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(54) Title: STYLING POLYMERS FOR ANTI-POLLUTION AND HAIR CLEANSING

(57) Abstract: The present invention relates to the use of a polymer - or of a cosmetic product comprising the polymer and in addition further cosmetically acceptable ingredients - for bringing about an antipollution effect on human hair, especially for protecting human hair against dust, especially for protecting human hair against fine dust, wherein the polymer is water-soluble and comprises sulfonic acid groups, and wherein the sulfonic acid groups of the polymer are present as free acid groups or as salts, wherein the salts preferably are salts of alkali metals, especially sodium salts.

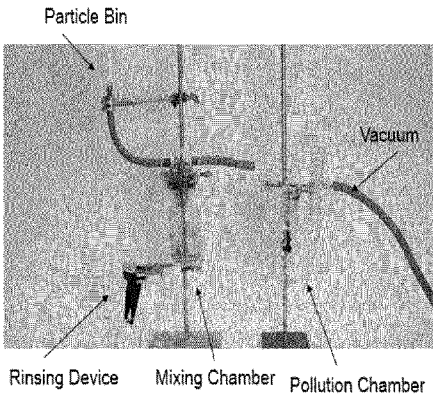

Fig 1a

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Styling Polymers for Anti-Pollution and Hair Cleansing

The present invention relates to the use of a polymer - or of a cosmetic product comprising the polymer and in addition further cosmetically acceptable ingredients - for bringing about an anti-pollution effect on human hair, especially for protecting human hair against dust, especially for protecting human hair against fine dust, wherein the polymer is water-soluble and comprises sulfonic acid groups, and wherein the sulfonic acid groups of the polymer are present as free acid groups or as salts, wherein the salts preferably are salts of alkali metals, especially sodium salts, wherein water-soluble means that the solubility of the polymer in water at 20°C and at at-least 0.1 % by weight of the aqueous polymer solution, preferably at least 2 % by weight.

The ambient air of human beings is often affected by air pollution. One component of air pollution are particulate substances, including fine dust, also including biological particles or bioaerosols like fungi, bacteria, viruses and pollen, also including necrotic tissues, like dandruffs from animal or human origin.

Particle size of these particulate inorganic or organic substances can range in size from 10 nm to 100 µm.

From a cosmetic point of view, the protection of human hair against air pollution, especially against the deposition of fine dust from the air, is not desirable, because the appearance of the hair is affected by the deposition of particulate substances.

The adhesion of particles and substances to hair surface can also cause other effects, like an increase in brittleness and roughness or damage of the hair by acidic or caustic substances. The sensitivity of the scalp can also be can be increased.

There is a need for cosmetic products that protect the hair against air pollution, in particular against particulate substances, in particular against sand or fine dust.

In other words, there is a need for cosmetic products that have an anti-pollution effect on human hair.

WO 2018/215136 discloses the use of several polymers for anti-pollution purposes.

There are a lot of film-forming polymers which can be applied on human hair using aqueous or ethanolic solutions, but preferably formulations, like hair mousses, gels, waxes or hair

sprays, are used which contain ancillary ingredients to adjust a certain texture or performance. Most of these formulations also contain wetting agents to ensure a homogenous distribution of the polymer on the hair. One example is described in the database GNBP (Online) Mintel, 4. November 2009, accession no. 1194588, disclosing an extra strong foam which protects hair from external elements and comprises polyacrylamidoethylenpropane sulfonic acid. The anti-pollution effect is linked to the content of micro proteins, whereas the polymers are included for styling purposes only.

The hair fibers can be glued together by these polymers to obtain styling effects, but also used to cover the hair surfaces. The polymer film can be removed from the hair surfaces by rinsing respectively washing procedures. Depending on the chemistry of the polymer and the degree of neutralization the removal of polymer is only partly complete and polymer residues can remain on the hair surface.

Beside the styling effect the polymer film on hair can also work as a protection barrier against harmful environmental impacts, like UV-radiation or free radicals from atmospheric origin. The effect of limiting or reducing UV radiation is here caused by the polymer film created on the surface of the human hair.

It has been found that these polymer films on hair can also be used as a protection barrier for particulate substances and surprisingly for almost complete removal of particulate substances. The adhesion of particulate matter on hair cannot be avoided because there will always be an electrostatic attraction of differently charged fine particles on mainly negatively surfaces like hair or scalp. Therefore, the polymer film will be loaded with a certain amount of particulate substances depending on fine dust concentration, relative humidity and fluid mechanics of the ambient air.

The problem underlying the present-invention is to bring about an anti-pollution effect on human hair.

This problem is solved by the use according to claim 1. This is one subject of the present invention. Another subject of the present invention is the process according to the independent process-claim of the present document.

The dependent claims are directed to specific embodiments of the present invention.

The polymer used in the present invention needs to be water soluble as defined in the independent claim. The solubility in water is preferable in the range from 0.1 to 20 % by weight of an aqueous polymer solution, more preferably between 2 and 20 % by weight, and most preferably in the range from 14 to 18 % by weight.

In one embodiment the composition according to the present invention comprises at least one further polymer, wherein this further polymer is used preferably at a concentration of 0.1 to 10% by weight.

In one embodiment the composition according to the present invention comprises at least one further polymer, wherein this further polymer is non-ionic and is used preferably at a concentration of 0.1 to 10% by weight.

In one embodiment the composition according to the present invention comprises at least one further polymer, wherein this further polymer is cationic and used preferably at a concentration of 0.1 to 10% by weight.

In one embodiment the formulation according to the present invention comprises at least one further polymer, wherein this further polymer is anionic and used preferably at a concentration of 0.1 to 10% by weight.

In one embodiment the composition according to the present invention comprises at least two further polymers, wherein these further polymers are used together at a total concentration of 0.1 to 15% by weight, preferably at a total concentration of 0.1 to 10% by weight.

In one embodiment of the present invention the polymer in the formulation is selected from the group consisting of Polyacrylamidomethylpropane sulfonic acid and Polystyrene sulfonic acid, preferably the polymer is Polyacrylamidomethylpropane sulfonic acid (e. g. Rheocare® HSP – or HSP 1180 - obtainable from BASF).

Organic and inorganic neutralizing agents can be used to neutralize the polymer according to the present invention. The organic neutralizing agents can also be combined with inorganic neutralizing agents so that a mixture of inorganic and organic neutralizing agents is used in an amount that leads to partial or complete neutralization of the polymer, so that the formulation preferably has a pH value of 1 to 14, preferably 3 to 9.

In one embodiment of the present invention the composition is a rinse-off composition selected from the group consisting of a hair shampoo and a shower gel, each containing anionic surfactants or betaine surfactants or nonionic surfactants.

In one embodiment of the present invention the composition is a conditioner containing at least one anionic, nonionic or cationic surfactant.

The polymer according to the present invention can be used in compositions, also called formulations, preferably non-aerosol formulations, containing at least one further, cationic polymer, e. g. Polyquaternium-4, Polyquaternium-11, Polyquaternium-16, Polyquaternium-46 or Polyquaternium-68.

The polymer according to the present invention can be used in formulations, preferably non-aerosol formulations, containing at least one further, anionic polymer, e. g. (in INCI-nomenclature) Acrylates Copolymers, Acrylate/Methacrylamide Copolymers, Acrylates/t-Butylacrylamide Copolymers, Vinylacetat/Crotonates Copolymers, Vinylacetat/Crotonates/Vinyl Neodecanoate Copolymers or Polyurethanes. It can also be used in formulations further comprising at least one further nonionic polymer, e.g. Polyvinylpyrrolidon, Polyvinylpyrrolidon/Vinylacetate Copolymers, Polyvinylcaprolactams or Polyvinylpyrrolidon/Methacrylamide/Vinylimidazole Copolymers.

The formulations according to the present invention can comprise solvents, like ethanol or propanol. They can also comprise other ancillary ingredients like glycerin, sorbitol, panthenol, proteins, rheology modifiers, preservatives, surfactants, emulsifiers, perfumes, pigments and/or coloring agents.

The polymer according to the invention can be formulated in various hair care and styling formulations. Due to its anionic nature it can also be formulated in rinse-off formulations, e. g. in hair shampoos containing ether sulfate surfactants, like Laureth sulfate, and/or betaine surfactants, like Cocoamidopropyl betaine, or nonionic surfactants, like Alkyl polyglucosides or ethoxylated fatty alcohols. The use in leave-on conditioners for hair care containing cationic surfactants is possible and can further enhance wet and dry combing.

The polymers according to the present invention can be applied to surfaces like human hair or natural respectively artificial fibers. They are especially useful for hair styling products like gels, creams, mousses serums or sprays to prevent hair damage during procedures like hair straightening respectively hair curling at elevated temperatures or by UV- light.

In a preferred embodiment of the invention the polymer is use as leave-on product, which means that after application of the polymer or the cosmetic product comprising the polymer no rinse with water takes place.

Further cosmetic ingredients suitable for use in the formulations according to the present invention have been described in the previous paragraphs. Furthermore, the ingredients used in the examples of the present text are suitable. Furthermore, there are numerous textbooks known to the person skilled in the art listing cosmetic ingredients suitable for use in the compositions according to the present, e. g. the “International Cosmetic Ingredient Dictionary and Handbook”, 16th edition, 2016, edited by the CTFA.

Examples

Method Description for Testing the Anti-Pollution Effect

5 single hairs were clamped vertically on a plastic holder and placed in the middle of a laboratory glass reactor. Vacuum was applied to the reactor and 2.5 mg of activated carbon (PM 2.5) was sucked through the apparatus (see Fig. 1a, 1b, 1c and 1d that together show the "pollution apparatus"). Hereby a dust swirl was induced around the single hairs. Afterwards the polluted single hairs were fixed on a microscopic slide and evaluated by microscopy. An imaging software was used to count the particles on the hair surface (see Fig. 2 that shows the imaging method for particle count and Fig. 3 that shows examples with activated carbon and titanium dioxide). Then the microscopic slides were rinsed off after clamping in a rectangular funnel (see Fig. 4 that shows a rinsing device). Rinsing could be done with tap water, surfactant or shampoo solutions.

Example 1

The formulation of examples 1, 2, 3 and 4 containing different polymers in the same chassis (a chassis is a frame formulation with same ancillary ingredients, but different key ingredient.) were compared using the described method with three-times ultra-bleached Chinese hair and activated carbon (PM 2.5) for pollution. Placebo meant same chassis but without polymer. Rinsing was done with 20 ml of Texapon® NSO (INCI: Sodium Laureth Sulfate), 12wt% AM. Texapon® NSO is often used as the main surfactant in shampoo formulations.

The following table shows the results of Example 1:

Formulation	**1 SH-DE-18-0004c-08**	**2 SH-DE-18-0004c-11**	**3 SH-DE-18-0004c-02**	**4 SH-DE-18-0004c-04**	**Placebo**
Polymer	**Rheocare® HSP (anionic)**	**Luviset® One (anionic)**	**Luviset® Clear (nonionic)**	**Luviquat® FC 550 (cationic)**	**-**
Particle Density after Adhesion [count/mm²]	22652 +/- 4127	21888 +/- 10850	25424 +/- 7054	27143 +/- 8059	36521 +/- 7119
Particle Density after Rinse-off [count/mm²]	1276 +/- 1174	525 +/- 622	3012 +/- 1554	18000 +/- 5403	7666 +/- 5316

Fig. 5 shows the results of Example 1 in graphical form.

Example 1 shows that the polluted hairs can be almost completely (> 90%) cleansed by formulations containing anionic polymers. Pollutants on hairs treated with formulations containing cationic polymers can't be hardly cleansed.

Example 2

The formulation examples 5, 6 and 7 containing Rheocare® HSP in different chassis are compared using the described method with three times ultra-bleached Chinese hair and activated carbon (PM 2.5) for pollution. Placebo means same chassis but without polymer. Rinsing was done with 20 ml of Texapon® NSO, 12wt% AM.

The following table shows the results of Example 2:

Formulation	**5 HB-DE-16-121-001**	**6 HB-DE-16-121-013**	**7 HB-DE-16-121-020**	**Placebo**
Polymer	**Rheocare® HSP**	**Rheocare® HSP**	**Rheocare® HSP**	**-**
Particle Density after Adhesion [count/mm²]	23524 +/- 5510	14549 +/- 3052	18703 +/- 4036	36521 +/- 7119
Particle Density after Rinse-off [count/mm²]	211 +/- 219	891 +/- 927	126+/-161	7666 +/- 5316

Fig. 6 shows the results of Example 2 in graphical form.

Example 2 confirms the results from example 1. Polluted hairs can be almost completely. (> 90%) cleansed by formulations containing anionic polymers, especially by polymers containing Polyacrylamidomethylpropane sulfonic acid.

Example Formulations

Concentrations are given in weight-% (wt%) unless another unit is given explicitly.
Concentrations mean concentrations of active matter (AM), unless another definition is given explicitly.

Rheocare® HSP 1180 (INCI: Polyacrylamidomethylpropane sulfonic acid) from BASF which is used for the following examples and formulations is an anionic product that has a polymer content of between 14 wt.-% AM and 18 wt.-% AM (active matter). Thus, the use of 12.5 wt.-% Rheocare® HSP 1180 in a formulation means 2 wt.-% AM polymer in the resulting formulation.

Luviset® One (INCI: Acrylates/Methacrylamide Copolymer) from BASF which is used for the following examples and formulations is an anionic product that has a polymer content of between 28 wt.-% AM and 31 wt.-% AM (active matter). Thus, the use of 6.7 wt.-% Luviset® One in a formulation means 2 wt.-% AM polymer in the resulting formulation.

Luviset® Clear (INCI: VP/Methacrylamide/ Vinyl Imidazole Copolymer) from BASF which is used for the following examples and formulations is a nonionic product that has a polymer content of between 19 wt.-% AM and 21 wt.-% AM (active matter). Thus, the use of 10 wt.-% Luviset® Clear in a formulation means 2 wt.-% AM polymer in the resulting formulation.

Luviquat® FC 550 (INCI: Polyquaternium-16) from BASF which is used for the following examples and formulations is a cationic product that has a polymer content of between 38 wt.-% AM and 42 wt.-% AM (active matter). Thus, the use of 5 wt.-% Luviquat® FC 550 in a formulation means 2 wt.-% AM polymer in the resulting formulation.

Formulation 1

A formulation containing 2 wt% AM Rheocare® HSP neutralized with Aminomethyl propanol was prepared:

Formulation no. SH-DE-18-0004c-08:

	Ingredient	INCI	%
A	Aqua, demin.	Aqua	86,3
	Rheocare® HSP 1180	Polyacrylamidomethylpropane sulfonic acid	12,5
	AMP Ultra® PC 2000	Aminomethyl propanol	qs
	Eumulgin® CO 40	PEG-40 hydrogenated castor oil	0.3
	Dehydol® LS 4 DEO N	Laureth-4	0.5
	Perfume „Cotton Touch“	Perfume	0,10
	Sodium Benzoate	Sodium benzoate	0,30
B	Citric acid, 10% sol.	Citric acid	qs

Properties:

pH value	6
Appearance	clear, slightly turbid

Manufacturing process:

Dissolve Rheocare® HSP 1180 in water. Adjust pH to ~7. Add the other components of phase A.

Adjust pH to 6 – 6.5 with phase B.

Formulation 2

A formulation containing 2 wt% AM Luviset® One neutralized with Aminomethyl propanol was prepared:

Formulation no. SH-DE-18-0004c-11:

	Ingredient	INCI	%
A	Aqua, demin.	Aqua	92.1
	Luviset® One	Acrylates/Methacrylamide Copolymer	6.7
	AMP Ultra® PC 2000	Aminomethyl propanol	qs
	Eumulgin® CO 40	PEG-40 hydrogenated castor oil	0.3
	Dehydol® LS 4 DEO N	Laureth-4	0.5
	Perfume „Cotton Touch“	Perfume	0,10
	Sodium Benzoate	Sodium benzoate	0,30
B	Citric acid, 10% sol.	Citric acid	qs

Properties:

pH value	6
Appearance	clear, slightly turbid

Manufacturing process:

Dissolve Luviset® One in water. Adjust pH to ~7. Add the other components of phase A. Adjust pH to 6 – 6.5 with phase B.

Formulation 3

A formulation containing 2 wt% AM Luviset® Clear was prepared:

Formulation no. SH-DE-18-0004c-02:

	Ingredient	INCI	%
A	Aqua, demin.	Aqua	88.8
	Luviset® Clear	VP/Methacrylamide/ Vinyl Imidazole Copolymer	10
	Eumulgin® CO 40	PEG-40 hydrogenated castor oil	0.3
	Dehydol® LS 4 DEO N	Laureth-4	0.5
	Perfume „Cotton Touch“	Perfume	0,10

	Sodium Benzoate	Sodium benzoate	0,30
B	Citric acid, 10% sol.	Citric acid	qs

Properties:

pH value	6
Appearance	clear, slightly turbid

Manufacturing process:

Dissolve Luviset® Clear in water. Add the other components of phase A. Adjust pH to 6 – 6.5 with phase B.

Formulation 4

A formulation containing 2 wt% AM Luviquat® FC 550 was prepared:

Formulation no. SH-DE-18-0004c-04:

	Ingredient	INCI	%
A	Aqua, demin.	Aqua	93.8
	Luviquat® FC 550	Polyquaternium-16	5
	Eumulgin® CO 40	PEG-40 hydrogenated castor oil	0.3
	Dehydol® LS 4 DEO N	Laureth-4	0.5
	Perfume „Cotton Touch“	Perfume	0,10
	Sodium Benzoate	Sodium benzoate	0,30
B	Citric acid, 10% sol.	Citric acid	qs

Properties:

pH value	6
Appearance	clear, slightly turbid

Manufacturing process:

Dissolve Luviquat® FC 550 in water. Add the other components of phase A. Adjust pH to 6 – 6.5 with phase B.

Formulation 5

Formulation no. HB-DE-16-121-001: a pump spray

	Ingredient	INCI	%
A	Aqua, demin.	Aqua	74,40
	Ethanol abs.	Alcohol	10

	Rheocare® HSP 1180	Polyacrylamidomethylpropane sulfonic acid	12,5
	Sodium Hydroxide, 10% sol.	Sodium hydroxide	qs
B	Gluadin® Kera-P LM	Hydrolyzed vegetable protein	2
	D-Panthenol 75W	Panthenol	0,50
C	Perfume „Cotton Touch“	Perfume	0,30
	Eumulgin® CO 40	PEG-40 hydrogenated castor oil	0,30
D	Citric acid, 50% sol.	Citric acid	qs

Rheocare® HSP 1180 is an aqueous solution containing about 14 to 18 % by weight polyacrylamidomethylpropane sulfonic acid.

Properties:

pH value	4.67
Viscosity (23°C, Brookfield RVT, Sp4, 10rpm)	1700 mPa*s
Appearance	slightly yellowish, clear

Manufacturing process:

Dissolve Rheocare HSP® 1180 in a mixture of water and ethanol. Adjust pH to ~6 with sodium hydroxide and add ingredients of phase B. Solubilize phase C separately and add to the combined phase A + B. If necessary, adjust pH with phase D.

Formulation 6

Formulation no. HB-DE-16-121-013: a pump spray

	Ingredient	INCI	%
A	Aqua, demin.	Aqua	74,40
	Ethanol abs.	Alcohol	10
	Rheocare® HSP 1180	Polyacrylamidomethylpropane sulfonic acid	12,5
	Neutrol® TE	Tetrahydroxypropyl ethylenediamine	qs
B	Gluadin® Kera-P LM	Hydrolyzed vegetable protein	2
	D-Panthenol 75W	Panthenol	0,50
C	Perfume „Cotton Touch“	Perfume	0,30
	Eumulgin® CO 40	PEG-40 hydrogenated castor oil	0,30

D	Citric acid, 50% sol.	Citric acid	qs

Properties:

pH value	4.85
Viscosity (23°C, Brookfield RVT, Sp4, 10rpm)	860 mPa*s
Appearance	slightly yellowish, clear

Manufacturing process:

Dissolve Rheocare HSP® 1180 in a mixture of water and ethanol. Adjust pH to ~6 with Neutrol® TE and add ingredients of phase B. Solubilize phase C separately and add to the combined phase A + B. If necessary adjust pH with phase D.

Formulation 7

Formulation no. HB-DE-16-121-020: a pump spray

	Ingredient	INCI	%
A	Aqua, demin.	Aqua	74,40
	Ethanol abs.	Alcohol	10
	Rheocare® HSP 1180	Polyacrylamidomethylpropane sulfonic acid	12,5
	AMP Ultra® PC 2000	Aminomethyl Propanol	qs
	Gluadin® Kera-P LM	Hydrolyzed vegetable protein	2
	D-Panthenol 75W	Panthenol	0,50
C	Perfume „Cotton Touch“	Perfume	0,30
	Eumulgin® CO 40	PEG-40 hydrogenated castor oil	0,30
D	Citric acid, 50% sol.	Citric acid	qs

Properties:

pH value	4.76
Viscosity (23°C, Brookfield RVT, Sp4, 10rpm)	2520 mPa*s
Appearance	slightly yellowish, clear

Manufacturing process:

Dissolve Rheocare HSP® 1180 in a mixture of water and ethanol. Adjust pH to ~6 with aminomethyl propanol and add ingredients of phase B. Solubilize phase C separately and add to the combined phase A + B. If necessary, adjust pH with phase D.

Claims

1. The use of a polymer - or of a cosmetic product comprising the polymer and in addition further cosmetically acceptable ingredients - for bringing about an anti-pollution effect on human hair, especially for protecting human hair against dust, especially for protecting human hair against fine dust, wherein the polymer is water-soluble and comprises sulfonic acid groups, and wherein the sulfonic acid groups of the polymer are present as free acid groups or as salts, wherein the salts preferably are salts of alkali metals, especially sodium salts, wherein water-soluble means that the solubility of the polymer in water at 20 °C of at least 0.1 % by weight of the aqueous polymer solution. preferably at least 2 % by weight.

2. The use according to claim 1, wherein the polymer is selected from the group consisting of polyacrylamidomethylpropane sulfonic acid and polystyrene sulfonic acid.

3. The use according to claim 1, wherein the polymer is polyacrylamidomethylpropane sulfonic acid.

4. The use according to any of claims 1 to 3, wherein the polymer is used in an aqueous solution with a pH value between 4 and 9 and a content on the polymer in the range from 0.1 to 20 % by weight of the aqueous solution, preferably from 2 to 15 % by weight.

5. The use according to any of claims 1 to 4, wherein human hair is protected against dust, and wherein this dust has a particle size of from 10 nm to 100 µm.

6. The use according to any of claims 1 to 5, wherein in addition to the anti-pollution effect a protecting-effect against UV-radiation is brought about.

7. The use according to any of claims 1 to 6, wherein the composition is used, and wherein this composition comprises at least one further polymer, wherein this further polymer is used preferably at a concentration of 0.1 to 10% by weight.

8. The use according to claim 7, wherein the further polymer is a non-ionic or a cationic polymer.

9. The use according to any of claims 1 to 6, wherein the composition is used, and wherein this composition comprises at least two further polymer, wherein these further polymers are used together at a total concentration of 0.1 to 15% by weight, preferably at a total concentration of 0.1 to 10% by weight.

10. A process for bringing about an anti-pollution effect on human hair comprising the contacting of the polymer as defined in claim 1 – or of the composition as defined in claim 1 - with human hair, that is in need of an anti-pollution effect.

11. A process according to claim 10, wherein said process does not comprise any rinse off with water after the hair has been brought into contact with the human hair.

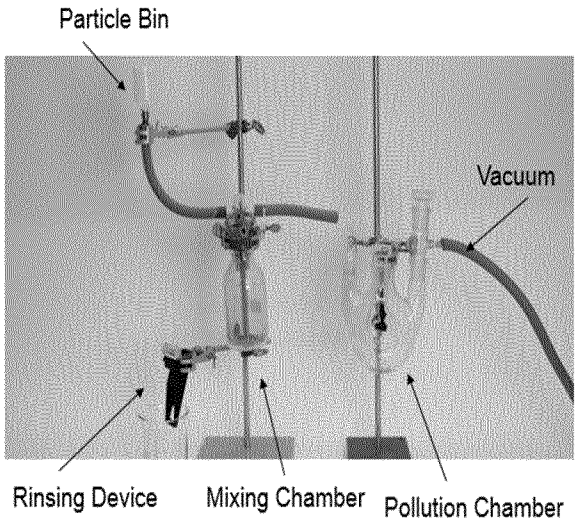

Fig 1a

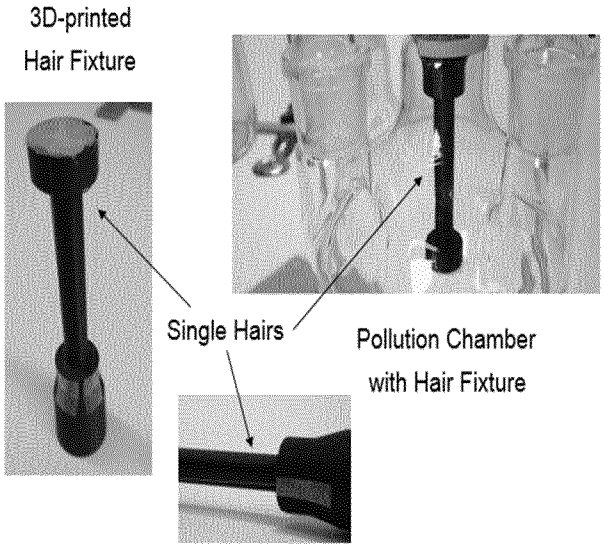

Fig 1b Fig 1c and 1d

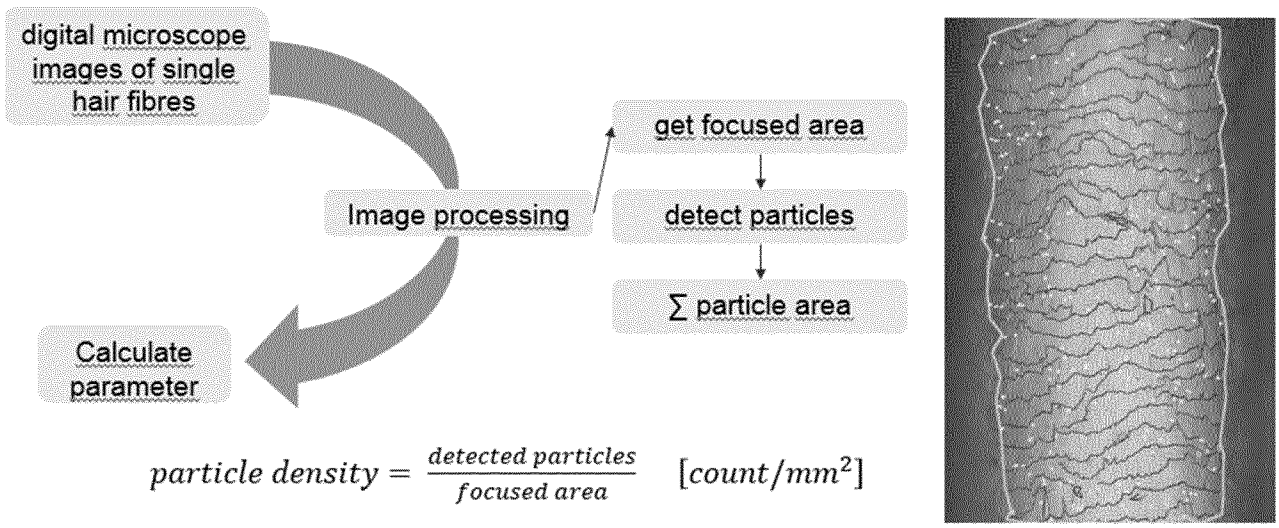

Fig. 2

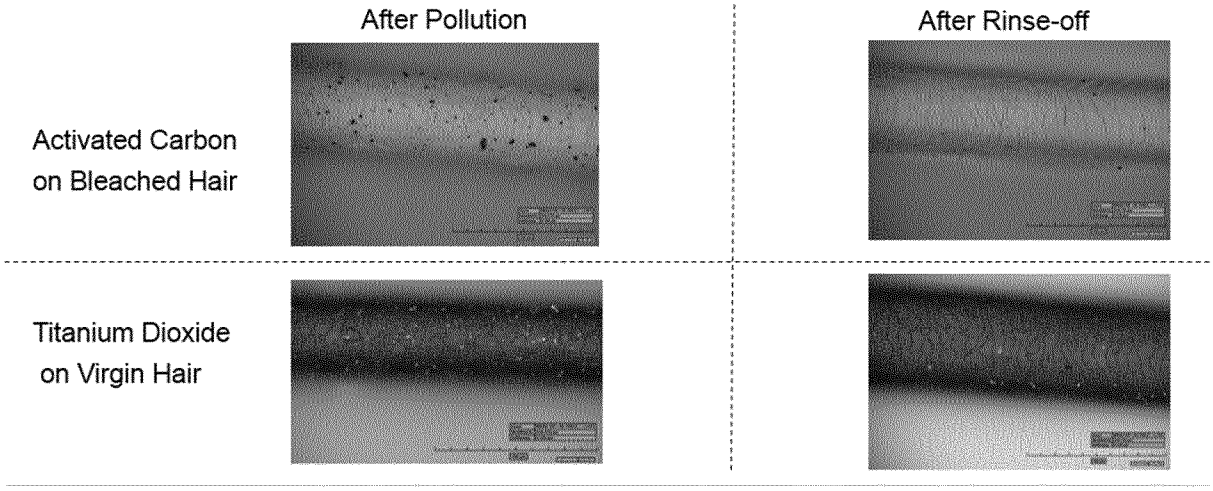
After Pollution
After Rinse-off
Activated Carbon
on Bleached Hair
Titanium Dioxide
on Virgin Hair

Fig. 3

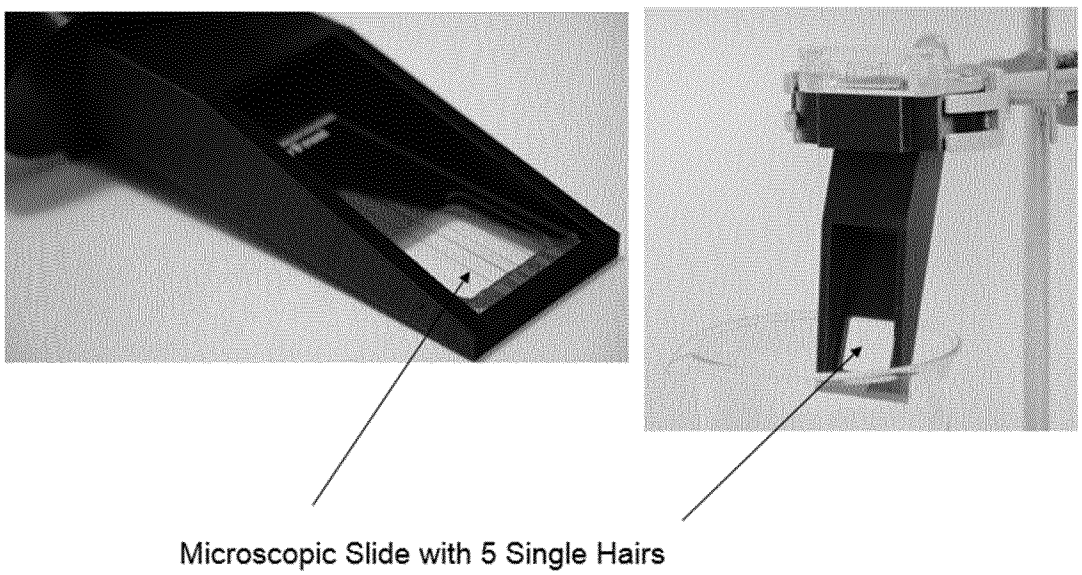
Microscopic Slide with 5 Single Hairs

Fig. 4

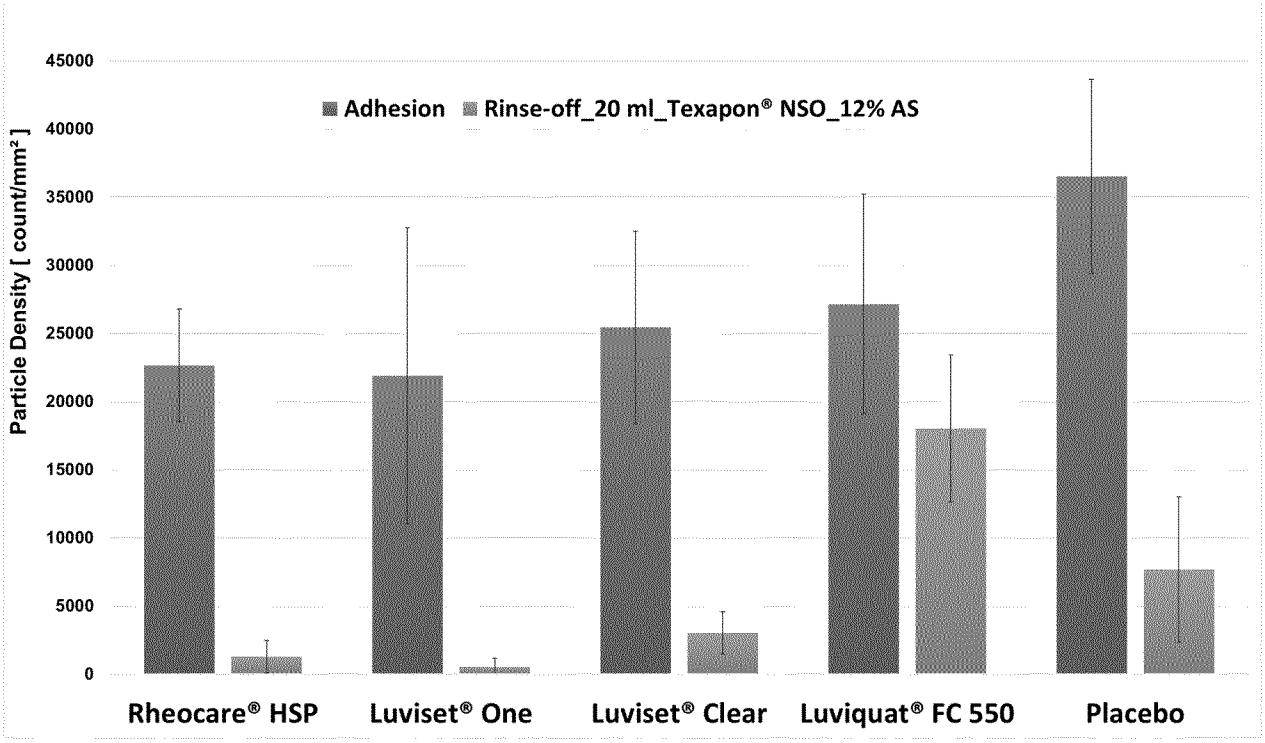
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
Particle Density [count/mm²]
Adhesion
Rinse-off_20 ml_Texapon® NSO_12% AS
Rheocare® HSP
Luviset® One
Luviset® Clear
Luviquat® FC 550
Placebo

Fig. 5

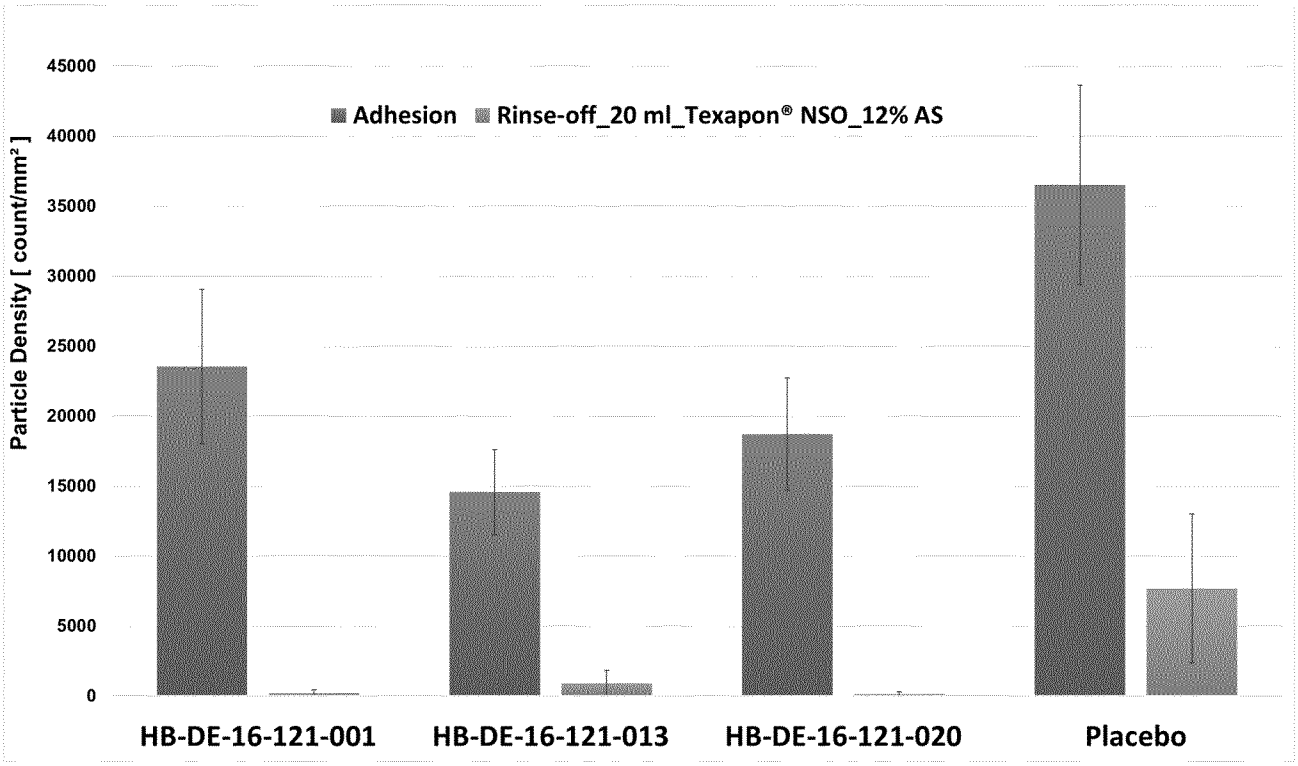
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
Particle Density [count/mm²]
Adhesion
Rinse-off_20 ml_Texapon® NSO_12% AS
HB-DE-16-121-001
HB-DE-16-121-013
HB-DE-16-121-020
Placebo

Fig. 6

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2020/054013

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61Q17/00 A61K8/81
ADD.

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)
A61Q A61K

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)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DATABASE GNPD [Online] MINTEL; 4 November 2009 (2009-11-04), anonymous: "Extra Strong Foam", XP055586466, retrieved from www.gnpd.com Database accession no. 1194588 abstract Product Description -----	1-11
X	DATABASE GNPD [Online] MINTEL; 25 January 2019 (2019-01-25), anonymous: "Triple Detox Shampoo", XP055586511, retrieved from www.gnpd.com Database accession no. 6250571 abstract ----- -/--	1,2,5,6, 8,10

[X] Further documents are listed in the continuation of Box C.

[X] 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
13 March 2020	31/03/2020

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Durand-Oral, Ilknur

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DATABASE GNPD [Online] MINTEL; 19 February 2014 (2014-02-19), anonymous: "Deep Clean Shampoo", XP055586456, retrieved from www.gnpd.com Database accession no. 2323038 abstract -----	1,2,5,6, 10
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A	WO 2018/073971 A1 (OREAL [FR]; KOIKE TORU [JP]; HARADA YASUKO [JP]; YASUDA YOICHI [JP]) 26 April 2018 (2018-04-26) page 1, lines 7-9 page 7, line 12 the whole document -----	1-11
A	WO 2018/215136 A1 (BASF SE [DE]) 29 November 2018 (2018-11-29) cited in the application the whole document -----	1-11

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2020/054013

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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		CN 109803637 A	24-05-2019
		EP 3528782 A1	28-08-2019
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WO 2018215136 A1	29-11-2018	CN 110662581 A	07-01-2020
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		WO 2018215136 A1	29-11-2018