A reflective and phosphorescent garment for use by humans or pets, as well as the method of manufacture. The garment includes light reflective capabilities as well as phosphorescent capabilities enabling the garment to simultaneously radiate and reflect light, thereby optimizing visibility. In the preferred embodiment, a visual means may be applied to a fabric member. Then a phosphorescent substance and a reflective substance may be applied to enhance the wearer’s visibility.
FIELD OF THE INVENTION

[0001] The present invention relates generally to a garment. More particularly, the present invention relates to a garment having both reflective and phosphorescent capabilities. In one embodiment, the garment may be used as a handkerchief worn by a motorcyclist to increase his visibility to other motorists, especially at night.

BACKGROUND OF THE INVENTION

[0002] Garments having enhanced visibility are well known in the industry. For example, safety vests having attached reflective strips, such as those worn by firefighters, are well known. Having a garment which enhances a wearer's visibility especially in dark or semi-dark environments enables the wearer to be more visible to others, thereby optimizing his safety.

[0003] When individuals are engaged in outdoor activities, e.g. an outdoor activity such as but not limited to walking, running, driving a motorcycle, bicycling, skiing, snowboarding, skateboarding or other outdoor activity, they may conduct some portion of that activity in a dimly lit or dark environment depending on the time of day or season in which they begin that activity. When an individual begins an outdoor activity, they will typically be less visible to others around them if it is early or late in the day and sunlight is scarce. Also, an individual will be less visible during seasons of the year in which the sun shines for fewer hours of the day. Accordingly, an individual will attempt to appear more visible to others to provide for these situations and conditions.

[0004] Additionally, individuals involved in outdoor activities, such as running, skiing, etc., may have a need to be very physically agile, e.g. a runner racing in a competition may need to keep his clothing light, breathable, and non-abrasive. Thus, it would be desirable to have a garment with enhanced visibility which is light and breathable, and highly flexible. A simultaneously reflective and phosphorescent garment for use in dark or dimly lit environments which is also light and flexible would enable wearers to enhance their visibility while performing outdoor activities.

[0005] Many known garments used to enhance visibility in dark or semi-dark environments are limiting because they provide only a reflective component which reflects light from an outside source, e.g. a garment that reflects light from an automobile headlight. Without an outside light source, a reflective material will not enhance visibility in a dark environment. Therefore, it is beneficial for a garment to possess both a reflective component which reflects light from an outside source, as well as a phosphorescent component to emanate light from the garment itself.

[0006] Additionally, known reflective material for use on garments is also often less flexible plastic material or stiff tape. The decreased flexibility of the reflective material impedes the wearer's physical agility. An athlete wearing such a known reflective-only garment may hinder his performance for the sake of increased visibility.

[0007] Many known garments used to enhance visibility in dark or semi-dark environments are limiting because they provide only a phosphorescent component. There are a variety of problems associated with known phosphorescent-only garments. Known phosphorescent-only garments must be “charged” by exposure to a light source before those garments will glow in the dark. The phosphorescent substance must first absorb electromagnetic radiation and then radiate photons back out in order to glow in the dark. Then, over time the phosphorescent material will slowly lose the capability to glow in the dark until the garment is recharged. Known phosphorescent-only garments also degrade over time so that the material emits less and less light the older the material becomes.

[0008] Other materials which are both reflective and phosphorescent are also limiting. U.S. Pat. No. 5,243,457 to Spencer discloses a material with enhanced visibility characteristics including a light reflective component and a luminescent component. The material requires a first layer of prismatic light reflective material formed from minute prism-like formations. Spencer is limiting in that the prism-like reflective layer possesses limited flexibility. The prism-like reflective layer is not light, breathable, or non-abrasive as needed for a garment in which the wearer is performing activities requiring physical agility. Further, the reflective layer of Spencer cannot be applied to a fabric member using a direct screen print. Thus, it would be desirable to have a garment where the reflective and phosphorescent layers may be applied to a fabric member easily and inexpensively using a direct screen print.

[0009] Thus, known garments do not provide a user with optimized enhanced visibility in dark or semi-dark conditions with both reflective and phosphorescent capabilities. Further, such known garments do not provide enough flexibility and are not suitable for athletic activities requiring a wearer's physical agility.

[0010] There exists a need for an improved garment which optimizes visibility by providing both reflective and phosphorescent components while enabling the wearer to perform athletic activities. In addition, there exists a need for an improved reflective and phosphorescent garment that is extremely flexible and easy to manufacture from a variety of differing textiles to suit many different activities. Finally, a need exists for a reflective and phosphorescent garment that is not cost-prohibitive for users.

[0011] The combination of all these features in a single garment would advantageously increase visibility in dark or semi-dark environments, thus increasing safety. This would reduce the cost and ease of manufacturing reflective and phosphorescent garments. The combination of all these features would also greatly increase the ease of use while wearing a garment made of reflective and phosphorescent material, namely the wearer may partake in activities requiring physical agility. The present invention satisfies these needs and provides further related advantages.

SUMMARY OF THE INVENTION

[0012] Aspects of the present invention relate to garments and methods at least partially embodied in garments for enhancing the wearer's visibility to increase safety. Such garments and methods may include a piece of apparel such as a handkerchief, shirt, shorts, pants, socks, shoes, pet garment or other piece of clothing. Such aspects may be used advantageously to provide a garment having a combination of light reflective and phosphorescent components for improved visibility, and a method of manufacturing the garment.

[0013] It is an object of the present invention to provide a garment which includes both a light reflective component and
a phosphorescent component so that the garment both reflects and emanates light for increased visibility.

[0014] It is another object of the present invention to provide a garment which remains light, flexible, and non-abrasive so that the wearer’s physical agility is not adversely impacted.

[0015] It is another object of the present invention to provide a method of manufacturing a garment made from common textiles or materials such as, but not limited to, cotton and/or cotton-blend, nylon, polyester, polyurethane, spandex, canvas and the like. The garment may be made from a variety of fabrics of varying weight and composition, thus increasing the ease of use and decreasing the cost to manufacture the garment.

[0016] It is another object of the present invention to provide a method of manufacturing a garment wherein the reflective and phosphorescent components may be applied easily and inexpensively to the fabric member of the garment using a direct screen print.

[0017] These and other objects will be apparent in light of the prior art and this disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] These, and further features of the invention, may be better understood with reference to the accompanying specification and drawings depicting the preferred embodiment, in which:

[0019] FIG. 1 is a perspective view of a first preferred embodiment of the present invention, or first version, of the reflective and phosphorescent garment;

[0020] FIG. 2 is a perspective view similar to that of the first version of FIG. 1 illustrating the layers of one embodiment;

[0021] FIG. 3 is a view similar to that of FIG. 1 illustrating an embodiment having both a reflective component and a phosphorescent component; and

[0022] FIG. 4 is a pictorial view depicting one embodiment of the invention.

[0023] The figures referred to above are not drawn necessarily to scale and should be understood to present a representation of the invention, illustrative of the principles involved. Some features of the garment depicted in the drawings have been enlarged or distorted relative to others to facilitate explanation and understanding.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

[0024] In describing the preferred embodiments, certain terminology will be utilized for the sake of clarity. Such terminology is intended to encompass the recited embodiment, as well as all technical equivalents, which operate in a similar manner for a similar purpose to achieve a similar result.

[0025] As described in greater detail below, the present invention is directed to a garment possessing a light reflective component as well as a phosphorescent component. In certain preferred embodiments, the garment may have different configurations, allowing for a variety of aesthetic designs, different functional characteristics and various levels of enhanced visibility. Thus, a user can have a variety of reflective and phosphorescent garments each specifically adapted for a particular activity.

[0026] Referring now generally to the Figures, and particularly to FIG. 1, FIG. 1 shows a first preferred embodiment of the present invention 2, or first version 2, wherein a garment 2 may include a fabric member 4 possessing an inner surface 5 adapted for a contiguous relationship with the wearer’s face region, and an outer surface 7 onto which a visual means 6 may be applied. The fabric member 4 may be comprised of a variety of materials, textiles, and combinations thereof. For example, the fabric member 4 may be made from but is not limited to cotton, cotton-blend, nylon, polyester, polyurethane, spandex, canvas or other material. The fabric member may possess triangular margins configured to at least partially cover the wearer’s face and neck. The fabric member may also possess laterally opposite ends 11 to extend around the wearer’s head and detachably connect at the back of the wearer’s head, e.g., the wearer may tie the opposing ends 11 together at the back of the wearer’s head.

[0027] In several alternative embodiments, the fabric member may be configured into a variety of apparel items such as but not limited to jackets, shirts, pants, shorts, jerseys, back packs, socks, shoes, and other apparel worn during outdoor activities. The fabric member may be made from a variety of differing textiles in a variety of differing configurations to best suit a particular outdoor activity e.g., a form fitting riding jacket for use by motorcyclists.

[0028] The visual means 6 may be but is not limited to a design, emblem, insignia, symbol, or a variety of aesthetic designs and may be comprised of, but is not limited to, plastisol ink, water-based ink, PVC/Phthalate free ink, discharge ink, foil, gloss, applique, Nylonbond, or mirrored silver ink.

[0029] In one embodiment of the first version 2, the garment may be configured so that a visual means 6 may be applied onto the outer surface 7 of a fabric member 4 using a direct screen print or other similar method of application. A second layer comprising a mixture of a reflective powder 26 and a phosphorescent substance 8 may be applied on top of the visual means 6 so that the visual means 6 is at least partially visible underneath the reflective and phosphorescent mixture 28. The phosphorescent substance 8 may be translucent, semi-translucent, or opaque. The phosphorescent substance 8 may be, but is not limited to, a phosphorescent ink such as that manufactured by One Stroke Inks™, 458 Roberts Avenue, Louisville, Ky. 40214.

[0030] In an alternative embodiment, the reflective substance 9 may be applied on top of the phosphorescent substance 8 rather than mixing the reflective substance 9 with the phosphorescent substance 8 before application. The reflective substance 9 may be comprised of but is not limited to a reflective powder 26 such as but not limited to a reflective powder containing microscopic glass beads or flakes and may be, but is not limited to, reflective inks or powders such as those manufactured by One Stroke Inks™, 458 Roberts Avenue, Louisville, Ky. 40214. The reflective and phosphorescent mixture 28 may simultaneously bounce back reflected light waves 12 from an outside source 14 and eminate radiated light waves 10, thereby optimizing visibility.

[0031] Referring generally to the Figures and particularly to FIG. 2, FIG. 2 illustrates an alternative embodiment of the first version 2 in which a visual means 6 may be applied on top of a fabric member 4. A second layer comprised of a phosphorescent substance 8 may be applied on top of the visual means 6 so that the visual means 6 is at least partially visible underneath the phosphorescent layer 8. The phosphorescent substance 8 may be translucent, semi-translucent, or opaque. The phosphorescent substance 8 may be, but is not limited to, a phosphorescent ink such as that manufactured by One
US 2009/0241234 A1

Stroke Inks™, 458 Roberts Avenue, Louisville, Ky. 40214. A third layer comprised of a reflective substance 9 may be applied on top of the phosphorescent layer 8. The reflective substance 9 may be but is not limited to a reflective ink 24 or reflective powder 26 and may be, but is not limited to, reflective inks or powders such as those manufactured by One Stroke Inks™, 458 Roberts Avenue, Louisville, Ky. 40214. The phosphorescent layer and reflective layer may simultaneously bounce back reflected light waves 12 from an outside source 14 and emanate radiated light waves 10, thereby enhancing visibility.

[0032] Referring generally to the Figures and particularly to FIG. 3, FIG. 3 shows a version of the first version 2 in which an outside light source 14 may produce light waves 16 which may be reflected 12 after contacting the reflective substance 9. The phosphorescent layer 8 of the first version 2 may also radiate light waves 10.

[0033] Referring now generally to the Figures and particularly to FIG. 4, FIG. 4 shows a pictorial view depicting an alternative embodiment wherein the garment is a sports jersey 20. The visual means 6 may be a design, emblem, insignia, symbol, or a variety of aesthetic designs and may be comprised of, but is not limited to, plastisol ink, water-based ink, PVC/phthalate free ink, discharge ink, foil, gloss, applique, Nylobond, or mirrored silver ink.

[0034] In an alternative embodiment, the visual means 6 may not be applied to the fabric member 4. Instead, the phosphorescent substance 8 may be applied directly to the fabric member 4 and a second layer of reflective substance 9 applied onto the phosphorescent substrate 8. In another embodiment, the reflective ink 24 or reflective powder 26 may be mixed together with the phosphorescent substance 8 and the mixture 28 applied directly to the fabric member 4.

[0035] Those skilled in the art will appreciate that various adaptations and modifications of the just-described preferred embodiments can be configured without departing from the scope and spirit of the invention. Other suitable fabrication, manufacturing, assembly, and test techniques and methods known in the art can be applied in numerous specific modalities by one skilled in the art and in light of the description of the present invention described herein. Therefore, it is to be understood that the invention may be practiced other than as specifically described herein. The above description is intended to be illustrative, and not restrictive. Many other embodiments will be apparent to those of skill in the art upon reviewing the above description. The scope of the invention should, therefore, be determined with reference to the knowledge of one skilled in the art and in light of the disclosures presented above.

What is claimed is:

1. A garment for use by humans or pets, said garment comprising: a fabric member, said fabric member having an inner surface adapted for contiguous relationship with the wearer’s body; an outer surface of said fabric member adapted for treatment with a mixture of at least one phosphorescent substance and at least one light reflective substance; and said outer surface of said fabric member being decorated with at least one visual means, said visual means at least partially underlying said mixture of said phosphorescent substance and said reflective substance.

2. The garment as set forth in claim 1 wherein said fabric member has generally triangular margins and laterally opposite ends.

3. A garment as set forth in claim 2 wherein said fabric member is configured to encircle the bottom portion of the wearer’s face and hang loosely about the wearer’s mouth region and chin region.

4. A garment as set forth in claim 3 wherein the laterally opposite ends of said fabric member are configured to extend around the wearer’s face region and detachably connect at the back of the wearer’s head or neck region.

5. A garment as set forth in claim 1 wherein said outer surface of said fabric member is decorated with a visual means comprising at least one aesthetic design.

6. A garment as set forth in claim 5 wherein said fabric member and said visual means being treated with a mixture of said phosphorescent substance and said reflective substance.

7. A garment as set forth in claim 6 wherein said phosphorescent substance is a phosphorescent ink.

8. A garment as set forth in claim 6 wherein said light reflective substance is a reflective powder.

9. A garment as set forth in claim 6 wherein said mixture of said phosphorescent substance and said reflective substance is a direct screen print onto said outer surface of said fabric member and said visual means.

10. A garment for use by humans or pets, said garment comprising: a fabric member configured for encircling the wearer’s face and neck and having a face region with margins generally triangular in shape and laterally opposite ends; an inner surface of said fabric member adapted for contiguous relationship with the wearer’s face; an outer surface of said fabric member adapted for treatment with at least one phosphorescent substance; said outer surface adapted for treatment with at least one light reflective substance; and said outer surface of said fabric member being decorated with at least one visual means, said visual means at least partially underlying said phosphorescent substance and said reflective substance.

11. A garment as set forth in claim 10 wherein said outer surface of said fabric member is decorated with a visual means comprising at least one aesthetic design.

12. A garment as set forth in claim 11 wherein said visual means being treated with said phosphorescent substance.

13. A garment as set forth in claim 12 wherein said visual means and said phosphorescent substance being treated with said light reflective substance.

14. A garment as set forth in claim 11 wherein said visual means is a direct screen print onto said outer surface of said fabric member.

15. A method of making a reflective and phosphorescent garment comprising the steps of:

a. Providing a fabric member configured for encircling the wearer’s face and neck and having a face region having margins generally triangular in shape and laterally opposite ends; an inner surface of said fabric member adapted for contiguous relationship with the wearer’s face; an outer surface of said fabric member adapted for treatment with at least one phosphorescent substance; said outer surface adapted for treatment with at least one light reflective substance; and said outer surface of said fabric member being decorated with at least one visual means, said visual means at least partially underlying said phosphorescent substance and said reflective substance;

b. Contiguously and integrally attaching to the outer surface of said fabric member a visual means;
c. Contiguously and integrally attaching to the underlying visual means a second layer of phosphorescent substance;
d. Contiguously and integrally attaching to the underlying second layer of phosphorescent substance a third layer of reflective substance;
e. Whereby the visual means is at least partially visible underneath the second phosphorescent layer and third reflective layer; and
f. Whereby the garment may simultaneously emit light from the second phosphorescent layer and reflect light from the third reflective layer.

16. A method as set forth in claim 15 including the step of applying said visual means to the outer surface of said fabric member by direct screen print onto said fabric member.

17. A method as set forth in claim 16 including the step of applying said phosphorescent substance to the visual means by direct screen print onto said visual means.

18. A method as set forth in claim 17 including the step of applying said reflective substance to the phosphorescent substance by direct screen print onto said phosphorescent substance.

19. A method as set forth in claim 18 wherein the visual means, phosphorescent substance, and reflective substance are composed of plastisol ink.

20. A method as set forth in claim 18 wherein the first, second, and third layers are heat cured.