Abstract:

COMPOSITIONS comprising LAMELLAR ELEMENTS AS A VISUAL CUE

Title: SURFACTANT COMPOSITIONS COMPRISING LAMELLAR ELEMENTS AS A VISUAL CUE

Abstract: A packaged, liquid or gel, preferably surfactant-containing formulation, comprising a visual cue, wherein the visual cue comprises a plurality of water-soluble sheet-like elements of dispersed material, preferably formed from modified polyvinyl alcohol.
SURFACTANT COMPOSITIONS COMPRISING LAMELLAR ELEMENTS AS A VISUAL CUE

FIELD OF INVENTION

The present invention relates to liquid or gel surfactant compositions comprising lamellar elements as a visual cue, in particular liquid laundry detergent compositions, processes for making the elements which comprise the visual cue, the elements *per se*, and to the use of said elements to deliver a benefit agent to fabric or to a wash and/or rinse medium during a wash process.

BACKGROUND

Laundry treatment compositions generally contain, in addition to surfactants and optional builders, ingredients which provide a benefit to laundered clothes. Examples of such ingredients include, but are not limited to, perfumes, enzymes, bleaches, shading pigments and dyes and fabric conditioning agents. These materials are also often the most expensive components of the laundry composition and are known as "benefit agents". It can be advantageous to protect (for example by encapsulation) benefit agents when they are included in formulations due to potential incompatibility with other ingredients in the formulation. This incompatibility can cause the formulation to be unstable, or involve unwanted reactivity of the benefit agent with other formulation components and so cause the efficacy of the benefit agent, or other product properties, to be adversely effected.
It has been proposed, for powders, to incorporate these benefit agents in a so-called "visual cue", and/or, where the benefit agent is stable in the composition, to include in the formulation visual cues to indicate that the benefit agent is present. The elements comprising the cue are delivered as part of the product dose and are soluble at some stage of the wash. One such visual cue is the coloured "speckle" which is often incorporated in enzyme containing laundry powders. This is often a particle of sodium carbonate coloured with a suitable dye and does not itself contain the enzyme.

US 2003/1 441 6 1 A discloses particulate laundry detergent compositions especially high bulk density powders and tablets which contain low levels of aloe vera or another herbal extract beneficial to the skin. The herbal extract is preferably present in the form of coloured (preferably green) speckles.

Other visual cues that have been proposed or used have included beads, lamellar shapes such as flat rings and various "flower" shapes.

GB 2358403 A discloses a particulate laundry detergent composition which comprises a major proportion of white or light-coloured particles and a minor proportion of visually contrasting bodies of significantly larger average particle size in at least one dimension than the average particle size of the white or light-coloured particles. Preferably the bodies are of regular shape and uniform size and formed of brightly-coloured material which is preferably highly reflective and/or fluorescent. The visually contrasting bodies provide strong cues to the consumer for example to demonstrate the presence of a beneficial ingredient even if present in very small amounts.

GB 2358404 A discloses a particulate laundry detergent composition which comprises a major proportion of white or light-coloured particles and a minor proportion of visually contrasting particles of material capable of imparting a colour
to the resulting solution when the composition is dissolved in water. The visually contrasting particles may contain a fluorescent material yielding fluorescent wash liquor or may contain a pH indicator which gives a coloured solution at high pH but a colourless or differently coloured solution at lower pH values. The visually contrasting particles and the visual effects in the wash liquor provide cues to the consumer for example to demonstrate the presence of a beneficial ingredient or to indicate that more product should be added.

WO 09/0471 25 A discloses a granular laundry detergent composition comprising at least 5 wt percent surfactant optional builder optional further cleaning ingredients a perfume and 0.01 to 10 wt percent of visual cues wherein the visual cue is shaped like a flower with petals, is coloured to have a naturally occurring petal colour and wherein the perfume is floral in essence.

WO 09/0471 26 A discloses granular detergent composition comprising 0.1 to 10 wt percent soluble coloured lamellar visual cues made from a soluble film each soluble coloured lamellar visual cue having a planar cross-sectional area of from 5mm² to 100 mm² the relative density of the film being from 0.2 to 0.8 kg/l and the film comprising 10 to 90 wt percent surfactant.

Known lamellar elements for use as a cue are typically manufactured by cutting a shape out of a flat sheet of a suitable material.

WO 09/0471 24 A discloses a laundry treatment composition comprising a laundry treatment base and from 0.01 to 10 wt percent of contrastingly coloured concave lamellar film particles which have a planar surface and a planar periphery and wherein: a) the periphery is shaped so that at least one straight line drawn through the planar surface intersects the periphery at more than two places; b) the concave lamellar film particles may be tiled; c) the concave lamellar film particles contrast in colour with the laundry treatment base whereby the concave lamellar
film particles function as a visual cue. In this citation "concave" refers to the edge of the cue.

With laundry liquids, and with other liquid or gel products for personal and household care, the problem of incorporating "sensitive" benefit agents is more serious than that with powder and granular products. For example, bleaches and enzymes may interact, as may enzymes and some thickening or structuring agents. Perfumes, being volatile, may be lost, and where benefit agents, such as perfumes, are encapsulated and provided with a polymeric deposition aid, the deposition aid may be degraded by other components present.

SUMMARY OF INVENTION

We have determined that water-soluble lamellar elements can form a useful visual cue in liquid and gel products, and can optionally be used to protect and/or deliver benefit agents.

Accordingly, the present invention provides a packaged liquid or gel formulation comprising a water-soluble visual cue, wherein the visual cue comprises a plurality of sheet-like elements of dispersed material, and wherein the cue comprises an optional benefit agent.

"Water-soluble", in the content of the present invention, means that the elements forming the cue will dissolve in demineralised water at 25 degrees Celsius.

"Packaged", in the context of the present invention, means that the liquid or gel formulation is stably enclosed within a container for sale and/or transport. Packaged does not include the transient wash-liquors that are formed when the known powder products containing a visual cue are placed in a washing machine.
Preferably, the formulation comprises a pourable liquid or a gel.

"Pourable liquid" as defined herein refers to a liquid having a viscosity of less than about 2000 mPa.s at 25°C and a shear rate of 20 sec\(^{-1}\). In some embodiments, the viscosity of the pourable liquid may be in the range of from about 200 to about 1000 mPa.s at 25°C at a shear rate of 20 sec\(^{-1}\). In some embodiments, the viscosity of the pourable liquid may be in the range of from about 200 to about 500 mPa.s at 25°C at a shear rate of 20 sec\(^{-1}\).

"Gel" as defined herein refers to a transparent or translucent liquid having a viscosity of greater than about 2000 mPa.s at 25°C and at a shear rate of 20 sec\(^{-1}\). In some embodiments, the viscosity of the gel may be in the range of from about 3000 to about 10,000 mPa.s at 25°C at a shear rate of 20 sec\(^{-1}\) and greater than about 5000 mPa.s at 25°C at a shear rate of 0.1 sec\(^{-1}\).

Typically, a low viscosity liquid will contain a structuring agent to assist in keeping the cues in suspension. One type of structuring agent which is especially useful in the compositions of the present invention comprises non-polymeric (except for conventional alkoxylation), crystalline hydroxy-functional materials which can form thread-like structuring systems throughout the liquid matrix when they are crystallized within the matrix in situ. Such materials can be generally characterized as crystalline, hydroxyl-containing fatty acids, fatty esters or fatty waxes. Specific examples of preferred crystalline, hydroxyl-containing structurants include castor oil and its derivatives. Examples include mixtures of hydrogenated castor oil and its hydrolysis products, e.g. hydroxy stearic acid. Specifically preferred are hydrogenated castor oil derivatives such as hydrogenated castor oil and hydrogenated castor wax. Commercially available, castor oil-based, crystalline, hydroxyl-containing structurants include THIXCIN® from Rheox, Inc. (now Elementis). In the alternative, cellulosic materials can be used.
Preferably, the packaging is at least in part transparent. "Transparent" as used herein means that a formulation, or a package according to the invention preferably has a transmittance of more than 25%, more preferably more than 30%, most preferably more than 40%, optimally more than 50% in the visible part of the spectrum (approx. 410-800 nm). Packaging materials with which this invention may be used include, but are not limited to: polypropylene (PP), polyethylene (PE), polycarbonate (PC), polyamides (PA) and/or polyethylene terephthalate (PETE), polyvinylchloride (PVC); and polystyrene (PS) or multilayer combinations.

The packaging may initially contain several doses of the formulation. The invention is also applicable to so-called "unit-dose" formulations which preferably comprise a water-soluble pouch containing a single dose of formulation, but the preferred format of the formulation is one delivered as a plurality of doses of a liquid in a re-closable bottle, multi-dose pouch or other like container.

Preferably the formulation is transparent. By transparent is meant that formulations are such that a sample of "Arial 12 point" printing can be read through a 1 centimetre depth of the formulation (in the absence of the cue). A lamellar cue in a transparent formulation and an at least partly transparent container has a higher visual impact as compared to a cue comprising spheres or other three-dimensional solids consisting of the same volume of material.

A particularly preferred embodiment of the invention provides a rigid, at least partially transparent container, which contains a transparent liquid laundry detergent composition, said composition having dispersed therein a plurality of sheet-like elements which are soluble in water but insoluble in the composition.
A further advantage that the cue provides is that the elements can be used to carry useful benefit agents (for example dyes) which, if not protected from the composition, would significantly change its visual appearance.

Preferably the ratio of the average diameter of the elements (measured flat) to the thickness of the elements is greater than 5:1, preferably greater than 8:1.

Typically, the average diameter of the elements will be in the range 1-10mm, preferably 3-6mm. Elements smaller than 1mm have a low visual impact whereas ones larger than 10mm can lead to irregular dosing. Typically, the average thickness of the elements will be in the range 100-2000 microns, preferably 200-500 microns. As the elements get thicker they become more expensive in formulation terms and less easy to suspend. As the elements become thinner they have less benefit agent carrying capacity and more may be needed to deliver an appropriate level of benefit agent.

A preferred surfactant composition is a liquid or gel laundry detergent composition comprising an anionic surfactant, a nonionic surfactant, or a mixture thereof. Such formulations are intended for use in a multi-stage laundry process which comprises a main-wash step and a rinsing step. Depending on the benefit agent being provided, the cue may be designed to dissolve in the early stages of the wash, or may be carried over into the rinse and subsequently dissolve in the rinse. Thus, a further advantage of the cue is that they can deliver benefit agents which are otherwise incompatible with a formulation's other components. For example, a cue can be used to deliver perfumes into the rinse and reduce the extent to which the perfumes are removed by the surfactants present in the main wash.

It is particularly preferred that, for the embodiments as liquid laundry detergent compositions, the dosage in which the composition is applied is such that the wash liquor produced has a surfactant (other than soap) concentration of less
than 1 g/L, more preferably less than 0.5 g/L. This is a low level of surfactant as compared with conventional wash liquors. It is also preferred that the dosage of a liquid detergent product containing the cue is less than 30ml and preferably less than 25ml. This is a low dosage as compared with conventional doses of laundry compositions. Such low dosage and/or low surfactant products have environmental advantages in that the products require transport of smaller quantities of material and have a reduced usage of surfactants. However in order to persuade the user that the low dosage of product is effective, it is highly advantageous to include a visual cue comprising lamellar elements as this has a significant visual impact even in a low dosage of product.

**DETAILED DESCRIPTION OF THE INVENTION**

All amounts quoted are wt.% of total composition unless otherwise stated.

Except in the operating and comparative examples, or where otherwise explicitly indicated, all numbers in this description indicating amounts or ratios of material or conditions of reaction, physical properties of materials and/or use are to be understood as modified by the word "about".

Elements forming the Cue:

Preferred elements are made from a material having a polymer backbone which is water-soluble prior to being hydrophobically-modified. In the alternative the elements of the cue may be made from a surfactant material which is insoluble in the bulk formulation.

Preferably, the polymer should dissolve in water such that when 0.1 g, preferably 0.3g, more preferably 0.5g of polymer is placed into 1L of demineralised water at
room temperature and shaken at 100 RPM on a rotator shaker at 20 Celsius for 2 hours, then removed from solution by filtering through a sieve or filter paper of appropriate size and dried, then the weight of the polymer removed is less than 95% by weight of that added. "Water-soluble", in the context of the cue means that the cue dissolves in the course of the wash or other use.

By insoluble' used herein in relation to the modified polymer, it is meant that the polymer (and hence the elements of the cu formed from it) should not dissolve in the formulation. Suitable polymers are ones which meet the condition that when 1g/L of the modified polymer is placed into an aqueous surfactant mixture (a mixture of linear alkylbenze sulfonate (LAS) and nonionic surfactant (which is a reaction product of aliphatic CH₂ to CH₅ primary linear alcohols with ethylene oxide (7 EO)) where the surfactant concentration is greater than 5g/l at room temperature and shaken at 100 RPM on a rotator shaker at 293K for 2 hours, then removed from solution by filtering through a sieve or filter paper of appropriate size and dried, then the weight of the modified polymer removed is within 95% by weight of that added.

Preferably, the cue is insoluble in an aqueous surfactant mixture (a mixture of linear alkylbenze sulfonate (LAS) and nonionic surfactant (which is a reaction product of aliphatic CH₂ to CH₅ primary linear alcohols with ethylene oxide (7 EO)) where the surfactant concentration is from 5 to 800g/l, more preferably greater from 5 to 500g/l, for example 50 to 500g/l.

Lower critical solution temperature (LCST) is a characteristic of a material that demonstrates good solubility in aqueous solutions at low temperatures, but separates from solution when the temperature is raised above the LCST (see Feil et al., Macromolecules 1993, 26, 2496-2500). The 'aqueous solutions' where the LCST effect referred to is shown for polymers of the present invention include water and aqueous surfactant solutions (including aqueous surfactant mixtures).
Preferred LCST ranges of the modified polymer are from 5 to 55°C, more 
preferably from 5 to 50°C. In a preferred embodiment of the invention, the 
modified polymer has a LCST in water of greater than 20°C, more preferably 
greater than 30°C.

Typically, the elements comprise a matrix of, for example, the polymer with 
multiple discrete benefit agent entities embedded in the matrix. The discrete 
benefit agent entities embedded in the matrix can be the same or different benefit 
agents. A discrete benefit entity means, for example, a particle comprising 
encapsulated perfume, or a droplet of softening oil.

The elements preferably comprises a matrix material, preferably a hydrophobically 
modified polymer (i), and a fabric benefit agent (ii), in a ratio of from 1:50 to 99:1 
parts by weight, more preferably from 1:40 to 95:1 parts by weight.

Polymers suitable for use as whole or part of the backbone of the hydrophobically 
modified polymer are preferably selected from the group consisting of polyvinyl 
alcohol, polyvinyl acetate, cellulose ethers, polyethylene oxide, starch, 
polyvinylpyrrolidone, polyacrylamide, polyvinyl methyl ether-maleic anhydride, 
polymaleic anhydride, styrene maleic anhydride, hydroxyethylcellulose, 
methylcellulose, polyethylene glycols, carboxymethylcellulose, polyacrylic acid 
salts, alginates, acrylamide copolymers, guar gum, casein, ethylene-maleic 
anhydride resin series, polyethyleneimine, ethyl hydroxyethylcellulose, ethyl 
methylcellulose and hydroxyethyl methylcellulose. Copolymers of 
polymers derived from the aforementioned backbones are also suitable. 
Preferably the polymer has a backbone and side chains comprising hydroxyl 
groups.
The most preferred backbone for the polymer comprises polyvinyl alcohol, and the polymer preferably has an average molecular weight of from 1,000 to 300,000 Daltons, preferably from 2,000 to 100,000 Daltons.

Polyvinyl alcohol (PVOH) can be supplied in a form comprising a certain amount of polyvinyl acetate (PVAc), in that a level of the hydroxyl groups (OH) of the PVOH material is substituted with acetate groups (OCOCH₃). Hydrolysis of PVAc is a common way to make PVOH. Thus the PVOH used herein generally comprise at some PVAc. The PVOH materials (either before or after hydrophobic modification) may comprise from 0.01 to 40% PVAc, preferably from 0.01 to 20%, more preferably from 0.1 to 15%, most preferably 0.5 to 10%, based on the % of the total number of monomers making up the polymer. As used herein, the term PVOH includes PVOH compounds with a PVAc level as previously defined. Particularly preferred materials have a "degree of hydrolysis" of from 85 to 99%.

The preferred polymer is modified to comprise hydrophobic substituents. One preferred method of modification is detailed in example 1.

Preferred hydrophobic dehvatisation groups include those based on parent groups selected from acetals, ketals, esters, fluohnated organic compounds, ethers, alkanes, alkenes and aromatics.

Highly preferred hydrophobic substituents are hydrocarbly groups of C₄ to C₂₂ carbon chain length. These hydrocarbly groups may be alkyl or alkenyl based, which can be straight chain, branched or comprise rings; it may also or alternatively incorporate aromatic moieties.

More preferably the hydrocarbly group has a carbon chain length of from C₄ to C₂₂, even more preferably from C₄ to C₁₅, most preferably from C₄ to C₁₀, for example, from C₄ to C₈.
Hydrocarbyl chain lengths greater than 2 are undesirable as the parent material from which the dehvatising group is obtained reacts poorly or not at all with the polymeric backbone. Hydrocarbyl groups shorter than 4 provide negligible additional hydrophobicity.

Especially preferred materials suitable for use to introduce the hydrophobic derivatisation groups onto the polymer are aldehydes such as butyraldehyde, octyl aldehyde, dodecyl aldehyde, 2-ethyl hexanal, cyclohexane carboxy-aldehyde, citral and 4-aminobutyaldehyde dimethyl acetal.

The hydrophobic material is preferably present in the polymer at a level from 0.1 to 40% by weight, based on the total weight of the polymer, more preferably from 2 to 30%, most preferably from 4 to 15%. In practice, with PVOH materials of relatively high degrees of hydrolysis this means that preferred materials will have 5-15% of the -OH groups of the polymer replaced with the hydrophobe.

Where the polymeric backbone is based on polyvinyl alcohol (PVOH), the hydrophobic derivatisation material is preferably present at a level such that the number ratio of the hydrophobic groups to the free hydroxyl pairs on the backbone is from 1:3 to 1:30, more preferably from 1:4 to 1:20, most preferably 1:7 to 1:15.

Additional modifying groups may be present on the polymer backbone. For instance, amines may be preferably included as a modifying group since this makes the polymer more soluble in response to, for instance, the change in pH and/or ionic strength from the wash to the rinse liquor.

A particularly preferred polymer particle comprises a hydrophobic modified polymer of formula:
wherein the average number ratio of \( z \) to \( x \) is within the range of from 1:200 to 1:6, \( y \) is in the range of from 0.01 to 20% based on the % of total number of monomers making up the polymer \( (x + y + z) \), and \( R \) is a hydrophobic group being an alkyl or alkenyl group having from 3 to 21 carbon atoms, preferably from 3 to 6 carbon atoms. Most preferably \( R \) is \( \text{C}_3\text{H}_7 \).

**Benefit Agents**

While benefit agents are an optional feature of the elements comprising the cue, their presence is highly preferred in at least some of the elements. Various benefit agents can be incorporated into the elements. Any compatible benefit agent which can provide a benefit to a substrate which is treated with the formulation can be used. Preferred benefit agents are in the laundry field, for example fabric benefit agents, and benefit agents which provide a benefit to a laundry wash and/or rinse medium.

Preferred benefit agents include perfumes (both free and encapsulated), enzymes, antifoams, shading dyes and/or pigments, detergency builders, fabric conditioning agents (for example water-insoluble quaternary ammonium materials and/or silicones), sunscreens, antioxidants, reducing agents, sequestrants, colour care additives, density matching polymers, photobleaches, unsaturated oils, emollients and antimicrobial agents.
A preferred embodiment of the invention includes a disintegrant in the elements in addition to the benefit agent.

The elements are particularly suitable for use with particulate benefit agents (for example encapsulated perfumes) or water soluble/dispersible benefit agents.

**Plasticiser and/or Crystallinity Disruptor**

Where the elements of the cue are formed from a polymer the polymer preferably incorporates a plasticiser and/or crystallinity disruptor.

It is to be understood that the term "plasticiser" and phrase "crystallinity disruptor" are interchangeable such that a reference to one is an implicit reference to the other.

The plasticiser influences the way the polymer chains react to external factors such as compression and extensional forces, temperature and mechanical shock by controlling the way that the chains distort/realign as a consequence of there intrusions and their propensity to recover to their former state. The key feature of plasticisers is that they are highly compatible with the polymer cue and are normally hydrophilic in nature. The plasticiser will depend on the nature of the polymer making up the elements of the cue.

Generally, plasticisers suitable for use with PVOH-based polymer cues have -OH groups in common with the \(-\text{CH}_2\text{-CH(OH)-CH}_2\text{-CH(OH)}\)- polymer chain of the polymer particle.

Their mode of functionality is to introduce short chain hydrogen bonding within the hydroxyl groups and this weakens adjacent chain interactions which inhibits swelling of the aggregate polymer mass - the first stage of polymer dissolution.
Water itself is a suitable plasticiser for PVOH polymer particles but other common plasticisers include: polyhydroxy compounds e.g. glycerol, trimethylolpropane, diethylene glycol, thethylene glycol, sorbitol, dipropylene glycol, polyethylene glycol, starches e.g. starch ether, esterified starch, oxidized starch and starches from potato, tapioca and wheat, cellulosics/carbohydrates e.g. amylopectin, dextrin, carboxymethylcellulose and pectin. Amines are particularly preferred plasticisers.

**SURFACANT COMPOSITIONS**

Various preferred surfactants which can be used in formulations according to the invention are listed below. Particularly preferred surfactant-containing formulations are those in the field of home and personal care, especially in the field of laundry, hair and oral care. The fully formulated products preferably comprise from 0.05 to 10 wt.% of the elements comprising the cue as previously described, and from 2 to 70 wt.%, more preferably 10 to 30 wt.% of a surfactant selected from an anionic surfactant, a nonionic surfactant, a cationic surfactant, or a mixture thereof. The elements forming the cue are more preferably present in the surfactant composition at a level of from 0.2 to 10 wt.%, most preferably from 0.2 to 5 wt.%.

**LAUNDRY TREATMENT COMPOSITIONS**

The cue is preferably incorporated in a formulation intended for and suitable for use as a laundry treatment composition. Such a formulation will be packaged in a form indicating that it is intended for such use.

The laundry treatment composition may, for example, take the form of an isotropic liquid, or a surfactant-structured liquid.
The laundry treatment composition may be a detergent composition for use in the main wash; alternatively it may be a composition for addition to a rinse cycle, for example a fabric conditioner.

The inner drum of a washing machine contains relatively small holes which allow water to pass but retain the articles being laundered within the drum. The lamellar nature of the cues confers the advantage, that when the product is introduced directly into the drum of the machine prior to starting the cycle and the cues are not soluble in the wash-liquor in the main wash, that the cues will at least in part be filtered by the drum at the end of the wash and retained into the rinse. As the cues in this mode of action need to be introduced into the drum they can advantageously be delivered as a unit-dose in a suitably water-soluble packaging or delivered by means of a so-called "shuttle". For multi-dose containers it is therefore advantageous that the product as sold comprises a kit including a shuttle to be placed in the drum or bears information as to how a shuttle may be obtained.

PROCESS OF PREPARATION

In one embodiment, the invention provides a process for making the elements of the cues of the invention, the process comprising the steps of:

(a) providing an aqueous mixture of a hydrophobically modified polymer as defined herein, and an optional fabric benefit agent;

(b) drying the aqueous mixture to remove whole or part of the water from the aqueous mixture to form a sheet;

(c) forming elements from the sheet in the desired shape and/or size; and,
(d) optionally, further drying the elements;

(e) dispersing the elements in a liquid or gel surfactant-containing composition, and;

(f) packaging the said dispersion.

Alternative methods for the incorporation of the benefit agent into the cues may be used. For example, while film manufacturers may be capable of working with perfumes, they are unlikely to have the apparatus needed to put materials such as enzymes into films. Therefore an alternative to incorporating the benefit agent into the film by casting is to locate the benefit agent between two layers of pre-existing film which are then pressed together.

- SURFACTANT -


Preferably the surfactants used are saturated.

Suitable nonionic detergent compounds which may be used include, in particular, the reaction products of compounds having a hydrophobic group and a reactive hydrogen atom, for example, aliphatic alcohols, acids, amides or alkyl phenols with alkylene oxides, especially ethylene oxide either alone or with propylene oxide.
Non-limiting examples of nonionic detergent compounds include: \( \text{C}_{12}-\text{C}_{8} \) alkyl ethoxylates, such as, NEODOL® nonionic surfactants from Shell and LUTENSOL® XL and LUTENSOL® XP from BASF; \( \text{C}_{10}-\text{C}_{2} \) alkyl phenol alkoxylates wherein the alkoxylate units are a mixture of ethoxy and propoxy units; \( \text{C}_{2}-\text{C}_{8} \) alcohol and \( \text{C}_{6}-\text{C}_{2} \) alkyl phenol condensates with ethylene oxide/propylene oxide block alkyl polyamine ethoxylates such as PLURONIC® from BASF; \( \text{C}_{4}-\text{C}_{22} \) mid-chain branched alcohols as discussed in US 6,150,322; \( \text{C}_{4}-\text{C}_{22} \) mid-chain branched alkyl alkoxylates, \( \text{BAE}_x \), wherein \( x \) is from 1-30, as discussed in US 6,153,577, US 6,020,303 and US 6,093,856

Specific nonionic detergent compounds are \( \text{C}_{6} \) to \( \text{C}_{22} \) alkyl phenol-ethylene oxide condensates, generally 5 to 25 EO, i.e. 5 to 25 units of ethylene oxide per molecule, and the condensation products of aliphatic \( \text{C}_{8} \) to \( \text{C}_{18} \) primary or secondary linear or branched alcohols with ethylene oxide, generally 5 to 40 EO.

Suitable anionic detergent compounds which may be used are usually water-soluble alkali metal salts of organic carboxylates, sulphates and sulphonates having alkyl radicals containing from about 8 to about 22 carbon atoms, the term alkyl being used to include the alkyl portion of higher acyl radicals. Nonlimiting examples of anionic surfactants useful herein include: \( \text{C}_{9}-\text{C}_{8} \) alkyl benzene sulphonates (LAS); \( \text{C}_{0}-\text{C}_{20} \) primary, branched-chain and random alkyl sulphates (AS); \( \text{C}_{10}-\text{C}_{18} \) secondary (2,3) alkyl sulphates; \( \text{C}_{0}-\text{C}_{8} \) alkyl alkoxy sulphates (\( \text{AE}_x \)S) wherein preferably \( x \) is from 1-30; \( \text{C}_{0}-\text{C}_{8} \) alkyl alkxy carboxylates preferably comprising 1-5 ethoxy units; mid-chain branched alkyl sulphates as discussed in US 6,020,303 and US 6,060,443; mid-chain branched alkyl alkxy sulphates as discussed in US 6,008,181 and US 6,020,303; modified alkylbenzene sulphonate (MLAS) as discussed in WO 99/05243, WO 99/05242, and WO 99/05244; methyl ester sulphonate (MES); and alpha-olefin sulfonate (AOS).
The preferred anionic detergent compounds are sodium C\textsubscript{6} to C\textsubscript{10} alkyl benzene sulphonates and sodium C\textsubscript{2} to C\textsubscript{8} alkyl sulphates. Also applicable are surfactants such as those described in EP-A-328 177 (Unilever), which show resistance to salting-out, the alkyl polyglycoside surfactants described in EP-A-070 074, and alkyl monoglycosides.

Preferred surfactant systems are mixtures of anionic with nonionic detergent active materials, in particular the groups and examples of anionic and nonionic surfactants pointed out in EP-A-346 995 (Unilever). Especially preferred is surfactant system that is a mixture of an alkali metal salt of a C\textsubscript{6} to C\textsubscript{8} primary alcohol sulphate together with a C\textsubscript{2} to C\textsubscript{5} primary alcohol 3 to 7 EO ethoxylate.

The nonionic detergent is preferably present in amounts greater than 10\%, e.g. 25 to 90 wt.% of the surfactant system. Anionic surfactants can be present for example in amounts in the range from about 5 wt.% to about 40 wt.% of the surfactant system.

Methyl ether based surfactants can be used instead of the simple alkyl based surfactants described above.

As noted above, the elements forming the cue may be insoluble simply by virtue of the presence of surfactant reducing the concentration of water in the formulation to the point where the cue becomes insoluble, or, more preferably, the surfactant may interact with the cue to prevent the elements dissolving.

**CATIONIC FABRIC SOFTENING COMPOUND**

The cationic surfactant may be a cationic fabric softening compound. Preferred cationic fabric softening compounds are water insoluble quaternary ammonium material which comprises a compound having two C\textsubscript{2}-is alkyl or alkenyl groups
connected to the nitrogen head group via at least one ester link. It is more preferred if the quaternary ammonium material has two or more ester links.

**BUILDERS OR COMPLEXING AGENTS**

The composition may optionally comprise from 0 to 50 wt.% of a detergency builder. Preferably builder is present at a level of from 1 to 40 wt.%.

Builder materials may be selected from 1) calcium sequestrant materials, 2) precipitating materials, 3) calcium ion-exchange materials and 4) mixtures thereof.

It is preferred that when an insoluble inorganic builder, e.g., zeolite is used, the size is in the range 0.1 to 10 microns (as measured by The Mastersizer 2000 particle size analyzer using laser diffraction ex Malvern™).

Examples of calcium sequestrant builder materials include alkali metal polyphosphates, such as sodium thpolyphosphate and organic sequestrants, such as ethylene diamine tetra-acetic acid.

Examples of precipitating builder materials include sodium orthophosphate and sodium carbonate.

Examples of calcium ion-exchange builder materials include the various types of water-insoluble crystalline or amorphous aluminosilicates, of which zeolites are the best known representatives, e.g. zeolite A, zeolite B (also known as zeolite P), zeolite C, zeolite X, zeolite Y and also the zeolite P-type as described in EP-A-0,384,070.

The composition may also contain 0-50 wt.% of a builder or complexing agent such as ethylenediaminetetraacetic acid, diethylenemamine-pentaacetic acid,
alkyl- or alkenylsuccinic acid, nitrilotriacetic acid or the other builders mentioned below. Many builders are also bleach-stabilising agents by virtue of their ability to complex metal ions.

5 Zeolite and carbonate (carbonate (including bicarbonate and sesquicarbonate) are preferred builders.

The composition may contain as builder a crystalline aluminosilicate, preferably an alkali metal aluminosilicate, more preferably a sodium aluminosilicate. This is typically present at a level of less than 15 wt.%. Aluminosilicates are materials having the general formula:

\[ 0.8-1.5 \text{M}_2\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 0.8-6 \text{SiO}_2 \]

where M is a monovalent cation, preferably sodium. These materials contain some bound water and are required to have a calcium ion exchange capacity of at least 50 mg CaO/g. The preferred sodium aluminosilicates contain 1.5-3.5 SiO\(_2\) units in the formula above. They can be prepared readily by reaction between sodium silicate and sodium aluminate, as amply described in the literature. The ratio of surfactants to aluminosilicate (where present) is preferably greater than 5:2, more preferably greater than 3:1.

Alternatively, or additionally to the aluminosilicate builders, phosphate builders may be used. In this art the term 'phosphate' embraces diphosphate, triphosphate, and phosphonate species. Other forms of builder include silicates, such as soluble silicates, metasilicates, layered silicates (e.g. SKS-6 from Hoechst).
Preferably the laundry detergent formulation is a non-phosphate built or largely un-built laundry detergent formulation, i.e., contains less than 1 wt.% of phosphate.

For transparent liquid or gel compositions non-particulate, water-soluble builders are preferred. While some insoluble builder may be used excessive use of builder will render the formulation cloudy or even opaque.

SHADING AGENT

The formulation preferably comprises a blue or violet shading agent in the range from 0.0001 to 0.01 wt.%. The shading agents reduce the perception of damage to many coloured garments and increase the perception of whiteness of white garments.

The shading agents are preferably selected from blue and violet dyes of the solvent disperse basic, direct and acid type listed in the colour index (Society of Dyers and Colourists and American Association of Textile Chemists and Colourists 2002).

Preferably a direct violet or direct blue dyes is present. Preferably the dyes are bis-azo, tris-azo dyes or triphenidioxazine dye. The carcinogenic benzidine based dyes are not preferred.

Bis-azo copper containing dyes such as direct violet 66 may be used.

The most preferred bis-azo dyes have the following structure:
wherein:

10 ring D and E may be independently naphthyl or phenyl as shown;

R_i is selected from: hydrogen and C_1-C_4-alkyl, preferably hydrogen;

R_2 is selected from: hydrogen, C_1-C_4-alkyl, substituted or unsubstituted phenyl
and substituted or unsubstituted naphthyl, preferably phenyl;

R_3 and R_4 are independently selected from: hydrogen and C_1-C_4-alkyl, preferably hydrogen or methyl;

X and Y are independently selected from: hydrogen, C_1-C_4-alkyl and C_1-C_4-alkoxy; preferably the dye has X = methyl; and, Y = methoxy and n is 0, 1 or 2, preferably 1 or 2.

20 Preferred bis-azo dyes are direct violet 7, direct violet 9, direct violet 11, direct violet 26, direct violet 31, direct violet 35, direct violet 40, direct violet 41, direct violet 51, and direct violet 99.
Preferred solvent and disperse dyes, are selected from, mono-azo or anthraquinone dyes, most preferably, solvent violet 13, disperse violet 27 disperse violet 26, disperse violet 28, disperse violet 63 and disperse violet 77.

A preferred pigment is pigment violet 23.

Examples of suitable organic dyes are disclosed in WO2008/01 7570. Preferred dyes also include Acid Violet 50 and Acid Blue 98. Polymeric shading/hueing agents are also preferred.

As noted above, the incorporation of the shading or hueing agent in the cue can be used to prevent the agent imparting an unwanted colour to the bulk of the product and/or prevent unwanted interaction of the shading agent with other formulation components and/or ensure that there is carry-over of the agent into the rinse to improve deposition.

ENZYMES

The composition preferably comprises one or more enzymes which provide cleaning performance and/or fabric care benefits. Examples of suitable enzymes include, but are not limited to, hemicellulases, peroxidases, proteases, cellulases, xylanases, lipases, phospholipases, esterases, cutinases, pectinases, mannanases, pectate lyases, keratinases, reductases, oxidases, phenoloxidases, lipoxygenases, ligninases, pullulanases, tannases, pentosanases, malanases, arabinosidases, hyaluronidase, chondroitinase, laccase, and amylases, or mixtures thereof.

A typical combination is an enzyme cocktail that may comprise, for example, a protease and lipase in conjunction with amylase and/or cellulase. When present in a cleaning composition, the aforementioned enzymes may be present at levels
from about 0.00001 wt.% to about 2 wt.%, from about 0.0001 wt.% to about 1 wt.% or even from about 0.001 wt.% to about 0.5 wt.% enzyme protein by weight of the composition.

Preferred enzymes are cellulase, lipase, protease and mixtures including one or more of these.

As noted above, enzymes may be incorporated in the lamellar elements of the cue to prevent unwanted interaction of the enzyme with other formulation components, such as the thickening or structuring system. The cellulose based structuring system will generally have a detrimental interaction with cellulase, whereas castor oil based structuring systems will be sensitive to lipase. Bleaches are in general detrimental to enzyme stability and protease can show negative interactions with other enzymes.

**FLUORESCENT AGENT**

The composition preferably comprises a fluorescent agent (optical brightener). Fluorescent agents are well known and many such fluorescent agents are available commercially. Usually, these fluorescent agents are supplied and used in the form of their alkali metal salts, for example, the sodium salts. The total amount of the fluorescent agent or agents used in the composition is generally from 0.005 to 2 wt.%, more preferably 0.01 to 0.1 wt.%. Preferred classes of fluorescer are: Di-styryl biphenyl compounds, e.g. Tinopal (Trade Mark) CBS-X, Di-amine stilbene di-sulphonic acid compounds, e.g. Tinopal DMS pure Xtra and Blankophor (Trade Mark) HRH, and Pyrazoline compounds, e.g. Blankophor SN. Preferred fluorescers are: sodium 2-(4-styryl-3-sulfophenyl)-2H-naphthol[1,2-d]trazole, disodium 4,4′-bis[[4-anilino-6-(N-methyl-N-2-hydroxyethyl) amino 1,3,5-thazin-2-yl)]amino]stilbene-2-2′ disulfonate, disodium 4,4′-bis[[4-anilino-6-
morpholino-1,3,5-triazin-2-yl)amino]stilbene-2-2' disulfonate, and disodium 4,4'-bis(2-sulfoslyryl)biphenyl.

As with shading agents, the incorporation of the fluorescer into the cue can be used both to protect the fluorescer from unwanted interaction with other components and/or to ensure that there is carry-over of the agent into the rinse to improve deposition.

PERFUME

Preferably the composition comprises a perfume. The perfume (excluding any encapsulation material or carrier) is preferably in the range from 0.001 to 3 wt.%, most preferably 0.1 to 2.5 wt.% on product. Many suitable examples of perfumes are provided in the CTFA (Cosmetic, Toiletry and Fragrance Association) 1992 International Buyers Guide, published by CFTA Publications and OPD 1993 Chemicals Buyers Directory 80th Annual Edition, published by Schnell Publishing Co.

It is commonplace for a plurality of perfume components to be present in a formulation. In the compositions of the present invention it is envisaged that there will be four or more, preferably five or more, more preferably six or more or even seven or more different perfume components.

In perfume mixtures preferably 15 to 25 wt.% are top notes. Top notes are defined by Poucher (Journal of the Society of Cosmetic Chemists 6(2):80 [1955]). Preferred top-notes are selected from citrus oils, linalool, linalyl acetate, lavender, dihydromyrcenol, rose oxide and cis-3-hexanol.

Perfume and particularly top notes may be used to cue fabric care benefits.
As with other benefit agents, the incorporation of perfume into the cue can be used both to protect the perfume from unwanted interaction with other components and/or loss by evaporation and/or to ensure that there is carry-over of the agent into the rinse to improve deposition.

The cue is a particularly effective way of delivering encapsulated perfumes as the separation of the encapsulated perfume (whether by sedimentation or flotation) is prevented by incorporation of the perfume within the cue. In addition, for encapsulates (or other carriers) which are prone to leakage, incorporation within the elements of a cue assists in retaining the perfume (or other benefit agent) within the encapsulate or other carrier.

Preferred levels of encapsulated perfume in the film used to make the elements of the cue are such that the weight ratio of film to encapsulate are such that more than 10%wt, preferably more than 25%wt of the of the cue is the perfume encapsulate.

**POLYMERs**

The composition may comprise one or more polymers in addition to any polymer present as the matrix of the elements forming the cue. Examples are carboxymethylcellulose, poly(ethylene glycol), polyvinyl alcohol), polycarboxylates such as polyacrylates, maleic/acrylic acid copolymers and lauryl methacrylate/ acrylic acid copolymers.

Polymers present to prevent dye deposition, for example poly(vinylpyrrolidone), poly(vinylpyrrolidone-N-oxide), and poly(vinylimidazole), are preferably absent from the formulation when a shading dye is present.
HYDROTROPE

For compositions in the form of a liquid, it is useful to include a hydrotrope, which prevents liquid crystal formation. Advantageously, the addition of the hydrotrope improves the clarity/transparency of the composition and assists in the perception of the cue.

Suitable hydrotropes include but are not limited to propylene glycol, ethanol, urea, salts of benzene sulphonate, toluene sulphonate, xylene sulphonate or cumene sulphonate. Suitable salts include but are not limited to sodium, potassium, ammonium, monoethanolamine, thethenolamine. Preferably, the hydrotrope is selected from the group consisting of propylene glycol, xylene sulfonate, ethanol, and urea to provide optimum performance. The amount of the hydrotrope is generally in the range of from 0 to 30%, preferably from 0.5 to 30%, more preferably from 0.5 to 30%, most preferably from 1 to 15%.

BLEACH PRECURSORS

Bleach precursors (e.g. tetra-acetylene diamine and sodium percarbonate) cannot be added directly to a liquid formulation as the resulting peracid species would not be stable. If the laundry treatment composition takes a liquid form, then it is generally preferred that the composition does not contain a peroxygen bleach, e.g., sodium percarbonate, sodium perborate, and peracid.

By encapsulating precursors within the elements forming the cue the generation of peracid can be prevented until the composition is introduced into the main wash.

OTHER BENEFIT AGENTS:

Preferred benefit agents for incorporation in the cues are perfume (whether free and/or encapsulated), pro-fragrance, enzyme, antifoam, fluoresces bleaching
agents and precursors thereof (including photo-bleach), shading dye and/or pigment, fabric conditioning agents (for example water-insoluble quaternary ammonium materials and/or silicones), lubricant, soil-release polymer, sunscreen, antioxidant, reducing agents, sequestrant, colour care additives, unsaturated oil, emollients and anti-microbial agents. Mixtures of two or more of these may be employed.

Benefit agents may be encapsulated or adsorbed onto a carrier prior to incorporation into the elements of the cue. Suitable and preferred encapsulating agents include polymers formed by addition or condensation polymerisation and mixtures of the same. Core-shell encapsulates are particularly preferred.

Benefit agents with an associated delivery aid are also preferred. Suitable delivery aids include fabric substantive polymers, including polysaccharides, polyesters and polyamides which are attached to a particle comprising the benefit agent. Incorporation of such particles with the elements of the cue can protect the deposition aid from, for example, enzymes, bleach and other species that could negatively influence the deposition aid.

As noted above with reference to perfume, the incorporation of the benefit agent into a lamellar cue which remains undissolved in the packaged product can prevent unwanted release and/or activation of the benefit agent and this can both lower formulation costs and improve benefit agent delivery and/or efficacy. This is particularly true when the benefit agent is borne on a carrier or is encapsulated.

It is particularly preferred to include a benefit agent selected from, perfume and or pro-fragrance, (particularly encapsulated or carrier-adsorbed perfume and/or pro-fragrance), bleaching agents and precursors thereof (including photo-bleaches), enzyme, fluoresces anti-microbial agents and any combination of two or more thereof.
FULLY FORMULATED PRODUCTS:

A particularly preferred embodiment of the invention comprises a packaged, surfactant-containing formulation comprising a water-soluble visual cue, wherein:

5  
   a) the surfactant-containing composition is a pourable, liquid, detergent composition; comprising:

   i) from 0.05 to 10 wt.% of elements forming a visual cue, and,

   ii) from 2 to 70 wt.%, preferably 10 to 30 wt.% of a surfactant selected from an anionic surfactant, a nonionic surfactant, a cationic surfactant, or a mixture thereof;

10  
   b) the package is at least in part transparent;

15  
   c) the visual cue comprises a plurality of sheet-like elements of dispersed material, wherein:

20  
   i) the ratio of the average diameter of the elements, measured flat, to the thickness of the elements is greater than 5:1, preferably greater than 8:1;

25  
   ii) the average diameter of the elements is in the range 1-10 mm, preferably 3-6 mm;

30  
   iii) the average thickness of the elements is in the range 100-2000 microns, preferably 200-500 microns; and;
iv) optionally, the elements of the visual cue comprise a benefit agent, more preferably a benefit agent selected from perfume and/or pro-fragrance, most preferably an encapsulated or carrier-adsorbed perfume and/or pro-fragrance.

Preferred elements are of a uniform appearance rather than being randomly formed from a larger sheet. Several populations of elements may however be present with differing characteristics of appearance such as shape and/or colour. It is preferable that there are fewer than ten, and more preferably less than five such populations present.

A preferred shape of the elements is one which is rotationally symmetrical through at least one twelfth of a rotation about an axis along the thin dimension of the cue. The symmetry is preferably such that the cue is symmetrical after a rotation though one sixth or one fifth of a rotation. Particularly preferred shapes include flower-like shapes and stars with four, five or six points. These preferred shapes assist in improving the visibility and/or the filtration of the cue. An alternative is that the cue is formed from disks or rings, or are quadrilaterals (such as rhombi). One cues may be formed from elements which have bilateral symmetry (such as cardioids and similar shapes). Specific populations of regular shapes rather than random shapes are a more positive indicator that the cue is intended to have some specific function.

Particularly preferred cues are selected such that the elements are also indicia found on flags (such as leafs, stars or crescents) and the colour of the cues and the bulk formulation can be selected to reflect this. Therefore cues may be white or yellow stars in a blue product.

Surprisingly, when the lamellar elements are present in a product containing a visibly coloured dye, it produces an optical illusion that the product is less
intensely coloured than is perceived when the cue is absent. This is an unexplained and unpredicted effect, but has the advantage that the dye which is typically present in surfactant-containing products to mask any off-colour of the base formulation, or dyes present as fabric shading agents, appears less intense.

In order that the invention may be further and better understood it will be described below with reference to particular examples.

**EXAMPLES**

**Example 1a: Preparation of the Hydrophobically Modified Polymeric Material:**

A 10wt% solution of polyvinyl alcohol (PVOH) in water was prepared by placing 100g PVOH (Mowiol 20-98 (trade name), ex Kuraray Specialities) and 900g demineralised water into a flask and heating to 70°C. To this, 10ml of hydrochloric acid (36% aqueous solution) was added to catalyse the reaction and then butyraldehyde was added. The mixture was then stirred at 70°C for 5 hours under an inert atmosphere, after which time the heating was stopped and agitation continued for a further 20 hours at room temperature. The reaction mixture was then brought to a pH of 7 using a sodium hydroxide solution.

The resulting solution was precipitated into acetone to yield the acetalised PVOH polymer and washed repeatedly with acetone (500ml) and then water (50ml). It was then dried under vacuum at 70°C overnight to yield a white polymer.
**Example 2: Preparation of Cue Elements:**

A solution comprising 3 parts of the hydrophobically modified PVOH prepared according to Example 1, in solution (15% active) was mixed with 7 parts of slurry containing an encapsulated perfume (31% perfume loading). The solution was used to form a film by pouring it into a Teflon™ film lined polystyrene bioassay tray. The resulting film was dried. Five pointed, star-shaped elements were cut from the film using a hand punch.

**Example 3: Preparation of Product:**

A formulation consisting of 12 x 35g dose was prepared by mixing the liquid base with 110-120 of the cues. This will deliver 2% perfume for each dose. A suitable base liquid formulation comprises 32% water, 36% surfactant (6.87% NI 7EO, 13.1 1% LAS, 10.23% SLES 3EO, 5.78% FA).

**Example 4: Deposition of Perfume:**

Washing studies (40°C, cotton programme, Miele 1714 FLA) were done on cotton samples with a 35g dose of formulation either comprising encapsulated perfume as such (at 2%wt on product) or a cue containing the encapsulates. The contents of the machine were 3kg clean ballast wash load and 16 terry towelling cotton monitors. The base liquid formulation comprised "Surf Small and Mighty"™.

"Encapsulates A" are melamine-based "diffusive" encapsulate which retain perfume rather poorly. Encapsulates B are melamine-based "hermetic" encapsulates which retain perfume well.
The table below shows the averaged scores obtained by a trained panel of perfume assessors before and after rubbing a sample of washed cloth. This is a model of the release of perfume when a garment is worn after storage. Higher scores represent a stronger perfume perception.

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<th>Sample</th>
<th>Before</th>
<th>After</th>
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<tr>
<td>Encapsulates A alone (comparative)</td>
<td>0.21</td>
<td>0.33</td>
</tr>
<tr>
<td><strong>Encapsulates A in stars</strong></td>
<td><strong>0.17</strong></td>
<td><strong>0.41</strong></td>
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<tr>
<td>Encapsulates B alone (comparative)</td>
<td>0.75</td>
<td>1.46</td>
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<td><strong>Encapsulates B in stars</strong></td>
<td><strong>0.68</strong></td>
<td><strong>2.46</strong></td>
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It can be seen that in both cases the benefit agent that had been incorporated in the star showed a better performance after rubbing.
CLAIMS

1. A packaged liquid or gel formulation comprising a water-soluble visual cue, wherein the visual cue comprises a plurality of sheet-like elements of dispersed material, and wherein the cue comprises an optional benefit agent.

2. A packaged formulation according to claim one which comprises a pourable liquid.

3. A packaged formulation according to claim two which has a viscosity at 20 sec⁻¹ of from 100 mPa.s to 2000 mPa.s.

4. A packaged formulation according to any preceding claim wherein the packaging is at least in part transparent.

5. A packaged formulation according to any preceding claim wherein the ratio of the average diameter of the elements, measured flat, to the thickness of the elements is greater than 5:1, preferably greater than 8:1.

6. A packaged formulation according to any preceding claim wherein the average diameter of the elements is in the range 1-10mm, preferably 3-6mm.

7. A packaged formulation according to any preceding claim wherein the average thickness of the elements is in the range 100-2000 microns, preferably 200-500 microns.

8. A packaged formulation according to any preceding claim wherein the elements are "star" or "flower"-shaped.
9. A packaged formulation according to any preceding claim wherein the elements comprise a hydrophobically modified polymer.

10. A packaged formulation according to claim 9 wherein the elements comprise the hydrophobically modified polymer (i), and a fabric benefit agent (ii), in a ratio of from 1:50 to 99:1 parts by weight, preferably from 1:40 to 95:1 parts by weight.

11. A packaged formulation according to any of claims 9-10, wherein the elements comprise a hydrophobically modified polymer having a backbone selected from the group consisting of polyvinyl alcohol, polyvinyl acetate, cellulose ethers, polyethylene oxide, starch, polyvinylpyrrolidone, polyacrylamide, polyvinyl methyl ether-maleic anhydride, polymaleic anhydride, styrene maleic anhydride, hydroxyethylcellulose, methylcellulose, polyethylene glycols, carboxymethylcellulose, polyacrylic acid salts, alginates, acrylamide copolymers, guar gum, casein, ethylene-maleic anhydride resin series, polyethyleneimine, ethyl hydroxyethylcellulose, ethyl methylcellulose, hydroxyethyl methylcellulose and copolymers of the monomers thereof.

12. A packaged formulation according to any preceding claim wherein the elements comprise a matrix material (i), and a fabric benefit agent (ii), in a ratio of from 1:50 to 99:1 parts by weight, preferably from 1:40 to 95:1 parts by weight.

13. A packaged formulation according to any preceding claim which comprises from 0.05 to 10 wt.% of the elements and from 2 to 70 wt.%, preferably 10 to 30 wt.% of a surfactant.
14. A packaged formulation according to any preceding claim wherein the elements comprise a benefit agent selected from, free perfume, encapsulated perfume, pro-fragrance, bleaching agents and precursors thereof, enzyme, fluorescer, anti-microbial agents and any combination of two or more thereof.

15. A process for making a packaged, formulation according to any of claims 1-14 comprising a water-soluble visual cue and a surfactant, which comprise the steps of:

(a) providing an aqueous mixture of a hydrophobically modified polymer as defined herein, and a fabric benefit agent;

(b) drying the aqueous mixture to remove whole or part of the water from the aqueous mixture to form a sheet;

(c) forming elements from the sheet in the desired shape and/or size; and,

(d) optionally, further drying the elements;

(e) dispersing the elements in a liquid or gel surfactant-containing composition, and;

(f) packaging the said dispersion.

16. A packaged surfactant-containing formulation according to claim 1, comprising a water-soluble visual cue, wherein:
a) the surfactant-containing formulation is a pourable, liquid, detergent composition; comprising:

i) from 0.05 to 10 wt.% of elements forming a visual cue, and,

ii) from 2 to 70 wt.%, preferably 10 to 30 wt.% of a surfactant selected from an anionic surfactant, a nonionic surfactant, a cationic surfactant, or a mixture thereof;

b) the package is at least in part transparent;

c) the visual cue comprises a plurality of sheet-like elements of dispersed material, wherein:

i) the ratio of the average diameter of the elements, measured flat, to the thickness of the elements is greater than 5:1, preferably greater than 8:1;

ii) the average diameter of the elements is in the range 1-10mm, preferably 3-6mm;

iii) the average thickness of the elements is in the range 100-2000 microns, preferably 200-500 microns; and;

iv) optionally, the elements of the visual cue comprise a benefit agent, more preferably a benefit agent selected from perfume and/or pro-fragrance, most preferably an encapsulated or carrier-adsorbed perfume and/or pro-fragrance.
**INTERNATIONAL SEARCH REPORT**

**International application No**

PCT/EP2010/054894

**A. CLASSIFICATION OF SUBJECT MATTER**

INV. C11D17/00 C11D17/04

**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)

C11D

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 practical, search terms used)

EPO-Internal, WPI Data

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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Further documents are listed in the continuation of Box C

SEE patent family annex

Date of the actual completion of the international search

14 July 2010

Date of mailing of the international search report

21/07/2010

Name and mailing address of the ISA

European Patent Office, P B 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tél (+31-70) 340-2040, Fax (+31-70) 340-3016

Authorized officer

Richards, Michael
### Category

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