

Description**BACKGROUND OF THE INVENTION**

The production of devices capable of emitting light through chemical means is well known in the art. Chemiluminescent lightsticks, for example, are taught by U.S. Patent 3539794. Other configurations of devices for emitting chemical light have also been the subject of many U.S. patents, see, for example U.S. Patent Nos. 3350553; 3729425 and 3893938. A recent patent, U.S. Patent No. 4635166 has also issued directed to an emergency light and containing a reflector.

- 10 The devices of the prior art, while satisfying some specific needs, have generally not received widespread commercial acceptance because they fail in one or more critical areas. The devices of U.S. 3350553, for example, must be activated by air which requires some means for accessing the air, which means are subject to failure such as by leaking etc. Other devices have failed commercially because of their inability to emit light over the required period of time while others emit poor quantities of light, do not
- 15 concentrate the light in a centralized area, require too much chemical to be commercially attractive from an economic standpoint, do not emit light over a uniform area, etc.

Accordingly, industry is continually on the lookout for chemiluminescent devices which overcome most, if not all, of the deficiencies mentioned above, which devices are economically attractive to the consumer and are relatively simply manufactured by the manufacturer.

SUMMARY OF THE INVENTION

- There is disclosed herein a novel chemiluminescent device which overcomes many of the deficiencies of the prior art disclosed devices. The device is easily manufactured, enables the use of quantities of chemicals which are economically attractive to the manufacturer and therefore also to the consumer while still resulting in a high light output over a period of time, which output may be adjusted by their specific selection, emits light in a uniform manner and otherwise constitutes a desirable, attractive, aesthetic article of manufacture.

DESCRIPTION OF THE INVENTION**INCLUDING PREFERRED EMBODIMENTS**

- The instant invention is directed to a chemiluminescent device comprising, in sequential relationship,
- 35 A. a first polymeric sheet, being transparent or translucent and having a shaped cavity formed therein, said cavity capable of receiving a liquid-absorbent article,
- B. a non-woven, liquid-absorbent article made from a polyolefin or a polyester or glass fiber, said article being of substantially the same shape as said cavity,
- 40 C. a first sealed receptacle containing a first liquid component of a chemiluminescent composition capable of providing chemiluminescent light when mixed with a second component,
- D. a second liquid component of a chemiluminescent composition outside said first sealed receptacle, and
- E. a second polymeric sheet sealed around its periphery to the periphery of said first polymeric sheet, said liquid - absorbent article:
- 45 i) being capable of absorbing and retaining substantially the complete volume of said chemiluminescent composition to thereby result in substantially complete saturation of the article;
- ii) being capable of allowing mixing of said first and second components of said composition after being absorbed thereby;
- iii) having a uniform density across its widest surface;
- 50 iv) being inert with regard to said composition and said first and second components;
- v) being substantially non-deformable in use in said device;
- vi) being capable of substantially instantaneous absorption of said first and second components, alone or when admixed, and
- vii) being opaque when substantially completely saturated with said chemiluminescent composition.
- 55 Considering the elements of the device of the instant invention in the sequence presented above, the first polymeric sheet is flexible, transparent or translucent and chemically inert. It has a shape retaining memory and toughness which resists bursting from internal or external pressure and discourages puncture. It is produced from a polyolefin, preferably polyethylene, polypropylene, or copolymers thereof and can

range from about 0.025 to about 0.127 cm (.01 to about .05 inch) in thickness, preferably from about 0.05 to about 0.1 cm (.02 to about .04 inch). A circumferentially raised rib may be incorporated into its exterior face around the periphery of the shaped cavity to help prevent accidental activation of the device. The sheet may be either injection molded or thermoformed. The cavity can be in any desired shape such as a geometric shape, i.e., square, rectangle, circle, cross, etc., or an arrow, letter, heart, number, etc. Indicia may be printed or otherwise imparted to either surface of the first polymeric sheet.

The non-woven, liquid-absorbent article is shaped to match the contour of the cavity in the first polymeric sheet. It is preferably die cut. The specific thickness, density etc. of the article is governed by the seven (7) critical features presented more fully below, not the least of which is the volume of the chemiluminescent composition employed. The article is chemically inert and may be somewhat compressible. The article is made from a polyolefin or a polyester or glass fibers. The polyolefin may be polyethylene, polypropylene etc., preferably polyethylene, which is formed into a non-woven mat by compression or is formed into a porous condition such as is taught in U.S. Patent Nos. 3729425 or 4384589, incorporated herein by reference. The porous polyethylenes are sintered, porous systems having a controlled porosity and having omni-directional, interconnecting pores. These products are available under the trade designation "Porex"® porous plastics and "Porous Poly"® from Porex Technologies, Corp. Fairlawn, New Jersey. In general, the pore size may vary from 1 to 200 microns, preferably 10-50 microns.

The polyester may be, for example, polyethylene glycol terephthalate, the preferred polyester; polybutylene glycol terephthalate; poly 1,4-cyclohexanedimethanol terephthalate and the like and may be formed into the non-woven article, for example, by compacting fibers thereof as is known in the art.

The glass fibers may be manufactured into the desired non-woven structure also as is known in the art. These non-woven glass structures are commercially produced by Whatman, Inc. of Clifton, N.J. and Gelman Sciences, Inc., Ann Arbor, Michigan and are preferably employed in the novel devices of the present invention in those instances where a high volume of light is desired over a short period of time.

The seven (7) critical criteria of the non-woven article, as mentioned above, are essential to the production of a satisfactory functional device. The seven criteria are as follows:

1. The article must be capable of absorbing and retaining substantially the complete volume of the chemiluminescent composition to thereby result in substantially complete saturation of the article. If the article cannot absorb the volume of the chemiluminescent composition, light will be emitted from the composition not absorbed, thereby resulting in the device emitting light from every surface thereof rather than concentrating the light in the liquid absorbent article and emitting it primarily from the cavity surface of the first sheet. Furthermore, if the article is not substantially completely saturated by the chemiluminescent composition, the emitted light will not be uniform across the cavity surface of the device because the composition will be concentrated in different locations across the surface of the liquid-absorbent article.

2) The liquid-absorbent article must further be capable of allowing substantially complete mixing of the components of the chemiluminescent composition once they are absorbed because, in the absence of such mixing, only localized emission of light will occur across the surface of the device. This requirement is vital in that, oftentimes, one of the components is absorbed into the article upon manufacture of the device, the other component being contained in a rupturable receptacle. Thus, rupture of the receptacle allows the released component to contact the article containing the already absorbed component and unless complete mixing of the two components is effected, poor light emission results. This limitation is less critical when the components of the chemiluminescent composition are substantially completely admixed before contact with the liquid-absorbent article, as discussed below.

3) The liquid-absorbent article must have a uniform density across its face. Such uniform density contributes to the satisfactory conformance of requirements, 1) and 2) above, since, unless the density is uniform, uniform absorbance, saturation and mixing is improbable.

4) The liquid-absorbent article must not be chemically reactive with the chemiluminescent composition and its components to the extent that the light formation is retarded since reaction between the components must be effected before light is emitted. Thus, if the liquid-absorbent article deleteriously chemically or physically interferes with the reaction of the components, the quantity, quality and intensity of the resultant chemiluminescent light can be seriously retarded or negated altogether.

5) If the liquid-absorbent article is deformable, i.e., loses its shape or continuity in the device, the light emitted will again be concentrated in that area of the cavity to which the deformed article moves upon activation during use of the device. Thus, the liquid absorbent article must be non-deformable, although it may be compressible in that it compresses when the device is subject to pressures such as required to rupture the receptacle, however, the article must remain in place during use of the device and also retain its shape in conformity to the shaped cavity.

6) The liquid-absorbent article must be capable of substantially instantaneous absorption of the chemiluminescent composition and or its components in order that the light created be centralized in the article and not in other void spaces in the device or even inside the ruptured receptacle. It is essential that all the liquid involved be positioned in the liquid-absorbing article and that the remaining interior of the device be as dry and light-free as possible. Rapid absorption creates such a result.

7) The material from which the liquid-absorbent article is made must be substantially opaque once it is completely wetted with the absorbed liquid because, if translucent, the light emitted is materially affected, especially from an aesthetic appearance, by the revelation of the debris, i.e., broken ampoules, ruptured receptacles, distributor plate, etc., behind the light. The result is areas of lighter and darker consistency upon visual observation of the light emitting device.

The first sealed, breakable or rupturable receptacle contains the first liquid component of the chemiluminescent composition. The receptacle is preferably composed of glass, i.e., may comprise a glass ampoule, however, the receptacle may also constitute a pouch. The main function of the receptacle is to segregate the chemiluminescent liquid contents therein from the second chemiluminescent liquid component, however, protection of the contained component from moisture, oxygen etc., and/or actinic light is also a favorable effect thereof. A preferred pouch is made from a heat-sealable polyethylene/foil/polypropylene/polyethylene film laminate. It is chemically inert and provides a light and moisture barrier. The oxalate portion of the chemiluminescent composition is usually packaged in such a pouch. The receptacle is sized to fit the device above the liquid-absorbing article in close proximity to the cavity and holds the volume of liquid which the article must absorb in conjunction with the second liquid component. In preparing the liquid filled receptacle, some nitrogen gas, liquid nitrogen, argon gas, etc. used to flush the receptacle may be trapped therein. In the case of the plastic pouch receptacle, the gas etc. oftentimes, causes the pouch to assume a pillow shape and thereby assists in rupturing the pouch upon activation of the device.

The second liquid component of the chemiluminescent light composition may be present in the device as such, i.e., as absorbed on the non-woven, liquid-absorbent article or in its own sealed, breakable or rupturable receptacle, as discussed above with regard to the first component. The second component usually comprises the peroxide portion of the chemiluminescent composition. Thus, one chemiluminescent composition component may be present in a receptacle or both may be present in individual receptacles. The receptacle can be a glass ampoule, for example, or can be a rupturable pouch. Alternatively, each component may be in its own ampoule and both ampoules may be packaged in a pouch, in which case the pouch may not be a foil pouch and need not be sealed on all sides. In this configuration, the breakage of the ampoules in the pouch, which should be chemically inert, allows initial mixing of the components before contact with the liquid-absorbing article, thereby assuring even greater uniformity of light emission.

The second, polymeric sheet may be prepared from the same material as the first sheet and is usually slightly thicker, ranging in thickness from about 0.05 to 0.15 cm (0.02 to 0.06 inch). It also is chemically inert, flexible and puncture resistant. A suitable material from which both the first and second polymeric sheets are preferably prepared is a propylene copolymer sold by Himont, U.S.A., Inc. of Wilmington, Del. as Profax®. The second sheet may be die cut, injection molded or thermoformed and it may contain a molded step inside its periphery to reduce bulging of the device caused by pressures resulting from the chemical reaction of the components once activation is effected. The peripheries of the first and second polymeric sheets are sealed together to form a non-rupturable bond by bar heating or ultrasonic sealing, for example, for about 5-10 seconds.

The second polymeric sheet may have an adhesive area on its outer surface which enables the attachment of the device to a substrate. The adhesive area may be covered with a protective paper layer to protect it from losing its adhesive character, said paper being removable to expose the adhesive.

In a further embodiment, a perforated plastic sheet may be positioned between the non-woven, liquid-absorbing article and the receptacle or receptacles containing the component or components of the chemiluminescent light composition. This plastic sheet acts as a dispenser, its perforations causing the liquid from the ruptured receptacle(s) to be more uniformly dispensed atop the non-woven article and thus aiding in the mixing and the uniform distribution of the composition over the complete area of the article. The perforations in the sheet can range from about 5 to about 500 microns in diameter and the sheet can comprise any inert polymeric material. The dispenser may be added to the device in a disengaged manner or may be heat or sonically sealed to the interior of the device.

When one of the chemiluminescent components is retained in a rupturable pouch, means may be positioned inside the device to assist in the rupture of the pouch. To this end, a puncturing means such as a spike or spikes may be positioned adjacent the pouch such as by molding said means into the perforated plastic distributing sheet, or into the inside surface of the second, opaque polymeric sheet, whereby

compression of the device will cause the spike to puncture the pouch.

The chemiluminescent components may be comprised of those chemicals known in the art to create light chemically upon mixing, those disclosed in any of the above specified patents being exemplary. Any such chemicals may be used in the instant device without detracting from the usefulness of the device. A typical yellow chemiluminescent composition is comprised as follows:

	<u>Oxalate Component</u>	<u>Activator Component</u>
10	Dibutyl Phthalate - 88.6%	Dimethyl Phthalate - 81.40%
	CPPO* (luminescer) - 11.1%	T-butyl alcohol - 13.30%
	CBPEA* (fluorescer) - 0.3%	90% aq. H ₂ O ₂ - 5.29%
15		Sodium Salicylate - 0.01
	CPPO = bis(2,4,5-trichloro-6-carbopentoxyphe-nyl)oxalate	
	CBPEA = 1-chloro-9,10-bis(phenylethynyl)anthracene	

The following examples are set forth for purposes of illustration only and are not to be construed as limitations on the present invention except as set forth in the appended claims. All parts and percentages are by weight unless otherwise specified.

25 Example 1

A first 7.6 cm x 7.6 cm (3" x 3") sheet of 0.089 cm (.035") low density polyethylene is thermoformed to impart a 5 cm x 5 cm (2" x 2") square cavity thereto, 0.64 cm (1/4") in depth. A 5 cm x 5 cm (2" x 2") square of a chemically-inert, non-woven, fibrous, polyethylene terephthalate polyester mat (PE 7111 from American Felt & Filter Co.) of 0.13 cm (.050") in thickness and having a uniform density across its surface is placed into the cavity. 1.0 Part of the "activator component" disclosed above is absorbed into the web. A pouch 4.45 cm x 3.81 (1 3/4" x 1 1/2") made from polyethylene/polypropylene/foil/polyethylene with a seal coating of ethylmethacrylate is charged with 3.0 parts of the "oxalate component" disclosed above and hermetically heat sealed around the outside 0.64 cm (1/4") periphery thereof. The pouch is placed atop the mat and a 7.6 cm x 7.6 cm (3" x 3") sheet of low density polyethylene is placed atop the pouch in peripheral alignment with the cavity containing first sheet and the resultant assembly is impulse heat sealed for 20-40 seconds around the outer 0.64 cm (1/4") periphery thereof. The resultant device resists pressure up to about 5 psi. The device is squeezed to cause rupture of the pouch and kneaded to assist in removing all the liquid therefrom. The mat absorbs and retains the entire amount of liquid in the device and is completely saturated thereby almost instantaneously. The components of the chemiluminescent composition mix thoroughly as evidenced by the uniform yellow light which immediately emits from the outer cavity surface. The mat does not deform when the device is shaken or otherwise used and is opaque as evidenced by the absence of any indication of the ruptured pouch behind the emitted light. Further, evaluation of the device is set forth in Table I, below.

45 Examples 2-17

Following the procedure of Example 1, except that equivalent size mats of other commercially available materials are substituted for that set forth therein, devices are produced and evaluated for light efficiency. The results are set forth in Table I, below.

Table I

EXAMPLE	WEB MATERIAL	LUMINANCE (m. lambert/hrs)			COMMENTS
		2 hr.	6 hr.	2 hr.	
	POLYESTERS				
1	PE-7111	4.03	12.41	13.2	40.7
2	EX-893*-339 g/m ² (10 oz/yd ²) (0.15 cm (.060") thick)	6.37	--	20.9	--
3C	EX-893*-339 g/m ² (10 oz/yd ²) (0.15 cm (.030") thick)	1.77	--	5.8	--
4C	EX-893*-170 g/m ² (5 oz/yd ²) (0.23 cm (.090") thick)	5.67	18.36	18.6	60.2
5C	PET (Chicopee 5470)**	0.70	--	2.3	--
	POLYOLEFINS				
6C	Polypropylene PPI6P - (Fibredyne) ¹	4.67	5.28	15.3	17.3
7C	Polypropylene 5-1*	7.05	9.55	23.1	31.3

Table I (cont.)

EXAMPLE	WEB MATERIAL	LUMINANCE (m. lambert/hrs)		LUMINANCE (ft. lambert/hrs)		COMMENTS
		2 hr.	6 hr.	2 hr.	6 hr.	
	POLYOLEFINS					
8C	Polypropylene 5-2*	6.47	--	21.2	--	Dark spots/non-uniform (material not dense enough)
9	Polypropylene 62FO(3)6/125*	6.19	--	20.3	--	Good mixing/uniformity retention and light output
10C	Polypropylene with PET veil 62FO(3)3/060*	5.46	--	17.9		spotty/not dense enough/fuzzy appearance
	GLASS FIBERS					
11	Whatman ² Glass 934-AH	4.51	--	14.8	--	Good mixing/uniformity; retention light output short duration
12	Gelman ³ Extra Thick	10.03	--	32.9	--	Good Light output, short duration
	OTHERS					
13C	100% Acrylic	3.23	6.74	10.6	22.1	High liquid volume Low light output

Table I (cont.)

EXAMPLE	WEB MATERIAL	LUMINANCE (m. lambert/hrs)		LUMINANCE (ft. lambert/hrs)		COMMENTS
	OTHERS	2 hr.	6 hr.	2 hr.	6 hr.	
14C	Dacron ⁴	6.35	7.63	20.8	25.0	Too much liquid needed for uniform light output
15C	Viscose Rayon 64 RV/PO 13EOS*	3.00	---	9.8	---	Poor absorbance/mixing
16C	Kendall ⁵ 149-255g (9 oz.) Cotton/Polypropylene	1.62	---	5.3	---	Too thin-deforms/poor light output/translucent
17C	Kendall ⁵ 9903 Rayon/Polypropylene	1.77	---	5.8	---	Poor light output

C=comparative

PET = polyethylene glycol terephthalate

* = American Felt & Filter Co.

** = Johnson & Johnson Co., New Brunswick, N.J.

1 = National Felt Co., North Hampton, Mass.

2 = Whatman, Inc., Clifton, N.J.

3 = Gelman Sciences, Inc., Ann Arbor, Michigan

4 = E.I. Du Pont de Nemours, and Co., Wilmington, Del.

5 = Colgate Polymolite, Co., Boston, Mass.

Example 18

The procedure of Example 1 is again followed except that a sheet of perforated, 0.0025 cm (.001 inch) thick, opaque, white, low density, polyethylene, film is heat sealed to the surface of the mat closest to the

pouch. Similar results are achieved except that uniform dispersion of the pouch liquid throughout the mat is somewhat more rapidly obtained.

Example 19

Again following the procedure of Example 1 except that a loose film of 0.0025 cm (.001 inch) thick, opaque, low density polyethylene having a 0.159 cm (1/16 inch) high spike molded into the center thereof is placed between the mat and the pouch. Upon applying pressure, the pouch is quickly and easily ruptured. Similar results are observed.

Example 20

A cavity is thermoformed into a 7.62 cm x 7.62 cm (3" x 3"), 25 mil polypropylene copolymer (Profax® from Himont, U.S.A., Inc.) sheet in the shape of a 5.7 cm (2-1/4") heart, 1.27 cm (1/2") in depth. A 5.7 cm (2-1/4") liquid absorbent article made of polyethylene glycol terephthalate polyester (PE7111) from American Felt and Filter, Co., 0.127 cm thick and approximately 0.034 kg/m² (0.050" thick and approximately 9 ounces per square yard) is placed within the cavity. 1.4 Parts of activator solution and 1.7 parts of oxalate solution (both as above in Example 1) each contained within a separate, crushable, glass ampoule are placed with the cavity. A 7.62 x 7.62 cm (3" x 3") flat sheet of the above polypropylene copolymer is placed on top of the cavity and the assembly is sonically sealed around the perimeter to produce a leak-proof bubble. Activation of the resultant device by rupturing the ampoules instantaneously results in a yellow light emission from the article, which light is uniform across the surface of the "heart." No unabsorbed liquid is evident in the device and strenuous agitation does not deform the glowing article. The seven criteria expressed above are fully satisfied.

Example 21

The procedure of Example 20 is followed except that both ampoules are placed within a square pouch composed of polyethylene plastic chemically inert to the chemiluminescent system. The pouch is sealed only on three sides. The ampoules in the pouch are sealed within the cavity. The ampoules are crushed within the pouch thereby mixing the two chemicals and the pouch is then tipped to allow the chemicals to drain therefrom. The liquid is instantaneous absorbed by the article to obtain a uniform yellow glowing surface substantially identical to that of Example 20.

Example 22

A liquid-absorbent article composed of polyethylene glycol terephthalate polyester is placed within a thermoformed cavity as described in Example 20. 1.4 Parts of activator solution are evenly distributed across the surface of the polyester. 1.7 Parts of oxalate component are sealed into a crushable glass ampoule which is then placed within the cavity. Activation occurs once the ampoule is broken, resulting in a device similar to that of Example 20.

Example 23

The procedure of Example 20 is again followed except that the copolymer sheet is thermoformed into an arrow and a green fluorescer is used in the oxalate solution. Again, an excellent device is produced which glows green in the area of the arrow configuration.

Example 24

The procedure of Example 23 is followed except the thermoformed shape is that of the letter "A". Similar results are achieved.

Claims

1. A chemiluminescent device comprising in sequential relationship.

A. a first polymeric sheet being translucent or transparent and having a shaped cavity formed therein, said cavity capable of receiving a liquid-absorbent article.



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A cavity is thermoformed into a 7.62 cm x 7.62 cm (3" x 3"), 25 mil polypropylene copolymer (Profax® from Himont, U.S.A., Inc.) sheet in the shape of a 5.7 cm (2-1/4") heart, 1.27 cm (1/2") in depth. A 5.7 cm (2-1/4") liquid absorbent article made of polyethylene glycol terephthalate polyester (PE7111) from American Felt and Filter, Co., 0.127 cm thick and approximately 0.034 kg/m² (0.050" thick and approximately 9 ounces per square yard) is placed within the cavity. 1.4 Parts of activator solution and 1.7 parts of oxalate solution (both as above in Example 1) each contained within a separate, crushable, glass ampoule are placed with the cavity. A 7.62 x 7.62 cm (3" x 3") flat sheet of the above polypropylene copolymer is placed on top of the cavity and the assembly is sonically sealed around the perimeter to produce a leak-proof bubble. Activation of the resultant device by rupturing the ampoules instantaneously results in a yellow light emission from the article, which light is uniform across the surface of the "heart." No unabsorbed liquid is evident in the device and strenuous agitation does not deform the glowing article. The seven criteria expressed above are fully satisfied.

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Claims

1. A chemiluminescent device comprising in sequential relationship.
 - A. a first polymeric sheet being translucent or transparent and having a shaped cavity formed therein, said cavity capable of receiving a liquid-absorbent article.



B. a non-woven, liquid-absorbent article made from a polyolefin, a polyester or glass fibers, said article being of substantially the same shape as said cavity.

C. a first sealed, breakable receptacle containing a first liquid component of chemiluminescent composition capable of providing chemiluminescent light when mixed with a second component,

D. a second liquid component of a chemiluminescent light composition outside said first sealed receptacle, and

E. a second polymeric sheer, sealed around its periphery to the periphery of said first polymeric sheet,

said liquid-absorbent article:

- 10 i) being capable of absorbing and retaining substantially the complete volume of said chemiluminescent light composition to thereby result in substantially complete saturation of the article;
- ii) being capable of allowing mixing of said first and second components of said composition after being absorbed thereby;
- 15 iii) having a uniform density across its widest surface,
- iv) being inert with regard to said composition and said first and second components,
- v) being substantially non-deformable in use in said device,
- vi) being capable of substantially instantaneous absorption of said first and second components, alone or when admixed, and
- 20 vii) being opaque when substantially completely saturated with said chemiluminescent composition.

2. A device according to Claim 1 wherein said non-woven article is made from polyethylene.

25 3. A device according to Claim 2 wherein said polyethylene is porous.

4. A device according to Claim 1 wherein said non-woven article is made from polyethylene glycol terephthalate.

30 5. A device according to Claim 1 wherein said non-woven article is made from glass fibers.

6. A device according to Claim 1 wherein said first and second polymeric sheets are composed of a polypropylene copolymer.

35 7. A device according to Claim 1 wherein said cavity is in the shape of a heart.

8. A device according to Claim 1 wherein said cavity is in the shape of a arrow.

40 9. A device according to Claim 1 wherein said first component is a solution of an oxalate.

10. A device according to Claim 1 wherein said second component is a solution of hydrogen peroxide.

11. A device according to Claim 1 containing:

45 F. a second, sealed, rupturable receptacle containing said second liquid component and abutting said first receptacle.

12. A device according to Claim 1 wherein said first receptacle is in the form of a pouch.

13. A device according to Claim 1 wherein said second liquid component is absorbed onto said article.

50 14. A device according to Claim 1 wherein said first receptacle is in the form of a glass ampoule.

15. A device according to Claim 11 wherein said second receptacle is in the form of a glass ampoule.

55 16. A device according to Claim 11 wherein both said first and second receptacles are in the form of glass ampoules.

17. A device according to Claim 11 wherein said first and second receptacles are packaged in a pouch.



18. A device according to Claim 16 wherein said first and second glass ampoules are packaged in a pouch.

Patentansprüche

- 5 1. Chemilumineszente Vorrichtung, die in aufeinanderfolgender Beziehung folgendes aufweist:
A. eine erste Polymerfolie, die durchscheinend oder lichtdurchlässig ist und in der ein geformter Hohlraum ausgebildet ist, der dazu in der Lage ist, einen Flüssigkeit absorbierenden Gegenstand aufzunehmen;
10 B. einen nicht gewebten, Flüssigkeit absorbierenden Gegenstand aus einem Polyolefin, einem Polyester oder aus Glasfasern, der im wesentlichen dieselbe Form wie der Hohlraum aufweist;
C. ein erstes, dichtes, zerstörbares Behältnis, das eine erste flüssige Komponente einer chemilumineszenten Zusammensetzung enthält, die dazu in der Lage ist, Chemilumineszenzlicht zu erzeugen, wenn sie mit einer zweiten Komponente vermischt wird;
15 D. eine zweite, flüssige Komponente einer Zusammensetzung für Chemilumineszenzlicht außerhalb des ersten, dichten Behältnisses; und
E. eine zweite Polymerfolie, die entlang ihres Umfangs mit dem Umfang der ersten Polymerfolie verschweißt ist;
- wobei der Flüssigkeit absorbierende Gegenstand:
20 i) dazu in der Lage ist, im wesentlichen das gesamte Volumen der Zusammensetzung für Chemilumineszenzlicht zu absorbieren und zu speichern, was zu einer im wesentlichen vollständigen Sättigung des Gegenstands führt;
ii) dazu in der Lage ist, das Vermischen der ersten und der zweiten Komponente der Zusammensetzung zu erlauben, nachdem sie durch ihn absorbiert wurden;
25 iii) eine gleichmäßige Dichte über den größten Teil seiner Oberfläche aufweist;
iv) gegen die Zusammensetzung und die erste und zweite Komponente inert ist;
v) beim Gebrauch der Vorrichtung im wesentlichen nicht verformbar ist;
vi) zu im wesentlichen sofortiger Absorption der ersten und der zweiten Komponente, einzeln oder in vermishtem Zustand, in der Lage ist; und
30 vii) lichtundurchlässig ist, wenn er im wesentlichen vollständig mit der chemilumineszenten Zusammensetzung gesättigt ist.
2. Vorrichtung nach Anspruch 1, bei der der nicht gewebte Gegenstand aus Polyethylen besteht.
3. Vorrichtung nach Anspruch 2, bei der das Polyethylen porös ist.
- 35 4. Vorrichtung nach Anspruch 1, bei der der nicht gewebte Gegenstand aus Polyethylenglycolterephthalat besteht.
5. Vorrichtung nach Anspruch 1, bei der der nicht gewebte Gegenstand aus Glasfasern besteht.
- 40 6. Vorrichtung nach Anspruch 1, bei der die erste und die zweite Polymerfolie aus einem Polypropylencopolymeren bestehen.
7. Vorrichtung nach Anspruch 1, bei der der Hohlraum die Form eines Herzens aufweist.
- 45 8. Vorrichtung nach Anspruch 1, bei der der Hohlraum die Form eines Pfeils aufweist.
9. Vorrichtung nach Anspruch 1, bei der die erste Komponente eine Oxalatlösung ist.
- 50 10. Vorrichtung nach Anspruch 1, bei der die zweite Komponente eine Wasserstoffperoxidlösung ist.
11. Vorrichtung nach Anspruch 1, mit:
F. einem zweiten, dichten, zerstörbaren Behältnis, das die zweite flüssige Komponente enthält und am ersten Behältnis anliegt.
- 55 12. Vorrichtung nach Anspruch 1, bei der das erste Behältnis in Form eines Beutels vorliegt.



13. Vorrichtung nach Anspruch 1, bei der die zweite flüssige Komponente auf dem Gegenstand absorbiert ist.
14. Vorrichtung nach Anspruch 1, bei der das erste Behältnis in Form einer Glasampulle vorliegt.
15. Vorrichtung nach Anspruch 11, bei der das zweite Behältnis in Form einer Glasampulle vorliegt.
16. Vorrichtung nach Anspruch 11, bei der sowohl das erste als auch das zweite Behältnis in Form von Glasampullen vorliegen.
17. Vorrichtung nach Anspruch 11, bei der das erste und zweite Behältnis in einem Beutel verpackt sind.
18. Vorrichtung nach Anspruch 16, bei der die erste und zweite Glasampulle in einem Beutel verpackt sind.

15 Revendications

1. Dispositif chimioluminescent comprenant successivement :

A. Une première feuille polymère translucide ou transparente et comportant une cavité, ladite cavité pouvant contenir un article absorbant de liquides

B. un article non tissé absorbant de liquides, fabriqué à partir d'une polyoléfine, d'un polyester ou de fibres de verre, ledit article ayant sensiblement la même forme que ladite cavité,

C. un premier réceptacle scellé cassable contenant un premier composant liquide d'une composition chimioluminescence capable d'émettre, lorsqu'elle est mélangée à un second composant, de la lumière par chimioluminescence,

D. un second composant liquide d'une composition chimioluminescente se trouvant à l'extérieur dudit premier réceptacle scellé, et

E. une seconde feuille polymère dont la périphérie est scellée à celle de ladite première feuille polymère,

ledit article absorbant de liquide:

I) étant capable d'absorber et de retenir la quasi totalité du volume de ladite composition chimioluminescente pour aboutir à une saturation presque totale de celui-ci;

II) étant capable d'autoriser le mélange desdits premiers et seconds composants de ladite composition à la suite de leur absorption;

III) ayant une masse volumique constante le long de sa surface,

IV) étant inerte par rapport à ladite composition et auxdits premiers et seconds composants,

V) étant sensiblement non déformable pendant l'utilisation dudit dispositif,

VI) étant capable d'absorber quasi instantanément lesdits premiers et seconds composants, individuellement ou après leur mélange, et

VII) étant opaque lorsqu'il est presque totalement saturé avec ladite composition chimioluminescente.

2. Dispositif selon la revendication 1 dans lequel ledit article non tissé est fabriqué à partir de polyéthylène.

3. Dispositif selon la revendication 2 dans lequel ledit polyéthylène est poreux.

4. Dispositif selon la revendication 1 dans lequel ledit article non tissé est fabriqué à partir de polytéraphthalate d'éthylène-glycol.

5. Dispositif selon la revendication 1 dans lequel ledit article non tissé est fabriqué à partir de fibres de verre.

6. Dispositif selon la revendication 1 dans lequel lesdites premières et secondes feuilles polymères sont constituées d'un copolymère de polypropylène.

7. Dispositif selon la revendication 1 dans lequel ladite cavité a la forme d'un coeur.

8. Dispositif selon la revendication 1 dans lequel ladite cavité a la forme d'une flèche.



9. Dispositif selon la revendication 1 dans lequel ledit premier composant est une solution d'un dérivé d'oxalate.
- 5 10. Dispositif selon la revendication 1 dans lequel ledit second composant est une solution de peroxyde d'hydrogène.
11. Dispositif selon la revendication 1 contenant:
F. un second réceptacle scellé, cassable contenant ledit second composant liquide et situé au voisinage dudit premier réceptacle.
- 10 12. Dispositif selon la revendication 1 dans lequel ledit premier réceptacle a la forme d'un sac.
13. dispositif selon la revendication 1 dans lequel ledit second composant liquide est absorbé sur ledit article.
- 15 14. Dispositif selon la revendication 1 dans lequel ledit premier réceptacle a la forme d'une ampoule en verre.
- 20 15. Dispositif selon la revendication 11 dans lequel ledit second réceptacle a la forme d'une ampoule en verre.
16. Dispositif selon la revendication 11 dans lequel lesdits premiers et seconds réceptacles ont tous les deux la forme d'une ampoule en verre.
- 25 17. Dispositif selon la revendication 11 dans lequel lesdits premiers et seconds réceptacles sont emballés dans un sac.
- 30 18. Dispositif selon la revendication 16 dans lequel lesdites premières et secondes ampoules sont emballées dans un sac.
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