US 20210328189A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2021/0328189 A1**

LI et al. (43) **Pub. Date: Oct. 21, 2021**

(54) **PACKAGING METHOD AND PACKAGING STRUCTURE OF PANEL, AND DISPLAY DEVICE COMPRISING PACKAGING STRUCTURE THEREOF**

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(21) Appl. No.: **16/620,904**

(22) PCT Filed: **Nov. 14, 2019**

(86) PCT No.: **PCT/CN2019/118470**

§ 371 (c)(1),
(2) Date: **Dec. 10, 2019**

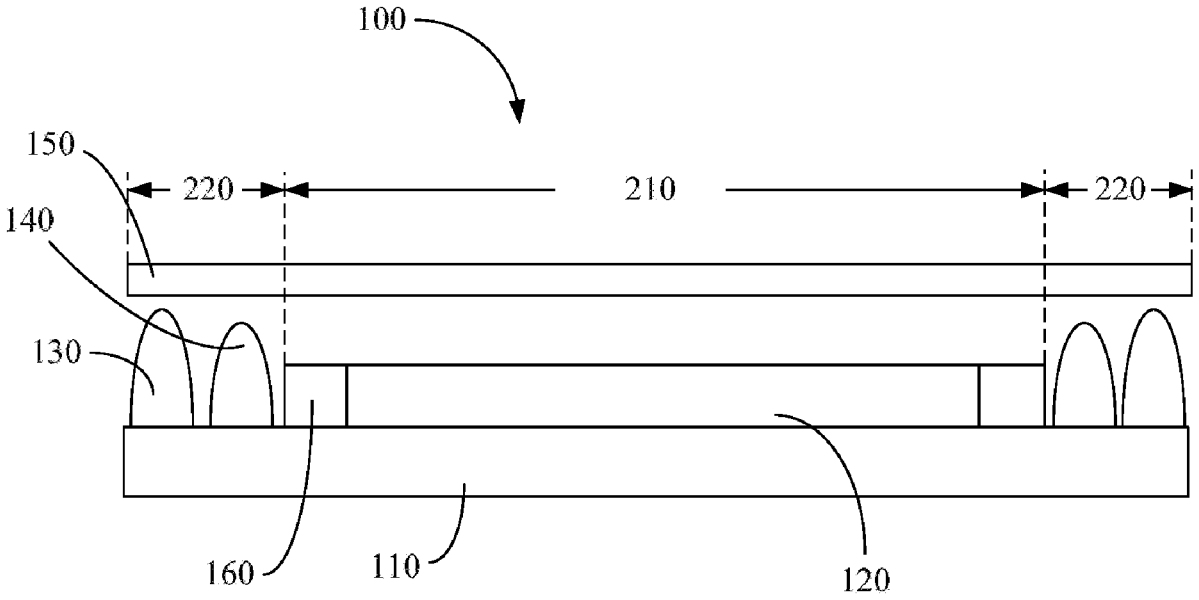
Publication Classification

(51) **Int. Cl.**
H01L 51/52 (2006.01)

(52) **U.S. Cl.**
CPC ***H01L 51/5259*** (2013.01); ***H01L 51/5246*** (2013.01)

(57) **ABSTRACT**

The present invention provides a packing method of a panel. The packing method of the panel includes following steps of: providing a substrate having an OLED light emitting device; coating a sealant around the OLED light emitting device; applying a water-oxygen absorber between the sealant and the OLED light emitting device; and aligning the substrate to cover a packaging glass cover for curing. Wherein, the water-oxygen absorber covers or partially covers a redundant pixel region of the OLED light emitting device to effectively reduce a width of a frame of the panel.



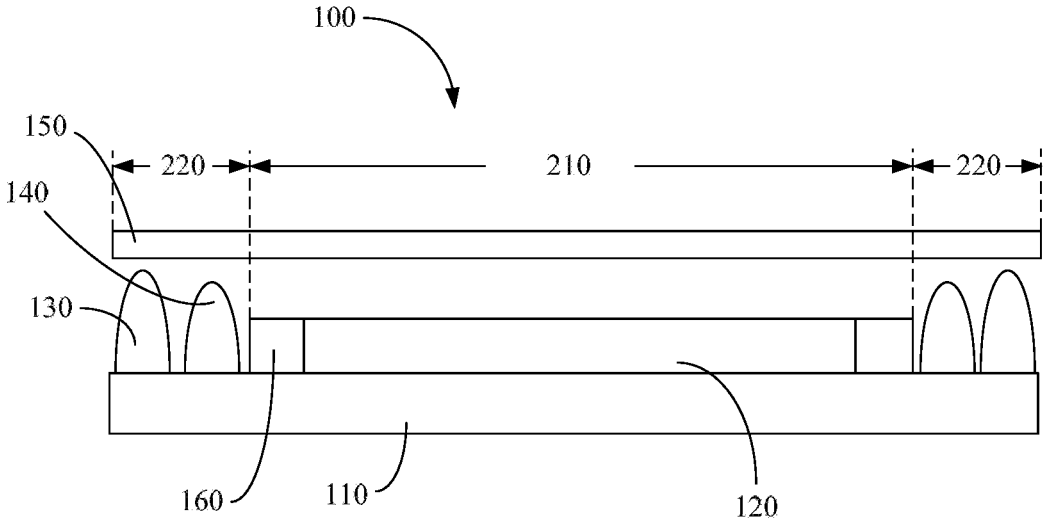


FIG. 1

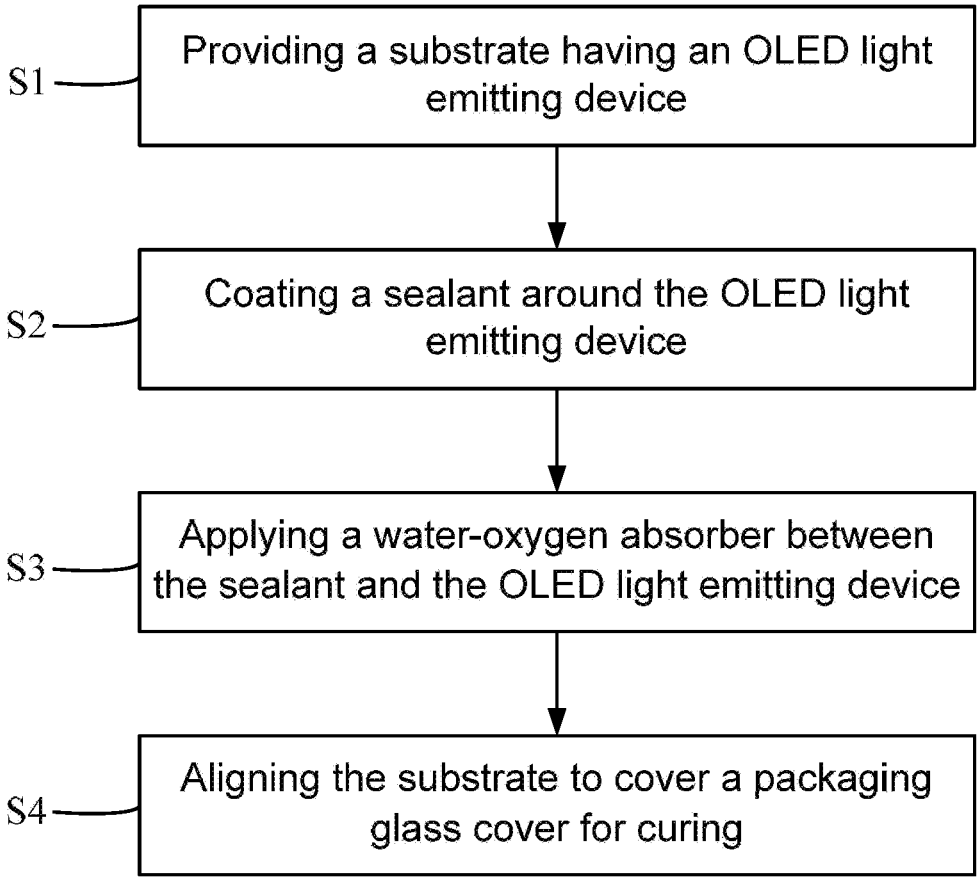

S1
Providing a substrate having an OLED light emitting device
S2
Coating a sealant around the OLED light emitting device
S3
Applying a water-oxygen absorber between the sealant and the OLED light emitting device
S4
Aligning the substrate to cover a packaging glass cover for curing

FIG. 2

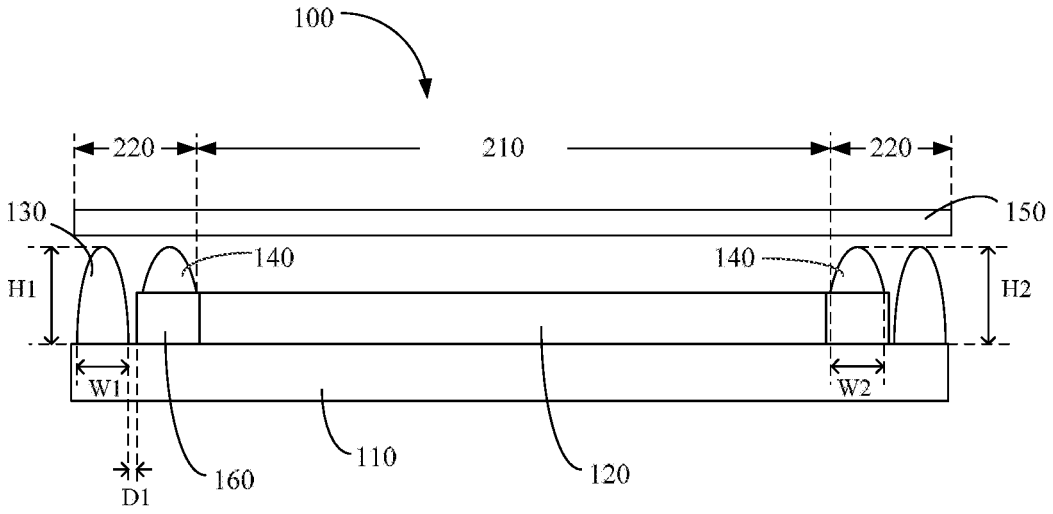


FIG. 3

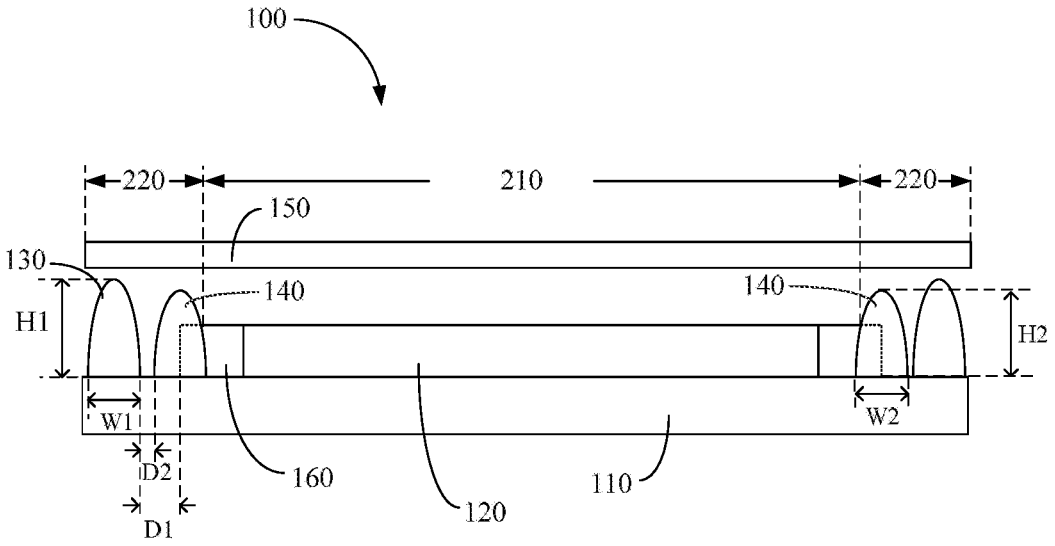


FIG. 4

PACKAGING METHOD AND PACKAGING STRUCTURE OF PANEL, AND DISPLAY DEVICE COMPRISING PACKAGING STRUCTURE THEREOF

FIELD OF INVENTION

[0001] The present invention relates to the field of display technologies, and in particular, to a packaging method and a packaging structure of a panel, and a display device comprising the packaging structure.

BACKGROUND OF INVENTION

[0002] Organic light emitting diode (OLED) panels are an important direction for research and development of display devices, and have achieved remarkable results in applications such as small sizes and large sizes.

[0003] However, in structures of OLED panels manufactured by inkjet printing technologies, redundant pixel regions with certain widths are generally required, so that an OLED light emitting device **120** can be uniformly formed within a film. Therefore, a frame of an inkjet printing panel generally at least comprises a circuit trace, a redundant pixel region, a packaging region, and the like.

[0004] Therefore, as shown in FIG. **1**, a panel comprises a display region **210** and a non-display region **220** disposed around the display region **210**. The display region **210** includes the OLED light emitting device **120** and a redundant pixel region **160**, and the non-display region **220** includes a connection trace region. This will make a frame of the panel too wide to achieve a narrow frame of the panel.

[0005] Therefore, there is a need to provide a packaging method and a packaging structure of a panel, and a display device comprising the packaging structure to solve problems existing in the prior art.

Technical Problem

[0006] Current panels comprise a display region and a non-display region disposed around the display region. There are an OLED light emitting device and a redundant pixel region in the display region, and a connection trace region in the non-display region. This will make a frame of the panel too wide to achieve a narrow frame of the panel.

Technical Solution

[0007] In order to solve the above technical problem, an object of the present invention is to provide a packaging method and a packaging structure of a panel, and a display device comprising the packaging structure, in which a water-oxygen absorber and a redundant pixel region are all covered or partially covered and shared to reduce a width of a frame of the panel.

[0008] In order to achieve the above object, the present invention provides a packaging method of a panel. The packaging method of the panel comprises following steps of: providing a substrate having an OLED light emitting device; coating a sealant around the OLED light emitting device; applying a water-oxygen absorber between the sealant and the OLED light emitting device; and aligning the substrate to cover a packaging glass cover for curing; wherein the water-oxygen absorber covers or partially covers a redundant pixel region of the OLED light emitting device.

[0009] In an embodiment of the present invention, a distance between the sealant and an edge of the redundant pixel region of the OLED light emitting device is between 0.1 mm and 10 mm, a width of the sealant is between 0.1 mm and 3 mm, and a height of the sealant is between 3 um and 60 um.

[0010] In an embodiment of the present invention, a distance between the water-oxygen absorber and the sealant is 0 mm to 3 mm, a width of the water-oxygen absorber is between 1 mm to 5 mm, and a height of the water-oxygen absorber is between 3 μm to 60 μm.

[0011] In an embodiment of the present invention, the curing step consists of curing by ultraviolet rays in an ultraviolet curing machine.

[0012] In an embodiment of the present invention, a curing condition of the curing step is: an energy density of the ultraviolet light is between 3000 mJ/cm^2 and 5000 mJ/cm^2, and an irradiation time of the ultraviolet light is between 30 seconds and 100 seconds.

[0013] In an embodiment of the present invention, a main component of the sealant is acrylic resin.

[0014] In order to achieve the above object, the present invention further provides a packaging structure of a panel. The packaging structure of the panel comprises a substrate; an OLED light emitting device disposed on the substrate; a sealant coated around the OLED light emitting device; a water-oxygen absorber disposed between the sealant and the OLED light emitting device; and a packaging glass cover, aligning and covering the substrate; wherein the water-oxygen absorber covers or partially covers a redundant pixel region of the OLED light emitting device.

[0015] In an embodiment of the present invention, a distance between the sealant and an edge of the redundant pixel region of the OLED light emitting device is between 0.1 mm and 10 mm, a width of the sealant is between 0.1 mm and 3 mm, and a height of the sealant is between 3 um and 60 um.

[0016] In an embodiment of the present invention, a distance between the water-oxygen absorber and the sealant is 0 mm to 3 mm, a width of the water-oxygen absorber is between 1 mm to 5 mm, and a height of the water-oxygen absorber is between 3 μm to 60 μm.

[0017] In an embodiment of the present invention, a main component of the sealant is acrylic resin.

[0018] In order to achieve the above object, the present invention further provides a display device. The display device comprises the packaging structure of the panel.

Beneficial Effect

[0019] The present invention provides a packaging method and a packaging structure of a panel, and a display device comprising the packaging structure, in which a water-oxygen absorber and a redundant pixel region are all covered or partially covered and shared. Therefore, a covered or partially covered region can effectively reduce a width of a frame of the panel to achieve a high screen ratio and a narrow frame.

DESCRIPTION OF DRAWINGS

[0020] FIG. **1** shows a schematic view of a packaging structure according to a prior art.

[0021] FIG. **2** shows a flowchart of a packaging method of a panel according to the present invention.

[0022] FIG. **3** shows a schematic structural view of a first embodiment of the packaging method of the panel according to the present invention.

[0023] FIG. **4** shows a schematic structural view of a second embodiment of the packaging method of the panel according to the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0024] The above and other objects, features, and advantages of the present invention will become more apparent from the understanding of the appended claims. Furthermore, the directional terms mentioned in the present invention, such as up, down, top, bottom, front, back, left, right, inner, outer, side, surrounding, center, horizontal, horizontal, vertical, longitudinal, axial, radial, uppermost or lowermost, etc., only refer to the direction of the additional schema. Therefore, the directional terminology used is for the purpose of illustration and understanding of the disclosure rather than limiting the disclosure.

[0025] In the drawings, units with similar structures are denoted by the same reference numerals.

[0026] FIG. **2** shows a flowchart of a packaging method of a panel according to the present invention.

[0027] Referring to FIG. **3** and FIG. **4** together, a schematic flowchart of the packaging method of the panel in the present invention comprises: S**1**: providing a substrate **110** having an OLED light emitting device **120**; S**2**: coating a sealant **130** around the OLED light emitting device **120**; S**3**: applying a water-oxygen absorber **140** between the sealant **130** and the OLED light emitting device **120**; and S**4**: aligning the substrate **110** to cover a packaging glass cover **150** for curing. Wherein, the water-oxygen absorber **140** covers or partially covers a redundant pixel region **160** of the OLED light emitting device **120**, thereby effectively reducing an overall width of a frame of the panel.

[0028] By providing the water-oxygen absorber **140** covering or partially covering and sharing the redundant pixel region **160**, the packaging method and the packaging structure of the panel, and a display device comprising the packaging structure of the embodiment can effectively reduce the width of the frame of the panel, and achieve technical effects of a high screen ratio and a narrow frame.

[0029] As shown in FIG. **3** and FIG. **4**, the present invention further provides a packaging structure **100** of a panel. The packaging structure **100** comprises: a substrate **110**, an OLED light emitting device **120**, a sealant **130**, a water-oxygen absorber **140**, and a packaging glass cover **150**.

[0030] The OLED light emitting device **120** is disposed on the substrate **110**. The sealant **130** is coated around the OLED light emitting device **120**. The water-oxygen absorber **140** is disposed between the sealant **130** and the OLED light emitting device **120**. The packaging glass cover **150** aligns and covers the substrate **110**. Wherein, the water-oxygen absorber **140** covers or partially covers a redundant pixel region **160** of the OLED light emitting device **120**.

[0031] In detail, as shown in a first embodiment of FIG. **3**, the water-oxygen absorber **140** covers or partially covers the redundant pixel region **160** of the OLED light emitting device **120**. At this time, a distance D**1** between the sealant **130** and an edge of the redundant pixel region **160** of the OLED light emitting device **120** is between 0.1 mm and 10 mm. In other words, in the first embodiment, a distance D**2** between the sealant **130** and the water-oxygen absorber **140** is also between 0.1 mm and 10 mm.

[0032] Preferably, in the first embodiment, a width W**1** of the sealant **130** is between 0.1 mm and 3 mm, and a height H**1** of the sealant **130** is between 3 um and 60 um. A width W**2** of the water-oxygen absorber **140** is between 1 mm and 5 mm, and a height H**2** of the water-oxygen absorber **140** is between 3 μm and 60 μm.

[0033] Therefore, when the water-oxygen absorber **140** is disposed on the redundant pixel region **160** of the OLED light-emitting device **120** in a fully covered manner, a size of the display region **210** can be effectively increased relative to the prior art, and a size of the non-display region **220** is reduced.

[0034] On the other hand, as shown in a second embodiment according to FIG. **4**, the water-oxygen absorber **140** is disposed on the redundant pixel region **160** of the OLED light emitting device **120** in a partially covered manner. At this time, the distance D**1** between the sealant **130** and the edge of the redundant pixel region **160** of the OLED light emitting device **120** is between 0.1 mm and 10 mm, and the distance D**2** between the water-oxygen absorber **140** and the sealant **130** is between 0 mm and 3 mm.

[0035] Preferably, in the second embodiment, the width W**1** of the sealant **130** is between 0.1 mm and 3 mm, and the height H**1** of the sealant **130** is between 3 um and 60 um. The width W**2** of the water-oxygen absorber **140** is between 1 mm and 5 mm, and the height H**2** of the water-oxygen absorber **140** is between 3 μm and 60 μm.

[0036] Therefore, when the water-oxygen absorber **140** is disposed on the redundant pixel region **160** of the OLED light-emitting device **120** in a partially covered manner, the size of the display region **210** can be effectively increased relative to the prior art, and the size of the non-display region **220** is reduced.

[0037] In the present invention, the curing step consists of curing by ultraviolet in an ultraviolet curing machine. A curing condition of the curing step is: an energy density of the ultraviolet light is between 3000 mJ/cm^2 and 5000 mJ/cm^2, and an irradiation time of the ultraviolet light is between 30 seconds and 100 seconds.

[0038] In the present invention, a main component of the sealant is acrylic resin.

[0039] The present invention further comprises a display device comprising the packaging structure **100** of the panel. The display device can be a liquid crystal display device, a light emitting diode display device, or the like.

[0040] As mentioned above, since the present invention can provide the packaging method and the packaging structure of the panel, and the display device comprising the packaging structure, in which the water-oxygen absorber **140** covers or partially covers and shares the redundant pixel region **160**, the covered or partially covered region can thus effectively reduce the width of the frame of the panel, and achieve objectives of a high screen ratio and a narrow frame.

[0041] The present invention has been shown and described with respect to one or more implementations, and equivalents and modifications will be apparent to those skilled in the art. The present invention includes all such modifications and variations, and is only limited by the scope of the claims. With particular regard to the various functions performed by the above-described components, the terms used to describe such components are intended to

correspond to any component (unless otherwise indicated) that performs the specified functions (for example, it is functionally equivalent) of the components, even if it is structurally not identical to the disclosed structure for performing the functions in the exemplary implementation of the present specification shown herein. Moreover, although specific features of the specification have been disclosed with respect to only one of several implementations, such features may be combined with one or more other implementations as may be desired and advantageous for a given or particular application.

[0042] In the above, various other corresponding changes and modifications can be made according to the technical solutions and technical ideas of the present invention to those skilled in the art, and all such changes and modifications are within the scope of the claims of the present invention.

What is claimed is:

1. A packaging method of a panel, comprising following steps of:

providing a substrate having an OLED light emitting device;

coating a sealant around the OLED light emitting device;

applying a water-oxygen absorber between the sealant and the OLED light emitting device; and

aligning the substrate to cover a packaging glass cover for curing;

wherein the water-oxygen absorber covers or partially covers a redundant pixel region of the OLED light emitting device.

2. The packaging method of the panel as claimed in claim **1**, wherein a distance between the sealant and an edge of the redundant pixel region of the OLED light emitting device is between 0.1 mm and 10 mm, a width of the sealant is between 0.1 mm and 3 mm, and a height of the sealant is between 3 um and 60 um.

3. The packaging method of the panel as claimed in claim **2**, wherein a distance between the water-oxygen absorber and the sealant is between 0 mm and 3 mm, a width of the water-oxygen absorber is between 1 mm and 5 mm, and a height of the water-oxygen absorber is between 3 μm and 60 μm.

4. The packaging method of the panel as claimed in claim **1**, wherein the curing step consists of curing by ultraviolet in an ultraviolet curing machine.

5. The packaging method of the panel as claimed in claim **4**, wherein a curing condition of the curing step is: an energy density of the ultraviolet is between 3000 mJ/cm^2 and 5000 mJ/cm^2, and an irradiation time of the ultraviolet is between 30 seconds and 100 seconds.

6. The packaging method of the panel as claimed in claim **1**, wherein a main component of the sealant is acrylic resin.

7. A packaging structure of a panel, comprising:

a substrate;

an OLED light emitting device disposed on the substrate;

a sealant coated around the OLED light emitting device;

a water-oxygen absorber disposed between the sealant and the OLED light emitting device; and

a packaging glass cover, aligning and covering the substrate;

wherein the water-oxygen absorber covers or partially covers a redundant pixel region of the OLED light emitting device.

8. The packaging structure of the panel as claimed in claim **7**, wherein a distance between the sealant and an edge of the redundant pixel region of the OLED light emitting device is between 0.1 mm and 10 mm, a width of the sealant is between 0.1 mm and 3 mm, and a height of the sealant is between 3 um and 60 um.

9. The packaging structure of the panel as claimed in claim **8**, wherein a distance between the water-oxygen absorber and the sealant is between 0 mm and 3 mm, a width of the water-oxygen absorber is between 1 mm and 5 mm, and a height of the water-oxygen absorber is between 3 μm and 60 μm.

10. A display device, comprising:

the packaging structure of the panel as claimed in claim **7**.

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