2	2	2
PropyleneGlycol	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5
Methylparaben	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1
Phenoxyethanol	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5
Sodium Chloride	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5
Aqua	83	83,05	83	82,9	82,4	82,9	82,9	82,9	82,9	82,9	82,9	82,1	82,9
CI 77891												0,8	
sum	100	100	100	100	100	100	100	100	100	100	100	100	100

* n=1-10, n means siloxane units;

** n>10; n means siloxane units.

Claims

1) A quick-breaking W/O-emulsion free from cyclomethicones, containing besides water
   - at least one emulsifier,
   - an oily phase, containing
     - at least one non-polar oil, wherein the at least one non-polar oils has an IOB value of 0, and
     - at least one polar oil, wherein the at least one polar oil has an IOB value > 0, wherein the molecular weight of the at least one polar oil is less than 600 and wherein the boiling point of the at least polar oil is < 500°C.
2) The W/O-emulsion according to claim 1 characterized in that water is contained in an amount of 50 to 95 % by weight, in relation to the total weight of the emulsion.
3) The W/O-emulsion according to claim 1 or 2 characterized in that the at least one non-polar oil is chosen from aliphatic, unbranched hydrocarbons having 12 to 40 carbon atoms, preferably 15 to 19 carbon atoms.
4) The W/O-emulsion according to any of the preceding claims characterized in that a blend of aliphatic, unbranched hydrocarbons having 15 to 19 carbon atoms, preferably a blend with the INCI name C15-19 alkane is contained.
5) The W/O-emulsion according to any of the preceding claims characterized in that the at least one non-polar oil is chosen from branched hydrocarbons having in total 12 to 40 carbon atoms, preferably 12 to 16 carbon atoms, more preferably isohexadecane and/or isododecane.
6) The W/O-emulsion according to any of the preceding claims characterized in that the non-polar oils are chosen from combinations of one or more aliphatic, unbranched hydrocarbon(s) having 15 to 16 carbon atoms, especially as a blend, and one or more branched hydrocarbon(s) having in total 12 to 14 carbon atoms.
7) The W/O-emulsion according to any of the preceding claims characterized in that the at least one non-polar oil is contained in a total amount of 0.10 to 10 % by weight, preferably 2.0 to 6.0 % by weight, in relation to the total weight of the emulsion.
8) The W/O-emulsion according to any of the preceding claims characterized in that the at least one polar oil is chosen from esters of saturated and/or unsaturated, branched and/or unbranched alkane carboxylic acids with a chain length of from 3 to 20 carbon atoms and saturated and/or unsaturated, branched and/or unbranched alcohols with a chain length of from 1 to 20 carbon atoms, and esters of aromatic carboxylic acids and saturated and/or unsaturated, branched and/or unbranched alcohols with a chain length of from 3 to 20 carbon atoms, preferably chosen from methyl palmitate, isopropyl myristate, isopropyl palmitate and/or C12-15 alkyl benzoate.

9) The W/O-emulsion according to any of the preceding claims characterized in that the at least one polar oilis chosen from the group of neopentyl glycol diheptanoate, propylene glycol dicaprylate/dicaprate, butylene glycol dicaprylate/dicaprate, C12-13 alkyl lactate, di-C12-13 alkyl tartrate, propylene glycol monoisostearate, tricaprylin, dimethylisosorbide and/or diisopropyladipate, preferably butylene glycol dicaprylate/dicaprate and/or diisopropyladipate.
10) The W/O-emulsion according to any of the preceding claims characterized in that the at least one polar oil is chosen from the group of dialkyl ethers and dialkyl carbonates, preferably dicaprylyl ether and/or dicaprylyl carbonate.
11) The W/O-emulsion according to any of the preceding claims characterized in that the at least one polar oil is chosen from and/or one or more dimethicone(s), having 10 or more siloxane units.
12) The W/O-emulsion according to any of the preceding claims characterized in that the at least one polar oil is contained in a total amount of 0.10 to 10 % by weight, preferably 0.5 to 5 % by weight, in relation to the total weight of the emulsion.
13) The W/O-emulsion according to any of the preceding claims characterized in that the weight ratio of the polar oil(s) to non-polar oil(s) is from 0.05 : 1 to 3 : 1.
14) The W/O-emulsion according to any of the preceding claims characterized in that the total oil content is less than 20 % by weight, preferably less than 10 % by weight, in relation to the total weight of the emulsion.
15) The W/O-emulsion according to any of the preceding claims characterized in that the at least one emulsifier is a W/O-emulsifier, preferably a dimethicone based W/O-emulsifier, more preferably Lauryl PEG-10 Tris(Trimethylsiloxy)silylethyl Dimethicone and/or Cetyl PEG/PPG-10/1 Dimethicone.
16) The W/O-emulsion according to any of the preceding claims characterized in that the at least one emulsifier is contained in a total amount of 0.1 to 5.0 % by weight, preferably 0.2 to 2 % by weight, in relation to the total weight of the emulsion.
17) The W/O-emulsion according to any of the preceding claims characterized in that additionally at least one moisturizer is contained, preferably chosen from propylene glycol, hexylene glycol, and butylene glycol, glyceryl triacetate, glycerol, sorbitol, xylitol, maltitol, polydextrose, hydrogenated starch hydrolysate, urea, Aloe vera gel, alpha hydroxy acids such as lactic acid, honey, more preferably from glycerol, butylene glycol and/or propylene glycol.
18) The W/O-emulsion according to claim 17 characterized in that the at least one moisturizer is contained in a total amount of 1.0 to 30.0 % by weight, preferably 5.0 to 10.0 % by weight, in relation to the total weight of the emulsion.

19) The W/O-emulsion according to any of the preceding claims characterized in that additionally at least one preservative is contained, preferably chosen methylparaben, ethylparaben, and Phenoxyethanol, or mixtures thereof.

20) The W/O-emulsion according to claim 19 characterized in that the at least one preservative is contained in a total amount of 0.01 to 3.0 % by weight, preferably 0.1 to 1.0 % by weight, in relation to the total weight of the emulsion and in relation to the active content.

Figures

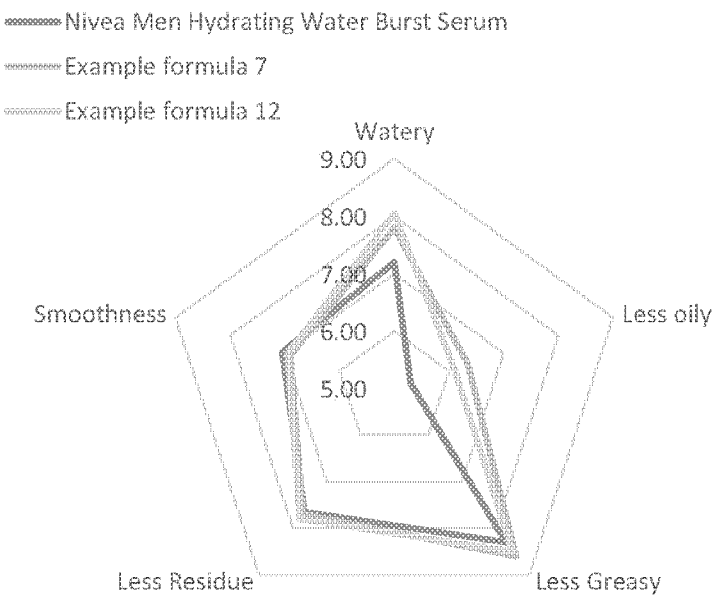


Fig.1

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2019/086726

A. CLASSIFICATION OF SUBJECT MATTER

A61K 8/06(2006.01)i; A61K 8/92(2006.01)i; A61Q 19/00(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A61K8/-;A61Q19/-

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

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

CNKI,CNPAT,WPI,EPODOC:emuls+, water, oil, isododecane, isohexadecane, carbonate, dimethicone, alkane, ether, benzoate

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2016012513 A1 (L'OREAL) 28 January 2016 (2016-01-28) description, Table 2	1-20
X	CN 101283958 A (L'OREAL) 15 October 2008 (2008-10-15) description, example 1	1-20
A	CN 103040633 A (LAF. JAHWA CO., LTD.) 17 April 2013 (2013-04-17) claims 1-12	1-20
A	CN 109549859 A (UNIV. ZHEJIANG HUANAN IND. TECH. RES. INST. et al.) 02 April 2019 (2019-04-02) description, paragraphs [0027]-[0030]	1-20
A	CN 105267051 A (STC NARA CO., LTD.) 27 January 2016 (2016-01-27) description, paragraphs [0060]-[0096]	1-20
A	WO 2018012557 A1 (L'OREAL) 18 January 2018 (2018-01-18) claims 1-15	1-20

☐ Further documents are listed in the continuation of Box C. ☑ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
16 January 2020	**01 February 2020**
Name and mailing address of the ISA/CN **National Intellectual Property Administration, PRC** **6, Xitucheng Rd., Jimen Bridge, Haidian District, Beijing 100088** **China** Facsimile No. **(86-10)62019451**	Authorized officer **FAN,Yandi** Telephone No. **86-(10)-53962275**

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2019/086726

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CN	109549859	A	02 April 2019		None		
CN	105267051	A	27 January 2016	KR	20160012963	A	03 February 2016
				KR	101811849	B1	22 December 2017
WO	2018012557	A1	18 January 2018	JP	2018024582	A	15 February 2018