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(54) **ORGANIC LIGHT EMITTING DIODE DISPLAY DEVICE**

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(57) **ABSTRACT**

An organic light emitting diode (OLED) display device, including: a base substrate, on which OLEDs are formed; and an encapsulation substrate disposed on the base substrate, to cover the OLEDs; and a bonding member connecting the base substrate and the encapsulating substrate. The base substrate and/or the encapsulation substrate include bonding grooves, in which the bonding member is disposed.

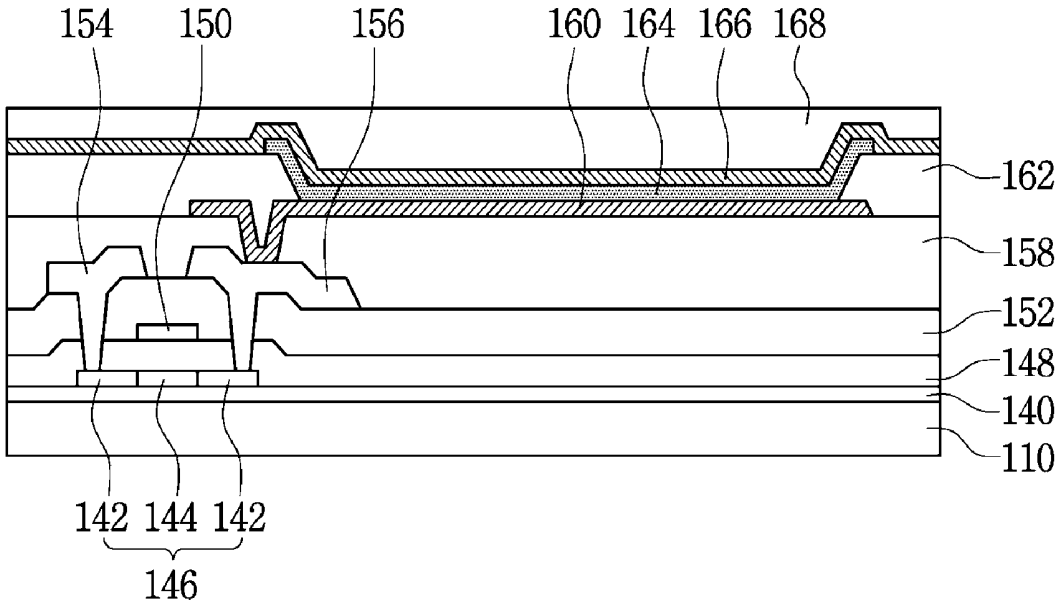


FIG. 1

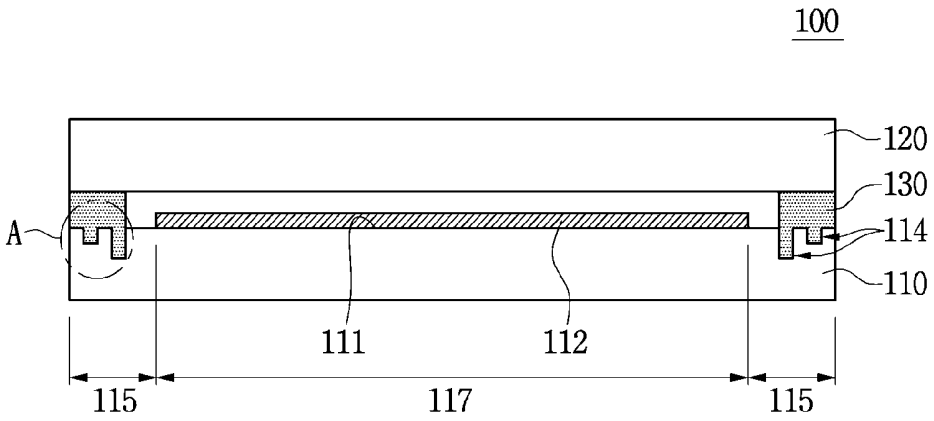


FIG. 2

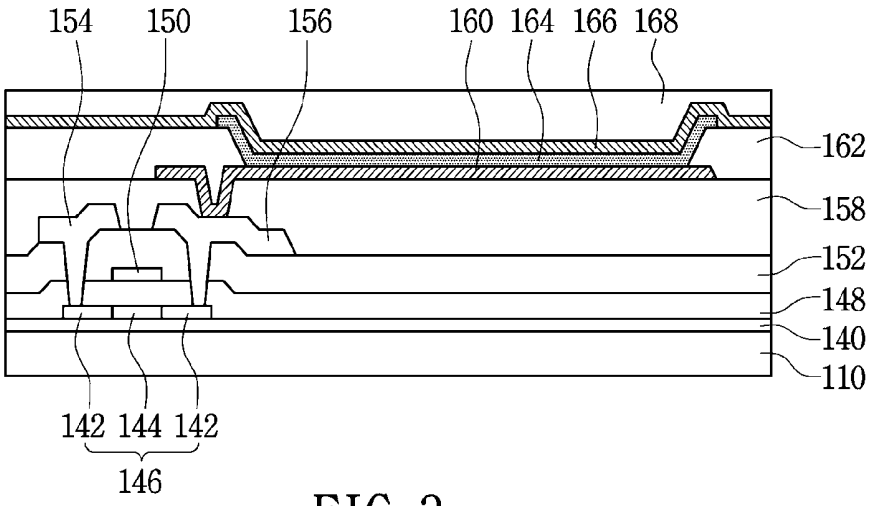


FIG. 3

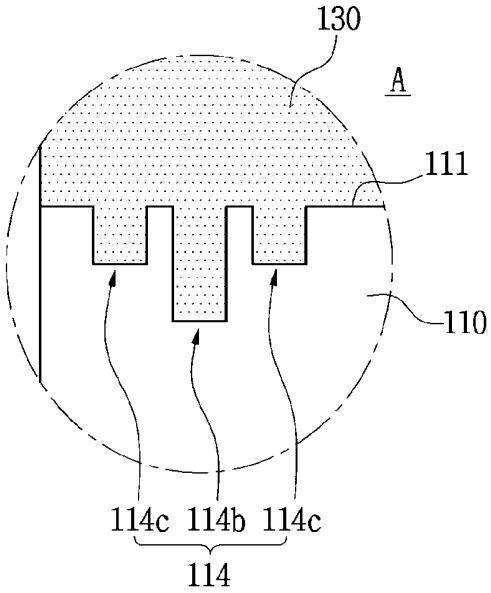


FIG. 4

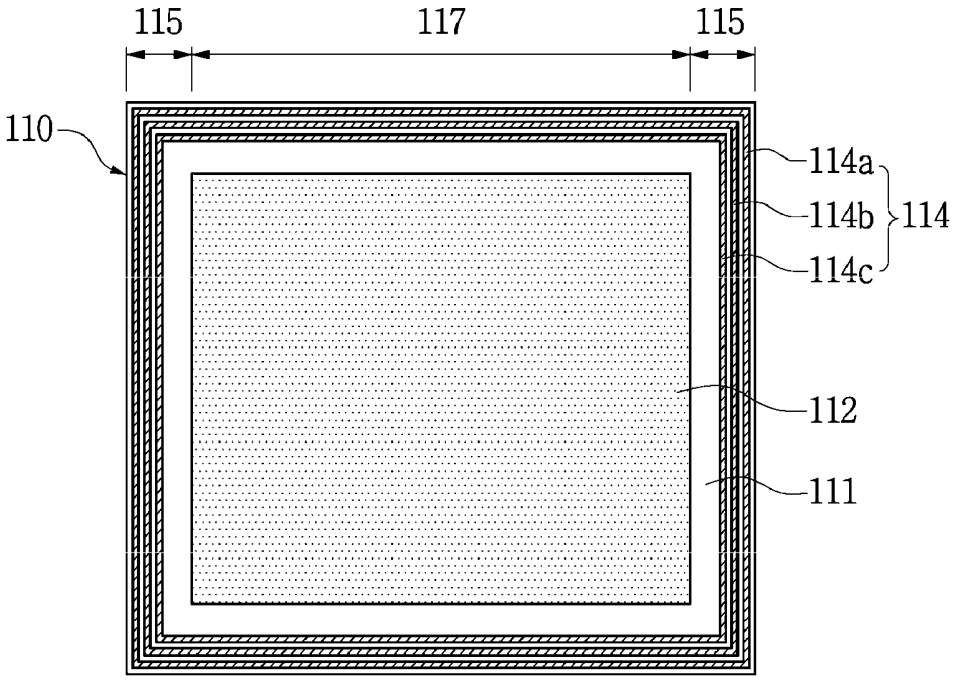

115
117
115
110
114a
114b
114
114c
112
111

FIG. 5

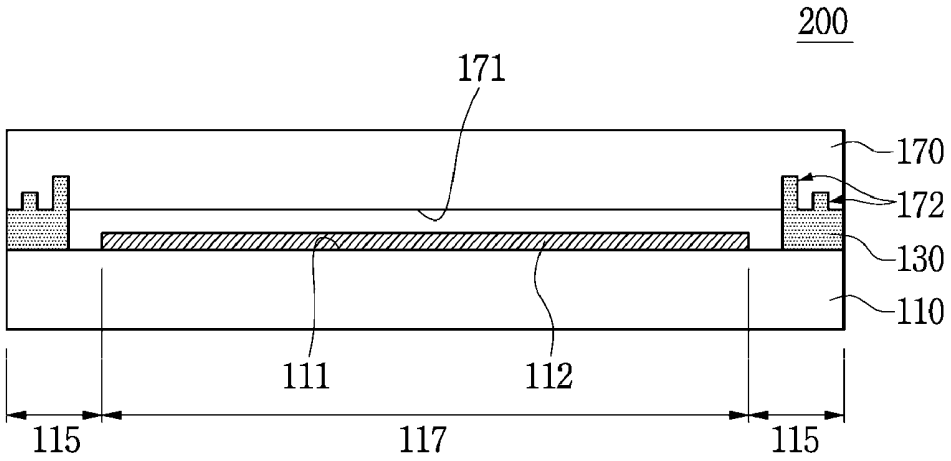

200
171
170
172
130
110
111
112
115
117
115

FIG.6

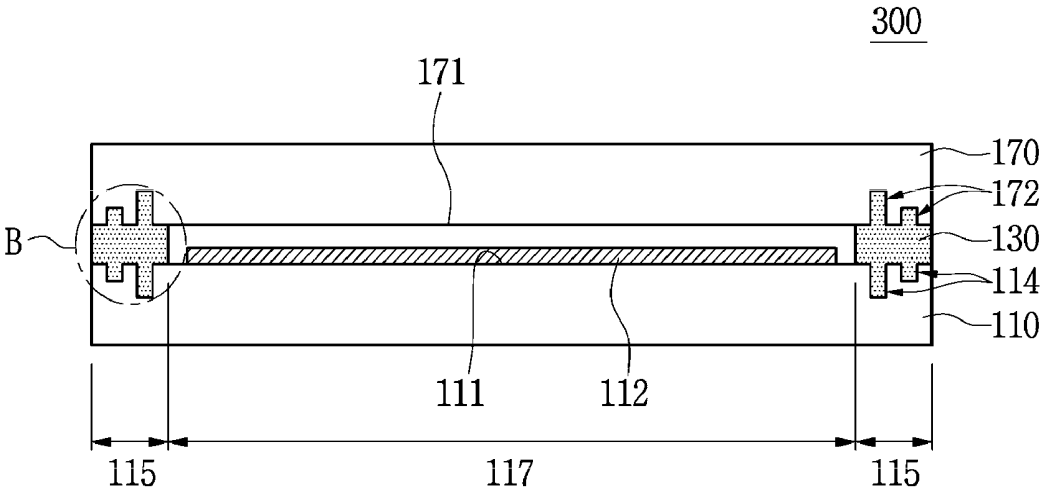


FIG.7A

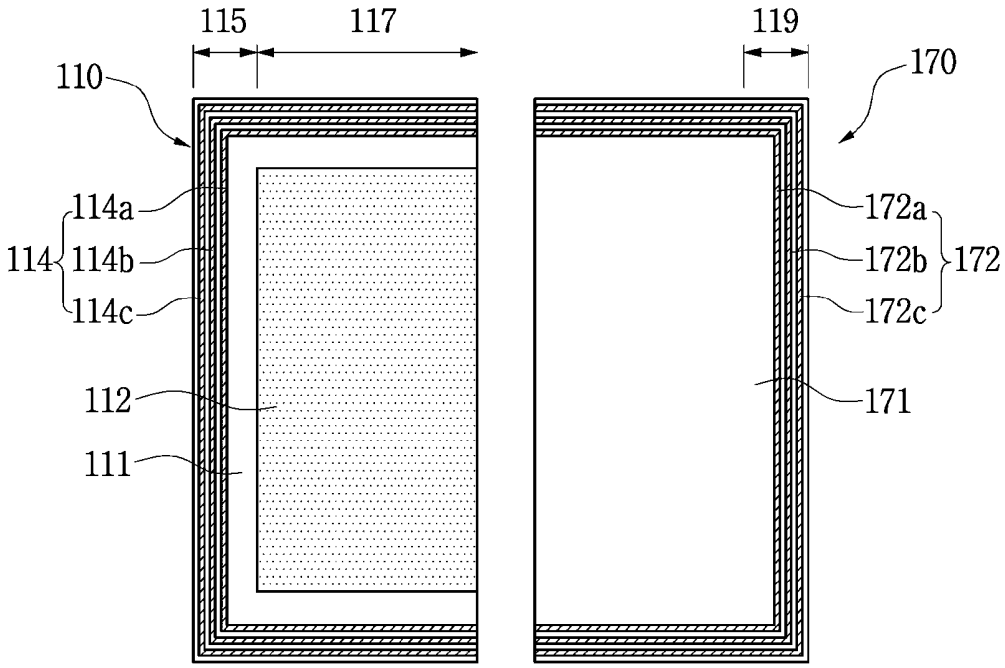

115
117
119
110
170
114a
114
114b
114c
172a
172b
172
172c
112
171
111

FIG.7B

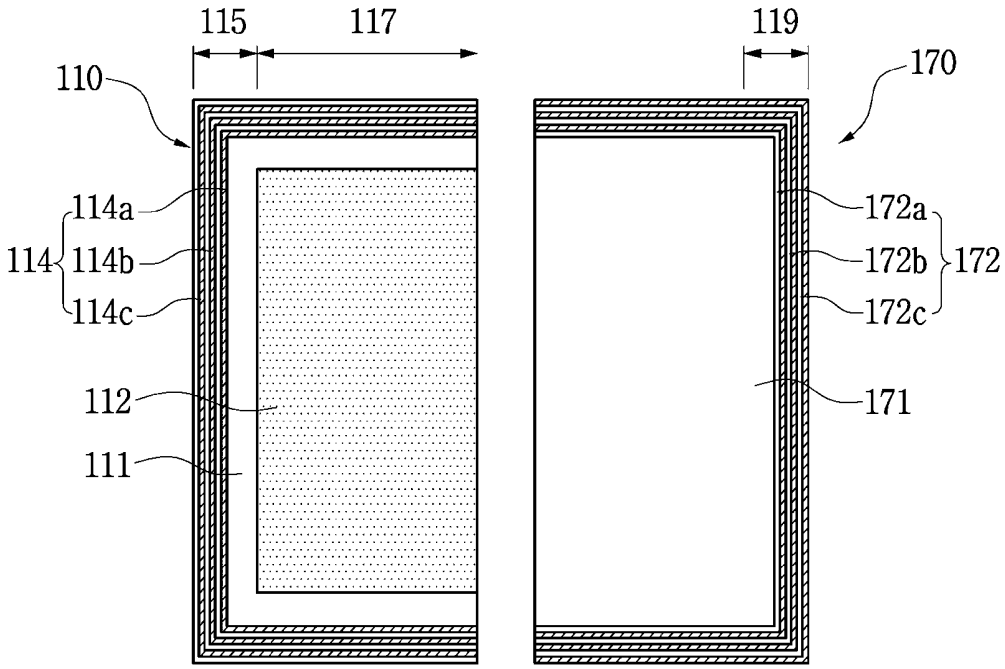
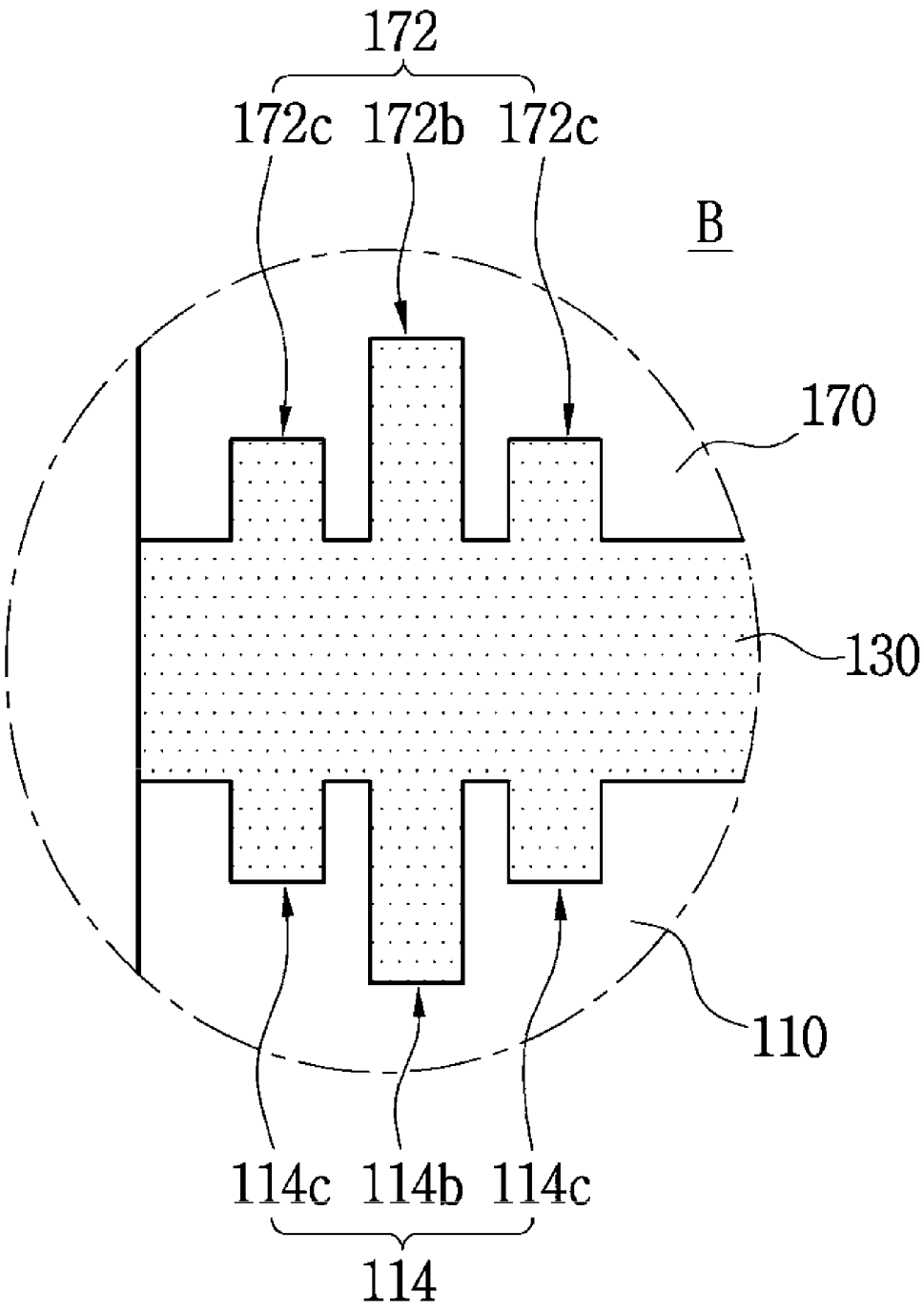

115
117
119
110
170
114a
114
114b
114c
172a
172b
172
172c
112
171
111

FIG. 8



ORGANIC LIGHT EMITTING DIODE DISPLAY DEVICE

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of Korean Patent Application No. 10-2009-0116420, filed Nov. 30, 2009, in the Korean Intellectual Property Office, the disclosure of which is incorporated herein by reference.

BACKGROUND

[0002] 1. Field

[0003] An aspect of the present disclosure relates to an organic light emitting diode (OLED) display device.

[0004] 2. Description of the Related Art

[0005] In general, flat panel displays (FPDs) are being used in place of cathode ray tube (CRT) displays, because the FPDs are thinner and lighter. Typical examples of the FPDs include liquid crystal displays (LCDs) and organic light emitting diode (OLED) display devices. OLED display devices have a higher luminance and a wider viewing angle than LCDs. Also, OLED display devices require no backlight, and thus, may be ultrathin.

[0006] In an OLED display device, electrons emitted from a cathode recombine with holes emitted from an anode, in a thin organic layer, to form excitons. When the excitons transition from an excited state to a ground state, light with a specific wavelength is emitted. In order to facilitate the emission of the light, by the recombination of the electrons with the holes, the anode, into which the holes are injected, may be formed of a material having a large work function, while the cathode, into which the electrons are injected, may be formed of a material having a small work function.

[0007] However, since the cathode may be highly active and chemically unstable, the cathode may react easily with external oxygen or moisture and thus, may be susceptible to oxidation or corrosion. Also, the thin organic layer may be crystallized, due to a reaction with external moisture or oxygen, so that the organic layer may be structurally changed and have degraded emission characteristics.

[0008] Thus, various methods for encapsulating OLED display devices have been developed, in order to block oxygen and moisture from infiltrating OLED display devices. Among these, an encapsulation method using an encapsulation substrate has lately attracted considerable attention.

[0009] According to the encapsulation method using the encapsulation substrate, a bonding member may be interposed between a base substrate, on which OLEDs are formed, and the encapsulation substrate, and pressure may be applied to bond the base substrate to the encapsulation substrate.

[0010] However, since the base substrate is pressure bonded to the encapsulation substrate, the bonding member may flow out of a bonding region, according to the amount and pressure applied to the bonding member. As such, controlling the width of the bonding member becomes problematic. In addition, when an amount of pressure is controlled to prevent the bonding member from flowing out, the thickness of the bonding member may be increased or become non-uniform.

SUMMARY

[0011] Aspects of the present disclosure provide an organic light emitting diode (OLED) display device, including a bonding member interposed between a base substrate and an encapsulation substrate, having a reduced width and thickness.

[0012] According to an aspect of the present disclosure, an OLED display device includes a base substrate, on which OLEDs are formed. An encapsulation substrate is disposed on the base substrate, to cover the OLEDs, and is bonded to the base substrate, using a bonding member. The base substrate or the encapsulation substrate may include a plurality of bonding grooves, in which the bonding member is disposed.

[0013] According to various aspects of the present disclosure, the bonding grooves may be disposed in edges of the base substrate or the encapsulation substrate.

[0014] According to various aspects of the present disclosure, the bonding grooves may be disposed in a surface facing the base substrate or the encapsulation substrate.

[0015] According to various aspects of the present disclosure, the bonding grooves may have the same width and depth or different widths and depths.

[0016] According to various aspects of the present disclosure, at least one of the bonding grooves may form a closed loop, extending along edges of the base substrate or the encapsulation substrate.

[0017] According to various aspects of the present disclosure, the bonding member may include a sealant or a glass frit.

[0018] According to various aspects of the present disclosure, the encapsulation substrate may be formed of a plate-shaped glass material.

[0019] According to another aspect of the present disclosure, an OLED display device is provided that includes a base substrate, on which a plurality of OLEDs are formed. An encapsulation substrate is disposed over the base substrate, to cover the OLEDs, and is bonded to the base substrate, using a bonding member. Each of the base substrate and the encapsulation substrate may include a plurality of bonding grooves, in which the bonding member is disposed.

[0020] According to various aspects of the present disclosure, the bonding grooves may be disposed in edges of the base substrate and the encapsulation substrate.

[0021] According to various aspects of the present disclosure, the bonding grooves may be disposed in surfaces of the base substrate and the encapsulation substrate, which are disposed opposite each other.

[0022] According to various aspects of the present disclosure, the bonding grooves included in the base substrate may be disposed in positions vertically corresponding to the bonding grooves included in the encapsulation substrate.

[0023] According to various aspects of the present disclosure, the bonding grooves included in the base substrate may be disposed in positions that vertically alternate with positions of the bonding grooves included in the encapsulation substrate.

[0024] According to various aspects of the present disclosure, the bonding member may include a sealant or a glass frit.

[0025] According to various aspects of the present disclosure, the bonding grooves included in the base substrate and the encapsulation substrate may be symmetrical to one another.

[0026] According to various aspects of the present disclosure, the bonding grooves included in each of the base substrate and the encapsulation substrate may have the same width and depth, or different widths and depths.

[0027] According to various aspects of the present disclosure, at least one of the bonding grooves may form a closed loop, along edges of the base substrate or the encapsulation substrate.

[0028] According to various aspects of the present disclosure, the encapsulation substrate may be formed of a plate-shaped glass material.

[0029] Additional aspects and/or advantages of the present disclosure will be set forth in part in the description which follows and, in part, will be obvious from the description, or may be learned by practice of the disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0030] These and/or other aspects and advantages of the present disclosure will become apparent and more readily appreciated from the following description of the exemplary embodiments, taken in conjunction with the accompanying drawings, of which:

[0031] FIG. **1** is a cross-sectional view of an organic light emitting diode (OLED) display device, according to an exemplary embodiment of the present disclosure;

[0032] FIG. **2** is a cross-sectional view of a unit OLED, according to an exemplary embodiment of the present disclosure;

[0033] FIG. **3** is a cross-sectional view of portion "A" of FIG. **1**;

[0034] FIG. **4** is a plan view of a base substrate of the OLED display device of FIG. **1**;

[0035] FIG. **5** is a cross-sectional view of an OLED display device, according to another exemplary embodiment of the present disclosure;

[0036] FIG. **6** is a cross-sectional view of an OLED display device, according to still another exemplary embodiment of the present disclosure;

[0037] FIGS. **7**A and **7**B are plan views of a base substrate and an encapsulation substrate of the OLED display device of FIG. **6**; and

[0038] FIG. **8** is a cross-sectional view of portion "B" of FIG. **6**.

DETAILED DESCRIPTION

[0039] Reference will now be made in detail to the exemplary embodiments of the present disclosure, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to the like elements throughout. The exemplary embodiments are described below, in order to explain the present disclosure, by referring to the figures.

[0040] FIG. **1** is a cross-sectional view of an organic light emitting diode (OLED) display device **100**, according to an exemplary embodiment of the present disclosure, and FIG. **2** is a cross-sectional view of a unit OLED, according to an exemplary embodiment of the present disclosure. FIG. **3** is a cross-sectional view of portion "A" of FIG. **1**, and FIG. **4** is a plan view of a base substrate of the OLED display device **100**.

[0041] Referring to FIG. **1**, the OLED display device **100** includes a base substrate **110** and an encapsulation substrate **120**. The base substrate **110** may include a plurality of first bonding grooves **114**, and the encapsulation substrate **120** may be disposed on the base substrate **110**.

[0042] Specifically, the base substrate **110** may include a pixel region **117** and a bonding region **115** disposed around the pixel region **117**. The pixel region **117** may include a plurality of OLEDs, and the bonding region **115** may have the first bonding grooves **114**.

[0043] The OLED display device **100** may be a top-emitting or bottom-emitting OLED display device. The present exemplary embodiment will be described using a top-emitting OLED display device of FIG. **2**, for convenience.

[0044] Referring to FIG. **2**, a buffer layer **140** may be disposed on the base substrate **110**, and a semiconductor layer **146**, having source and drain regions **142** and a channel region **144**, may be disposed on the buffer layer **140**. A gate insulating layer **148** covering the semiconductor layer **146** may be disposed on the base substrate **110**, and a gate **150** may be disposed on the gate insulating layer **148**. An interlayer insulating layer **152** covering the gate **150** may be disposed on the gate insulating layer **148**. Source and drain electrodes **154** and **156** may be disposed on the interlayer insulating layer **152** and respectively connected to the corresponding source and drain regions **142**. A planarization layer **158** covering the source and drain electrodes **154** and **156** may be disposed on the interlayer insulating layer **152**. The planarization layer **158** may have a stacked structure of an inorganic layer and an organic layer.

[0045] A first electrode **160** may be disposed on the planarization layer **158**. The first electrode **160** may be connected to the drain electrode **156** and operate as an anode. A pixel defining layer **162** exposing a portion of the first electrode **160** may be disposed on the planarization layer **158**. An organic thin layer **164** may be disposed on the exposed portion of the first electrode **160** and a portion of the pixel defining layer **162**. A second electrode **166** operates as a cathode and may be disposed on the pixel defining layer **162** and the organic thin layer **164**. A passivation layer **168** may be disposed on the second electrode **166**. The passivation layer **168**, which is formed of a transparent material, may block external moisture and oxygen.

[0046] Referring to FIG. **3** and FIG. **4**, which shows a top surface **111** of the base substrate **110** of FIG. **1**, the bonding region **115** of the base substrate **110** may be disposed at edges of the base substrate **110**, surrounding the pixel region **117**.

[0047] First bonding grooves **114***a*, **114***b*, and **114***c* may be disposed in the top surface **111** of the base substrate **110**, in the bonding region **115**, facing the encapsulation substrate **120**. During the bonding of the base substrate **110** and the encapsulation substrate **120**, the first bonding grooves **114***a*, **114***b*, and **114***c* may be filled with a portion of the bonding member **130**, to prevent the bonding member **130** from flowing out of the bonding region **115**.

[0048] Various numbers of the first bonding grooves **114***a*, **114***b*, and **114***c* may be provided, in consideration of, for example, the coated amount of and bonding pressure applied to the bonding member **130**, and the shapes of the base and encapsulation substrates **110** and **120**. The first bonding grooves **114***a*, **114***b*, and **114***c* may have the same or different widths and depths. For example, the first bonding grooves **114***a*, **114***b*, and **114***c* may have the same width and different depths or different widths and the same depth. The first bonding grooves **114***a*, **114***b*, and **114***c* may be spaced apart from one another by the same interval or at different intervals.

[0049] At least one of the first bonding grooves **114***a*, **114***b*, and **114***c* may be formed as a closed loop extending along the edge of the base substrate **110**. All the first bonding grooves **114***a*, **114***b*, and **114***c* may be formed as closed loops extending along the edges of the base substrate **110**. When at least

one of the first bonding grooves **114***a*, **114***b*, and **114***c* is a closed loop, the other first bonding grooves may be closed loops disposed inside or outside thereof.

[0050] Referring to FIGS. **1** and **3**, the encapsulation substrate **120** may be disposed on the base substrate **110**. The encapsulation substrate **120** may protect the pixel region **117** and OLEDs disposed therein, and may prevent external moisture and oxygen from contacting the OLEDs. The encapsulation substrate **120** may be formed of, for example, a plate-shaped glass material.

[0051] The base substrate **110** and the encapsulation substrate **120** may be bonded to each other with the bonding member **130**, which is interposed between the bonding region **115** and a portion of the encapsulation substrate **120** facing the bonding region **115**. The bonding member **130** may include, for example, a sealant or a glass frit, and a paste obtained by mixing a ceramic material, such as silicon dioxide, with an organic binder.

[0052] The bonding of the base substrate **110** and the encapsulation substrate **120** may include coating the bonding member **130**, applying pressure to adhere the base substrate **110** and the encapsulation substrate **120**, and curing the bonding member **130**. In this case, during the application of the pressure the first bonding grooves **114***a*, **114***b*, and **114***c* may prevent the bonding member **130** from flowing out of the bonding region **115**, due to the pressure. In other words, a portion of the bonding member **130** may flow into the first bonding grooves **114***a*, **114***b*, and **114***c*, during the bonding process, thereby preventing the bonding member **130** from flowing out of the bonding region **115**.

[0053] Thus, the width of the bonding member **130** may be easily controlled. Also, since the first bonding grooves **114***a*, **114***b*, and **114***c* are filled with any excess amount of the bonding member **130**, the base substrate **110** and the encapsulation substrate **120** may be bonded to each other under a high pressure. Therefore, the distance between the base substrate **110** and the encapsulation substrate **120** may be reduced, and the bonding member **130** may be formed to a uniform thickness.

[0054] FIG. **5** is a cross-sectional view of an OLED display device **200**, according to another exemplary embodiment of the present disclosure. The OLED display device **200** may include substantially the same components as the OLED display device **100**. Thus, a repeated description of similar components will be omitted.

[0055] Referring to FIG. **5**, the OLED display device **200** includes a base substrate **110** and an encapsulation substrate **170** disposed on the base substrate **110**. The encapsulation substrate **170** includes a plurality of second bonding grooves **172**.

[0056] The second bonding grooves **172** may be disposed at edges of the encapsulation substrate **170**, facing a bonding region **115** of the base substrate **110**. The second bonding grooves **172** may be disposed on an inner surface **171** of the encapsulation substrate **170**, which faces the base substrate **110**.

[0057] Various numbers of the second bonding grooves **172** may be provided. For example, the second bonding grooves **172** can include second bonding grooves **172***a*, **172***b*, and **172***c*, in consideration of the coated amount and bonding pressure of a bonding member, and the shapes of the base substrate **110** and the encapsulation substrate **170**. The second bonding grooves **172***a*, **172***b*, and **172***c* may have the same width and depth or different widths and depths. The second bonding grooves **172***a*, **172***b*, and **172***c* may be spaced apart by the same interval or by different intervals.

[0058] At least one of the second bonding grooves **172***a*, **172***b*, and **172***c* may be formed as a closed loop, along the edges of the encapsulation substrate **170**. For example, all the second bonding grooves **172***a*, **172***b*, and **172***c* may be formed as closed loops, along the edges of the base substrate **110**. When at least one of the second bonding grooves **172***a*, **172***b*, and **172***c* is a closed loop, the second bonding grooves disposed inside or outside thereof, may be formed as separate closed loops.

[0059] FIG. **6** is a cross-sectional view of an OLED display device **300**, according to still another exemplary embodiment of the present disclosure. FIGS. **7**A and **7**B are plan views of a base substrate **110** and an encapsulation substrate **170** of the OLED display device **300**, and FIG. **8** is a cross-sectional view of portion "B" of FIG. **6**.

[0060] The OLED display device **300** includes substantially the same components as the OLED display device **100**. Thus, a repeated description of similar components will be omitted.

[0061] Referring to FIG. **6**, the OLED display device **300** includes the base substrate **110** and the encapsulation substrate **170**, which is disposed on the base substrate **110**. The base substrate **110** may have a plurality of first bonding grooves **114**, while the encapsulation substrate **170** may have a plurality of second bonding grooves **172**. The base substrate **110** and the encapsulation substrate **170** may be disposed such that the first bonding grooves **114** face the second bonding grooves **172**.

[0062] Specifically, referring to FIGS. **7**A and **7**B, which illustrate inner surfaces **111** and **171** of the base substrate **110** and the encapsulation substrate **170**, the base substrate **110** may include a pixel region **117** and a first bonding region **115**. The pixel region **117** may be a region where a plurality of OLEDs are formed. The encapsulation substrate **170** may include a second bonding region **119**.

[0063] The first bonding region **115** may be disposed in the inner surface **111**, at edges of the base substrate **110**, so as to surround the pixel region **117**. The first bonding grooves **114***a*, **114***b*, and **114***c* may be disposed in a portion of the base substrate **110** facing the first bonding region **115**.

[0064] The second bonding region **119** may be disposed in the inner surface **171**, at edges of the encapsulation substrate **170**. The second bonding grooves **170** may include second bonding grooves **172***a*, **172***b*, and **172***c* disposed in a portion of the encapsulation substrate **170** facing the second bonding region **119**. The second bonding region **119** may face the first bonding region **115** of the base substrate **110**.

[0065] As shown in FIG. **7**A, the first bonding grooves **114***a*, **114***b*, and **114***c* may be disposed facing the second bonding grooves **172***a*, **172***b*, and **172***c*. Alternatively, as shown in FIG. **7**B, the first bonding grooves **114***a*, **114***b*, and **114***c* and the second bonding grooves **172***a*, **172***b*, and **172***c* may be offset from one another, i.e., so as not to directly face one another.

[0066] The first bonding grooves **114***a*, **114***b*, and **114***c* and the second bonding grooves **172***a*, **172***b*, and **172***c* may be symmetrically shaped. The first bonding grooves **114***a*, **114***b*, and **114***c* and the second bonding grooves **172***a*, **172***b*, and **172***c* may be provided in various numbers, in consideration of, for example, the coated amount and bonding pressure of a bonding member, and the shapes of the base substrate **110** and the encapsulation substrate **170**. The first bonding grooves

114*a*, **114***b*, and **114***c* and the second bonding grooves **172***a*, **172***b*, and **172***c* may have the same or different widths and depths. For example, the first bonding grooves **114***a*, **114***b*, and **114***c* and the second bonding grooves **172***a*, **172***b*, and **172***c* may have the same width and different depths, or different widths and the same depth. Furthermore, the first bonding grooves **114***a*, **114***b*, and **114***c* may be spaced apart by the same interval or by different intervals, and the second bonding grooves **172***a*, **172***b*, and **172***c* may be spaced apart by the same interval or by different intervals.

[0067] At least one of the first bonding grooves **114***a*, **114***b*, and **114***c* may be formed as a closed loop, along edges of the base substrate **110**. Also, at least one of the second bonding grooves **172***a*, **172***b*, and **172***c* may be formed as a closed loop, along edges of the encapsulation substrate **110**. For example, all the first bonding grooves **114***a*, **114***b*, and **114***c* and the second bonding grooves **172***a*, **172***b*, and **172***c* may all be formed as closed loops, along the edges of the base substrate **110** and the encapsulation substrate **170**, respectively. When at least one of the first bonding grooves **114***a*, **114***b*, and **114***c* and at least one of the second bonding grooves **172***a*, **172***b*, and **172***c* is a closed loop, the bonding grooves disposed inside or outside thereof may be separate closed loops.

[0068] The first bonding grooves **114***a*, **114***b*, and **114***c* may be closed loops, while the second bonding grooves **172***a*, **172***b*, and **172***c* may be closed loops. Alternatively, the first bonding grooves **114***a*, **114***b*, and **114***c* may be separate closed loops, while the second bonding grooves **172***a*, **172***b*, and **172***c* may be closed loops.

[0069] Referring to FIGS. **6** and **8**, the base substrate **110** and the encapsulation substrate **170** may be bonded to each other, by a bonding member **130** interposed between the first bonding region **115** having the first bonding grooves **114***a*, **114***b*, and **114***c*, and the second bonding region **119** having the second bonding grooves **172***a*, **172***b*, and **172***c*. The first bonding grooves **114***a*, **114***b*, and **114***c* and the second bonding grooves **172***a*, **172***b*, and **172***c* may prevent a portion of the bonding member **130** from flowing out of the first and second bonding regions **115** and **119**, during the bonding process. In other words, an excess amount of the bonding member **130** may fill the first bonding grooves **114***a*, **114***b*, and **114***c* and the second bonding grooves **172***a*, **172***b*, and **172***c*, during the bonding process, so that the bonding member **130** does not flow out of the first and second bonding regions **115** and **119**.

[0070] According to the present disclosure, a plurality of bonding grooves may be formed in a base substrate, on which OLEDs are formed, or in an encapsulation substrate encapsulating the base substrate. Also, a plurality of bonding grooves may be formed in each of the base substrate and the encapsulation substrate.

[0071] As a result, an excess amount of the bonding member may fill the bonding grooves during the bonding of the base substrate with the encapsulation substrate, thereby preventing the bonding member from flowing out of the bonding region. Accordingly, the width of the bonding member can be easily controlled.

[0072] Furthermore, by filing the bonding grooves with a portion of the bonding member, the base substrate and the encapsulation substrate can be bonded under a high pressure. Therefore, a distance between the base substrate and the encapsulation substrate can be reduced, and the bonding member can be formed to a uniform thickness.

[0073] As explained thus far, the present disclosure provides an OLED display device in which a plurality of bonding grooves are formed in a base substrate, on which OLEDs are formed, or in an encapsulation substrate for encapsulating the base substrate. Also, the present disclosure provides an OLED display device, in which bonding grooves are formed in each of a base substrate and an encapsulation substrate.

[0074] Although a few exemplary embodiments of the present disclosure have been shown and described, it would be appreciated by those skilled in the art that changes may be made in these exemplary embodiments, without departing from the principles and spirit of the present disclosure, the scope of which is defined in the claims and their equivalents.

What is claimed is:

1. An organic light emitting diode (OLED) display device comprising:
- a base substrate;
- OLEDs disposed on the base substrate;
- an encapsulation substrate covering the OLEDs; and
- a bonding member connecting the base and encapsulation substrates,
- wherein the base substrate or the encapsulation substrate includes bonding grooves, in which the bonding member is disposed.

2. The display device of claim **1**, wherein the bonding grooves are disposed in edge regions of the base substrate or the encapsulation substrate.

3. The display device of claim **1**, wherein the bonding grooves face the base substrate or the encapsulation substrate.

4. The display device of claim **1**, wherein the bonding grooves have the same width and depth.

5. The display device of claim **1**, wherein at least one of the bonding grooves forms a closed loop.

6. The display device of claim **1**, wherein the bonding member comprises a sealant or a glass frit.

7. The display device of claim **1**, wherein the encapsulation substrate is plate-shaped and comprises a glass material.

8. An organic light emitting diode (OLED) display device comprising:
- a base substrate having first bonding grooves;
- OLEDs disposed on the base substrate; and
- an encapsulation substrate covering the OLEDs, having second bonding grooves formed in edge regions thereof; and
- a bonding member connecting the encapsulating substrate and the base substrate,
- wherein the bonding member is disposed in the first and second bonding grooves.

9. The display device of claim **8**, wherein the first and second bonding grooves are disposed in edge regions of the base substrate and the encapsulation substrate, respectively.

10. The display device of claim **8**, wherein the first bonding grooves face the second bonding grooves.

11. The display device of claim **8**, wherein each of the first bonding grooves directly faces a corresponding one of the second bonding grooves.

12. The display device of claim **8**, wherein the first and second bonding grooves are offset in a direction perpendicular to the plane of the base substrate, so as not to directly face one another.

13. The display device of claim **8**, wherein the bonding member comprises a sealant or a glass frit.

14. The display device of claim **8**, wherein the first bonding grooves are symmetrical in shape to the second bonding grooves.

15. The display device of claim **8**, wherein the first and second bonding grooves have the same width and depth.

16. The display device of claim **8**, wherein at least one of the first and second bonding grooves forms a closed loop extending along edges of the corresponding base substrate or encapsulation substrate.

17. The display device of claim **8**, wherein the encapsulation substrate is formed of a plate-shaped glass material.

18. The display device of claim **8**, wherein the first and second bonding grooves have different widths and depths.

19. The display device of claim **1**, wherein the bonding grooves have different widths and depths.

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专利名称(译)	有机发光二极管显示装置		
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摘要(译)

一种有机发光二极管（OLED）显示装置，包括：基底基板，其上形成有OLED;封装基板，设置在基底基板上，以覆盖OLED;以及连接基础基板和封装基板的接合构件。基础衬底和/或封装衬底包括接合凹槽，接合构件设置在接合凹槽中。