

A Long Afterglow Lamp

Technical Field

The present invention relates to an illuminating lamp, which has long fluorescent lag characteristic, and in particular a long afterglow lamp that can keep glowing for a period of time after the power turns off.

Background of the Invention

Along with the progress of technology, the illuminating performance of compact type fluorescent lamps has already met the requirement of illumination and such lamps have been applied to various places. The long afterglow illuminating materials are widely used in indicative situations that includes those in the realm of fire service, marine vessel, architecture, traffic, railroad and military or the like.

In the realm of the fire service, an indication of escapeway can guide directions and allows people at a pinch to find the way out whenever an emergency or a power breakdown occurred. However, it is not enough to have only the indication of direction at stairways, underground and interior corridors of a large building. Because in such places there is nearly no natural light, people are unable to see the way under their feet, thus easily plunging into chaos. Objectively, there is a need to have an illuminating lamp, by which the illumination effect is still maintained to a certain extent even after the power turns off. An illuminating lamp having long afterglow characteristic was thus designed to meet such a requirement.

Presently, the manufacturing process of the illuminating lamp having long afterglow characteristic is as follows: during the manufacturing of fluorescent lamp tube, a layer of long afterglow illuminating material needs first to be applied on the interior of the glass tube before the coating of the fluorescent powder. Since the long afterglow illuminating material is coated on interior of the glass tube, such a procedure for doing so is complex and the requirement for the

thickness and the homogeneity of the coating layer is higher. In addition, high purity long afterglow illuminating material is required because impurities therein will affect the operation of the lamp tube. By using such a method, the manufacturing cost of the fluorescent lamp having the long afterglow characteristic is relatively high.

Summary of the Invention

To obviate drawbacks of prior art illuminating lamps having long afterglow characteristic, it is an object of the present invention to provide a long afterglow lamp, which would not require the lamp tube to be specifically made and is simple in structure and is easy in production.

The long afterglow characteristic of the present invention is realized by sleeving the long afterglow rubber sheath outside the lamp body. It is simple in structure, thus greatly facilitating the manufacturing process and reducing the cost. Ultraviolet light or visible light is absorbed by the long afterglow fluorescent powder in the long afterglow rubber sheath when the lamp body glows; and after the lamp turns off, the long afterglow fluorescent powder in the long afterglow rubber sheath can still keep glowing for more than ten minutes, whereby using as illuminating or indicating.

According to one aspect the invention resides in a long afterglow lamp, comprising:

a lamp body having an exterior diameter, and

a long afterglow rubber sheath having an interior diameter and two opposed ends, forming a sleeve for at least a portion of said lamp body, said long afterglow sheath being a separate element and sleeved onto said body:

wherein the long afterglow sheath comprises rubber and a light storing photoluminescent material, and the interior diameter of the sheath is slightly larger than, or equal to, or slightly smaller than the exterior diameter of the lamp body.

According to a preferred feature of the invention the long afterglow rubber sheath and the lamp body are identical or similar in shape.

According to a preferred feature of the invention the ratio of the long afterglow fluorescent powder to the long afterglow rubber sheath is in the range of 1% to 25% by weight.

According to a preferred feature of the invention the preferred rubber is silicone.

According to a preferred feature of the invention the thickness of the long afterglow rubber sheath ranges from 0.1 mm to 3 mm.

According to a preferred feature of the invention the lamp body is of shade type, compact type or straight tube type.

According to a preferred feature of the invention at least one end of the long afterglow rubber sheath is open.

According to a preferred feature of the invention the long afterglow sheath and the lamp body are identical in shape.

According to a preferred feature of the invention wherein the photoluminescent material comprises a powder.

According to a preferred feature of the invention the light storing photoluminescent material is configured to glow for more than ten minutes after the lamp body is turned off.

According to a preferred feature of the invention the lamp body is a shade type lamp body.

According to a preferred feature of the invention the lamp body is a compact type body.

According to a preferred feature of the invention the lamp body is a straight tube type lamp body.

According to a further aspect the invention resides in a long afterglow lamp comprising:

a lamp body having an exterior diameter, and

a long afterglow sheath, said sheath being a separate element and configured to be mounted over at least a portion of said lamp body, the sheath having a thickness of 0.1mm to 3mm,

wherein the long afterglow sheath comprises rubber and a light storing powder comprising lead sulphate.

According to a preferred feature of the invention, before mounting, the sleeve has an inner diameter slightly smaller than the exterior diameter of the lamp body.

According to a preferred feature of the invention wherein the light storing powder is configured to glow for more than ten minutes after the lamp body is turned off.

The invention will be more fully understood in the light of the following description of several specific embodiments.

Brief Description of the Drawings

The description is made with reference to the accompanying drawings of which:

Figure 1 is an afterglow keeping characteristic curve of the long afterglow lamp of the present invention;

Figures 2a-2c are respectively schematic views of a long afterglow fluorescent rubber sheath, a lamp body and a cross section thereof taken on lines A-A of an embodiment of the present invention;

Figures 3a-3c are respectively schematic views of a long afterglow fluorescent rubber sheath, a structure of a lamp body and a long afterglow lamp of another embodiment of the present invention; and

Figures 4a-4c are respectively schematic views of a long afterglow fluorescent rubber sheath and a lamp body, and a partly enlarged view of portion B of a long afterglow lamp of another embodiment of the present invention.

Detailed Description of the Specific Embodiments

The embodiments of the invention comprises a lamp body and a long afterglow rubber sheath that is sleeved outside the lamp body. The long afterglow rubber sheath is pervious to light, its shape is identical to or similar to the lamp body to be sleeved and the interior diameter of the sheath is slightly larger than or equals to or slightly smaller than the exterior diameter of the lamp body to be sleeved, one end of which can be closed or both ends thereof can be also open.

The long afterglow rubber sheath having required sizes and shapes is manufactured from a rubber made by adding long afterglow fluorescent powder into the rubber in an appropriate ratio. Ultraviolet light or visible light from the light source of the lamp body is absorbed by the long afterglow fluorescent powder in the long afterglow rubber sheath; after the lamp turns off, the long afterglow fluorescent powder in the long afterglow rubber sheath can still keep glowing for a period of time. The preferred rubber sheath material is silicone. The long afterglow fluorescent powder is selected from lead sulphate type light storing noctilucant materials or from aluminium oxide type light storing noctilucant materials. The amount of the long afterglow fluorescent powder per unit area is determined based on the required afterglow brightness in practical cases, and then the weight ratio of the long afterglow fluorescent powder to the

rubber is chosen according to the thickness of the sheath. To obtain a better effect, the ratio of the long afterglow fluorescent powder to the long afterglow rubber sheath is in the range of 1% to 25% by weight; and the thickness of the long afterglow rubber sheath ranges from 0.1 mm to 3 mm. When the lamp body turns off, the afterglow keeping characteristic of the long afterglow rubber sheath is shown in figure 1. As seen from figure 1, visible fluorescent light can last more than 10 minutes.

Example 1

As shown in figures 2a-2c, a shade type lamp body 2 is introduced in this embodiment, thereby the shape of the long afterglow rubber sheath is also similar to that of the lamp body 2 to be sleeved (as shown in figure 2), which is sleeved outside the lamp body 2 (as shown in figures 2b, 2c), thereby a shade type long afterglow lamp is performed.

Example 2

As shown in figures 3a-3c, the embodiment introduces a compact type lamp body 3 that has a two-tube configuration (as shown in figure 3b). One end of the long afterglow rubber sheath 1 is closed, and another end thereof is open such that the whole of the two tubes of the lamp body 3 is sleeved by the long afterglow fluorescent rubber sheath 1 (as shown in figures 3a, 3c), thereby a compact type long afterglow lamp having two-tube configuration is performed.

Example 3

As shown in figures 4a-4c, the lamp body 3 of the embodiment is of straight tube type and the long afterglow rubber sheath 1 is in hollow tube shape, both ends of which are open (as shown in figure 4) such that the straight tube type lamp body 4 is sleeved by said sheath 1, thereby performing a straight tube type long afterglow lamp.

The above disclosed shapes and configurations of the present invention should be for the purpose of description and should not be regarded as limiting. To match every variety of form of the lamp body to be sleeved, for the long afterglow lamp rubber sheath, many alternatives, modifications and variations can be also made, and are within the scope of the following claims.

Throughout the specification and claims, unless the context requires otherwise, the word "comprise" or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated integer or group of integers but not the exclusion of any other integer or group of integers.

The present invention is not to be limited in scope by any of the specific embodiments or examples described herein. These embodiments are intended for the purpose of exemplification only. Functionally equivalent products, formulations and methods are clearly within the scope of the invention as described herein.

The Claims Defining the Invention are as Follows

1. A long afterglow lamp, comprising:
 - a lamp body having an exterior diameter, and
 - a long afterglow rubber sheath having an interior diameter and two opposed ends, forming a sleeve for at least a portion of said lamp body, said long afterglow sheath being a separate element and sleeved onto said body:
 - wherein the long afterglow sheath comprises rubber and a light storing photoluminescent material, and the interior diameter of the sheath is slightly larger than, or equal to, or slightly smaller than the exterior diameter of the lamp body.
2. A long afterglow lamp in accordance with claim 1 wherein the long afterglow rubber sheath and the lamp body are identical are similar in shape.
3. A long afterglow lamp in accordance with claim 1 or 2 wherein the ratio of the long afterglow fluorescent powder to the long afterglow sheath is in the range of 1% to 25% by weight.
4. A long afterglow lamp in accordance with claim 1, or 2 or 3 wherein the preferred rubber comprises silicone.
5. A long afterglow lamp in accordance with any one of claims 1 to 4 wherein the thickness of the long afterglow rubber sheath ranges from 0.1 mm to 3 mm.
6. A long afterglow lamp in accordance with any one of claims 1 to 5 wherein the lamp body is of shade type, compact type and straight tube type.
7. A long afterglow lamp in accordance with any one of claims 1 to 6 wherein at least one end of the long afterglow rubber sheath is open.

8. A long afterglow lamp in accordance with any one of the preceding claims wherein the long afterglow sheath and the lamp body are identical in shape.
9. A long afterglow lamp in accordance with any one of the preceding claims wherein the photoluminescent material comprises a powder.
10. A long afterglow lamp in accordance with any one of the preceding claims wherein the light storing photoluminescent material is configured to glow for more than ten minutes after the lamp body is turned off.
11. A long afterglow lamp in accordance with claim 10 wherein the lamp body is a shade type lamp body.
12. A long afterglow lamp in accordance with claim 10 wherein the lamp body is a compact type body.
13. A long afterglow lamp in accordance with claim 10 wherein the lamp body is a straight tube type lamp body.
14. A long afterglow lamp comprising:

a lamp body having an exterior diameter, and

a long afterglow sheath, said sheath being a separate element and configured to be mounted over at least a portion of said lamp body, the sheath having a thickness of 0.1mm to 3mm,

wherein the long afterglow sheath comprises rubber and a light storing powder comprising lead sulphate.
15. A long afterglow lamp in accordance with claim 14 wherein the sheath and the lamp body are similar in shape.

16. A long afterglow lamp in accordance with claim 14 or 15 wherein, before mounting, the sleeve has an inner diameter slightly smaller than the exterior diameter of the lamp body.
17. A long afterglow lamp in accordance with claim 14, 15 or 16 wherein the light storing powder has the capacity to glow for more than ten minutes after the lamp body is turned off.
18. A long afterglow lamp substantially as herein described with reference to the accompanying drawings