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

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H01L 51/56 (2006.01)

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CPC **H01L 51/5256** (2013.01); **H01L 51/56**
(2013.01); **H01L 2251/562** (2013.01)

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H01L 31/14; H01L 31/0232; H01L 33/04;
H01L 33/00
USPC 257/88, 40, 99, 84, 98; 313/506, 504,
313/498, 512
See application file for complete search history.

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(57) **ABSTRACT**

An organic light emitting diode (OLED) display is provided.
The OLED display includes a substrate, an organic light
emitting element on the substrate, and a thin film encapsula-
tion layer on the substrate and covering the organic light
emitting element. The thin film encapsulation layer includes
at least one conductive layer having a voltage application pad.

13 Claims, 10 Drawing Sheets

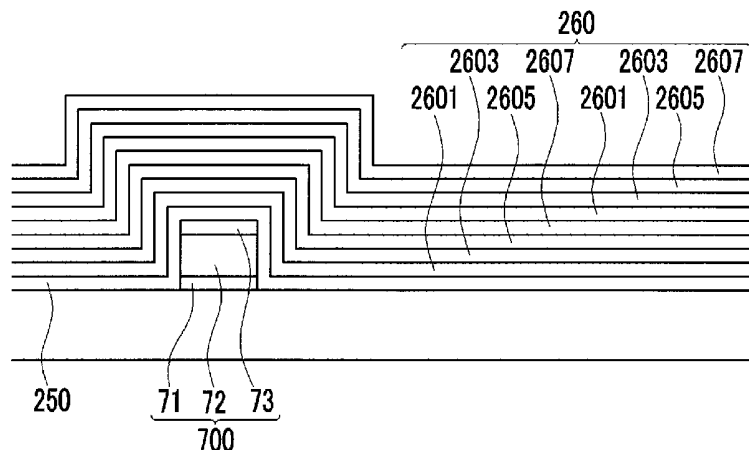


FIG. 1

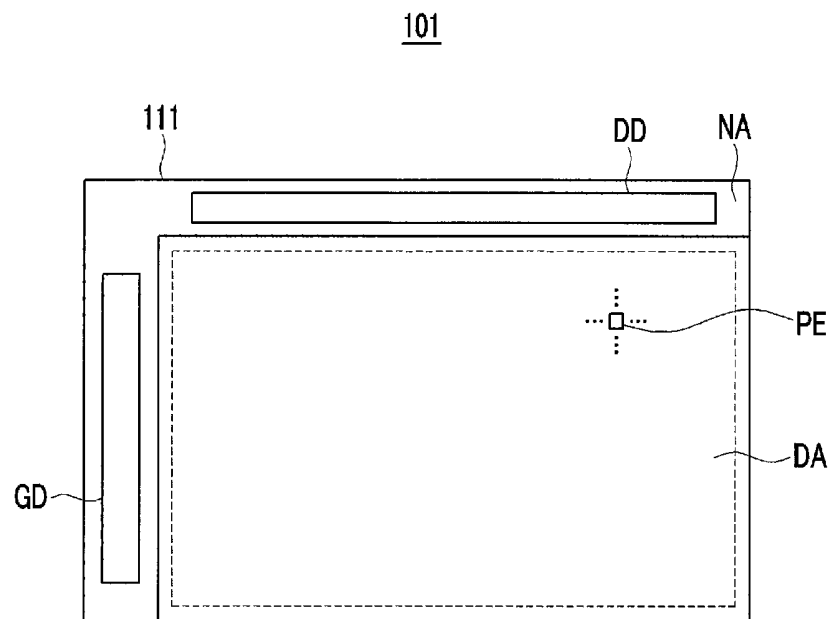


FIG. 2

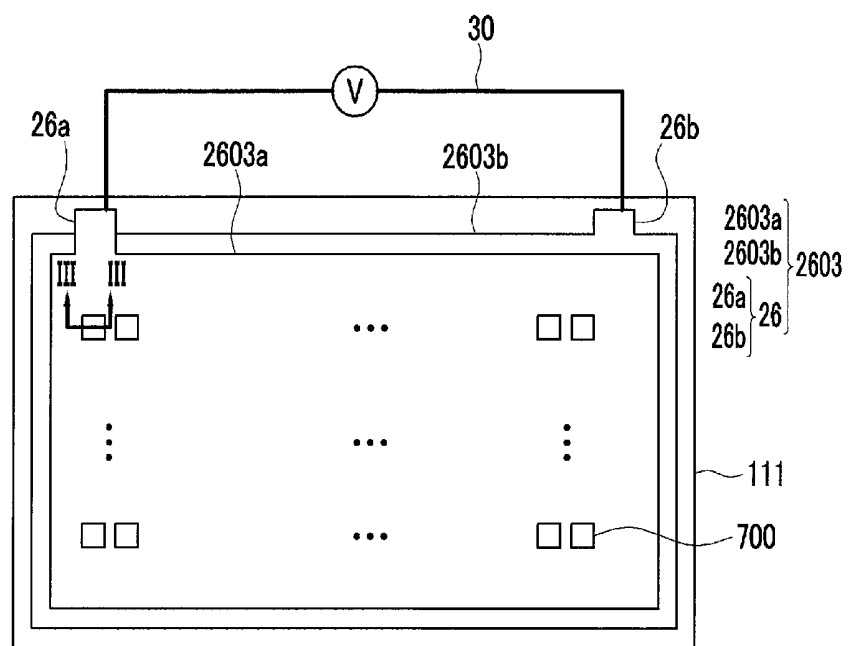


FIG. 3

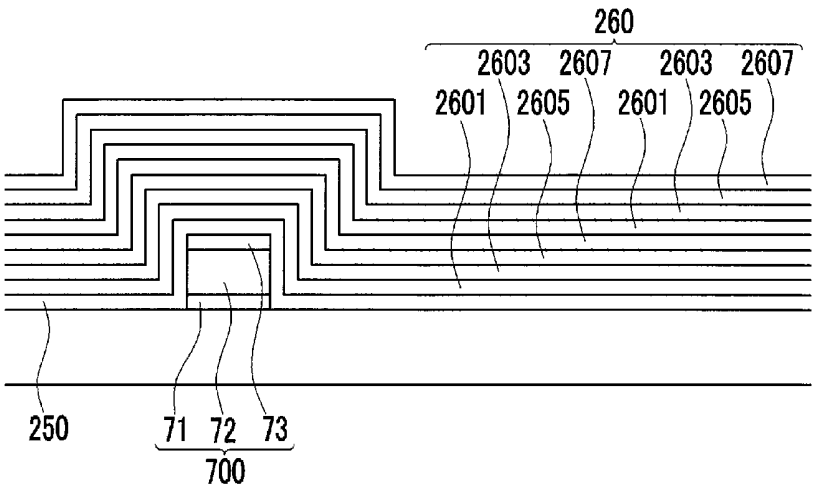


FIG. 4A

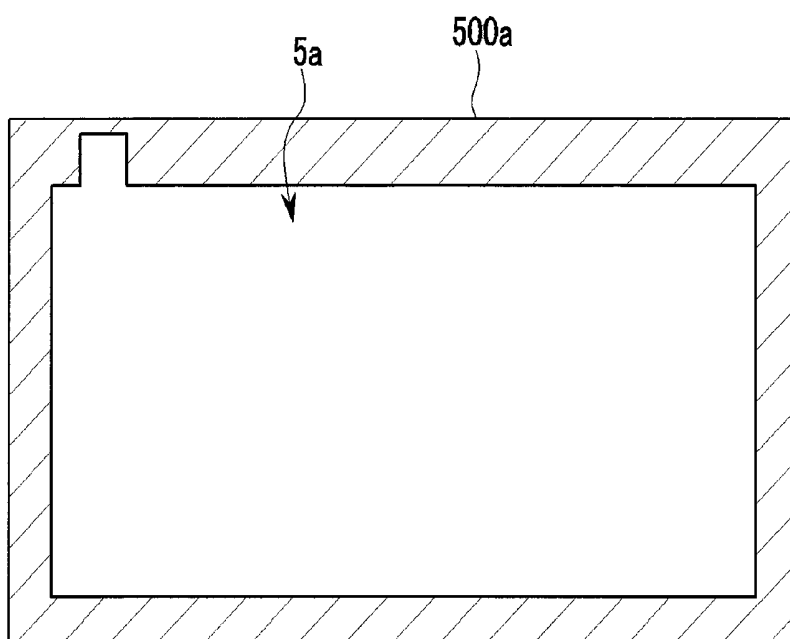


FIG. 4B

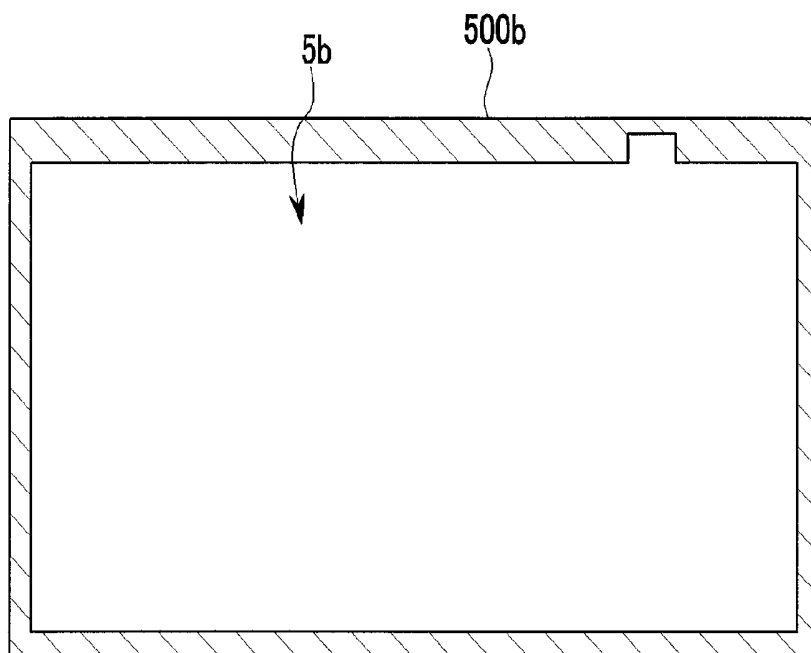


FIG. 4C

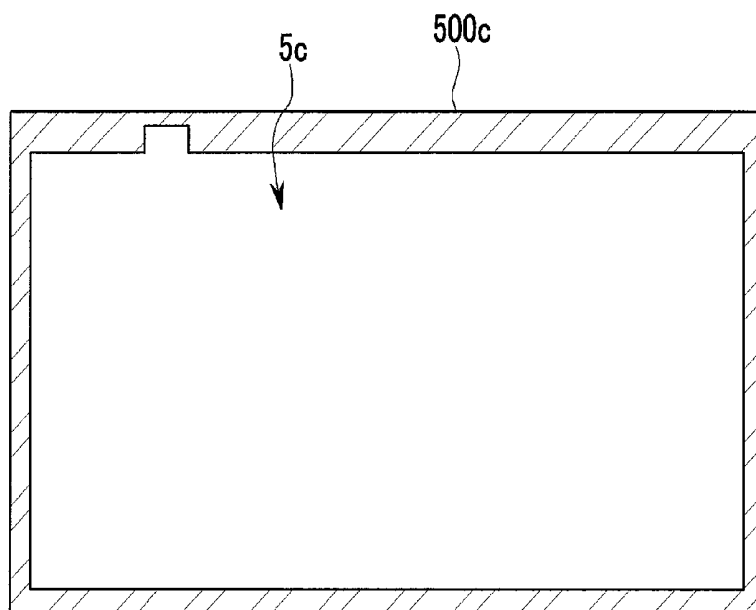


FIG. 4D

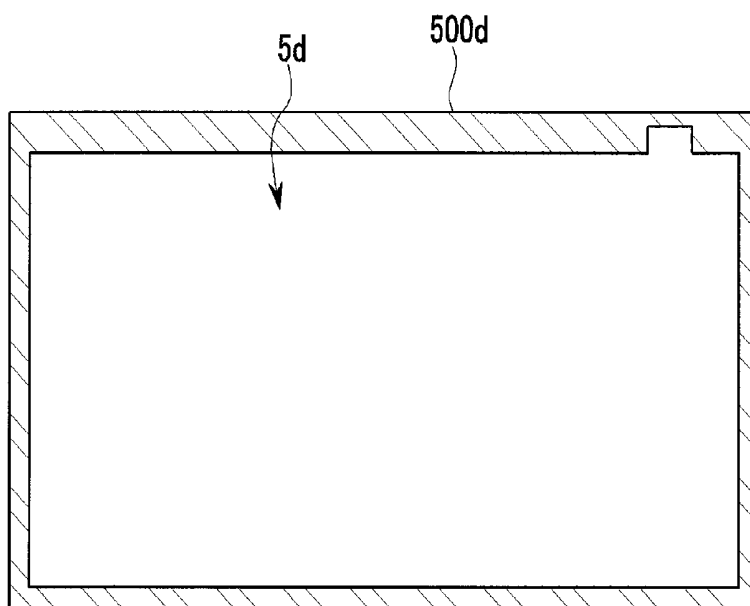


FIG. 5

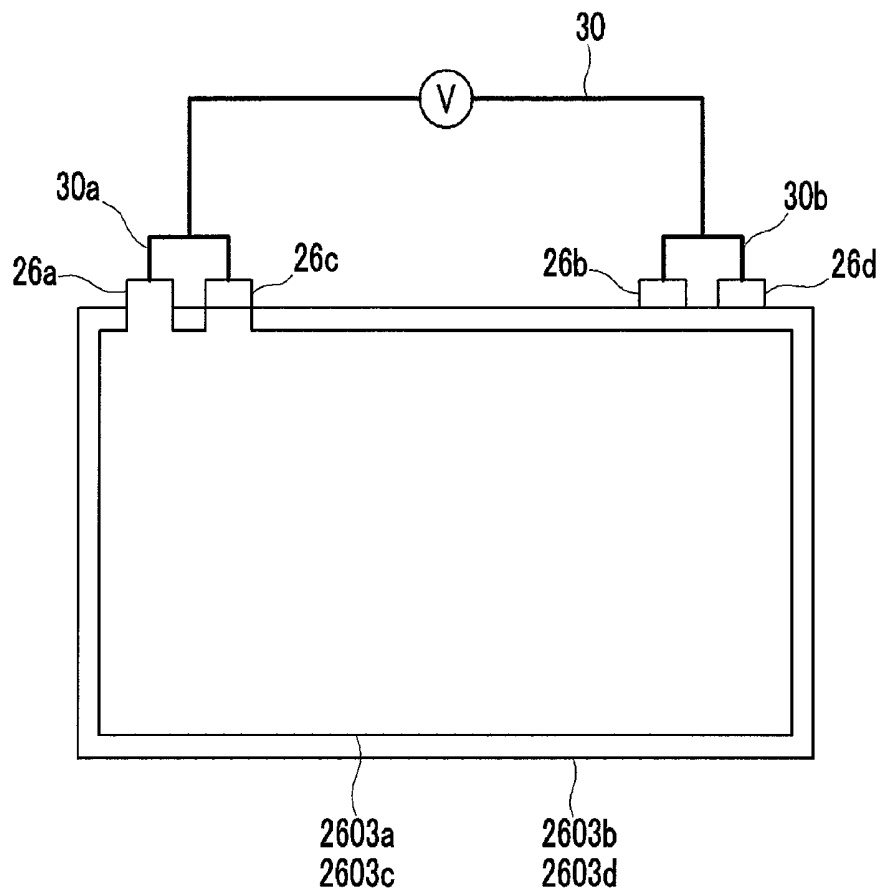


FIG. 6

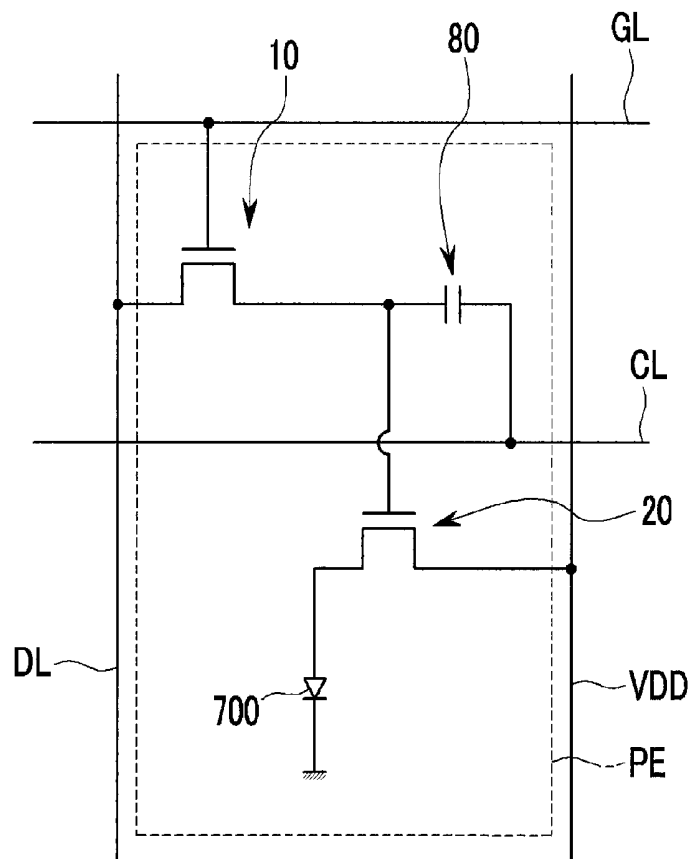
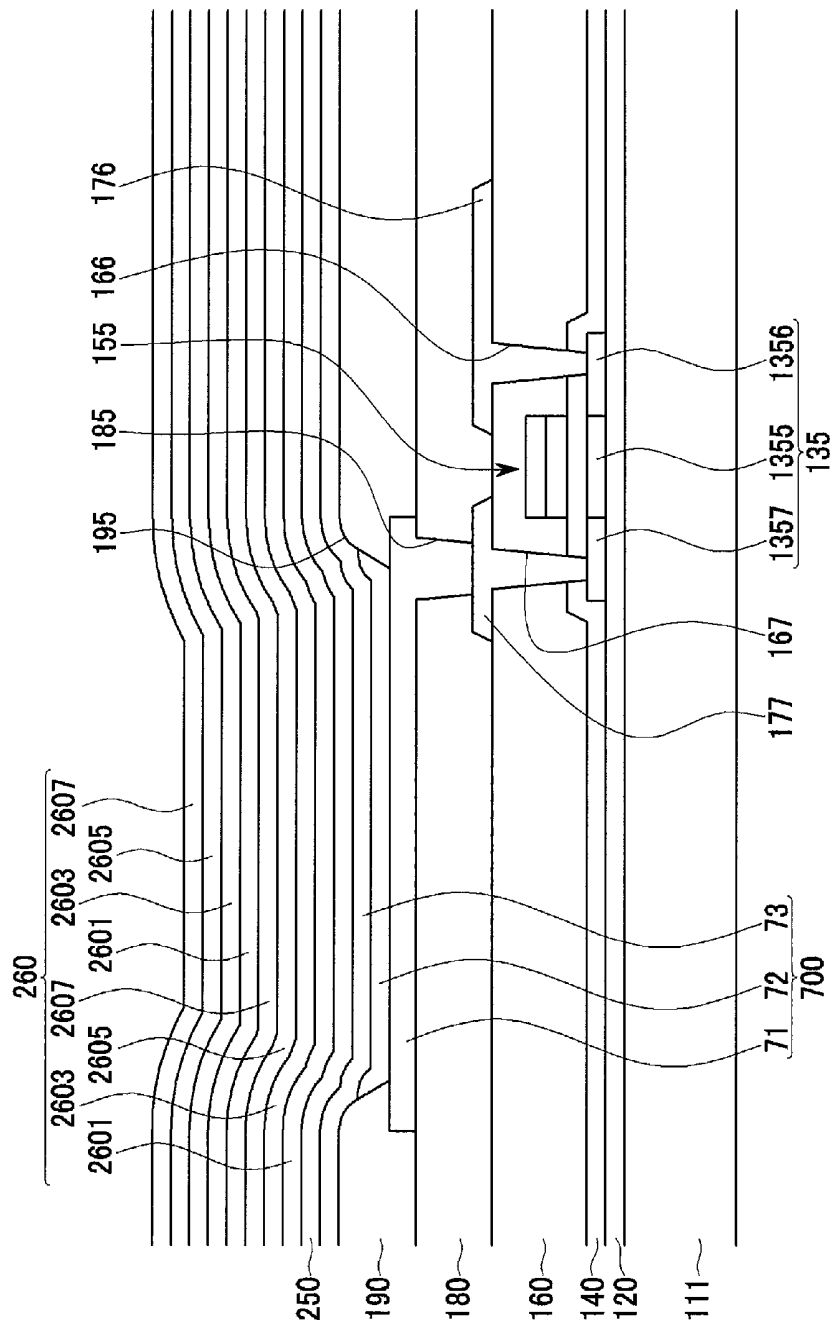


FIG. 7



ORGANIC LIGHT EMITTING DIODE DISPLAY

CROSS-REFERENCE TO RELATED APPLICATION

This application claims priority to and the benefit of Korean Patent Application No. 10-2012-0030132, filed in the Korean Intellectual Property Office on Mar. 23, 2012, the entire content of which is incorporated herein by reference.

BACKGROUND

1. Field

Aspects of embodiments of the present invention relate generally to an organic light emitting diode (OLED) display.

2. Description of the Related Art

An OLED display includes organic light emitting elements, each formed of a hole injection electrode (such as an anode), an organic emission layer, and an electron injection electrode (such as a cathode). Each OLED emits light by energy generated when excitons (that are created when electrons and holes are combined) drop from an excited state to a ground state. The OLED display displays an image by using the generated light.

The OLED display has self-luminance characteristics, and unlike a liquid crystal display (LCD), the thickness and weight of an OLED display can be reduced since a separate light source is not required. Further, because the OLED display has high quality characteristics such as low power consumption, high luminance, and high reaction speed, the OLED display is appropriate for use in a mobile electronic device.

Such an OLED display may experience a short-circuit problem in an anode and a cathode due to impurities such as particles. Accordingly, an aging or burning process may be added during a manufacturing process of the display device to eliminate the impurities. During the aging process, a shorting bar is formed by connecting data lines in one line and another shorting bar is formed by connecting scan lines in another line. After the aging process is performed, the shorting bars are disconnected.

However, the aging process is performed before the display device module is completed, such as before any thin film encapsulation. Thus, the aging process cannot be further performed to correct a failure generated due to fine particles that takes place after thin film encapsulation. Thus, a progressive failure is generated due to impurities such as non-eliminated fine particles.

The above information disclosed in this Background section is only for enhancement of understanding of the background of the present invention and therefore it may contain information that does not form the prior art that is already known in this country to a person of ordinary skill in the art.

SUMMARY

Aspects of embodiments of the present invention relate generally to an organic light emitting diode (OLED) display. More particularly, aspects of embodiments of the present invention relate to an OLED display that can perform aging after thin film encapsulation. Further aspects provide for an OLED display that can perform an aging process after completion of a module (panel or cell).

In an exemplary embodiment of the present invention, an organic light emitting diode (OLED) display is provided. The OLED display includes a substrate, an organic light emitting

element on the substrate, and a thin film encapsulation layer on the substrate and covering the organic light emitting element. The thin film encapsulation layer includes at least one conductive layer having a voltage application pad.

The OLED display may further include a buffering layer between the organic light emitting element and the thin film encapsulation layer.

The organic light emitting element may include an electron injection layer (EIL). The buffering layer may include a same material as the EIL.

The buffering layer may include at least one of LiQ, LiF, and WO₃.

The thin film encapsulation layer may further include an oxide layer between the at least one conductive layer and the buffering layer.

The oxide layer may include an aluminum oxide.

The thin film encapsulation layer may further include at least one of an organic layer or an inorganic layer on the at least one conductive layer.

The at least one conductive layer may be formed using a sputtering method or a plasma coating method.

The at least one conductive layer may include at least one of aluminum, tungsten, copper, and molybdenum.

A thickness of the at least one conductive layer may be less than 200 Å.

The at least one conductive layer may include a transparent conductive layer.

A voltage applied to the voltage application pad may be less than 50 V.

The OLED display according to an exemplary embodiment forms a conductive layer for aging between a buffering layer and an organic layer for forming a thin film encapsulation layer so that impurities can be effectively eliminated. Accordingly, few or no progressive failures due to the impurities occur in the OLED display.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic top plan view of a structure of an OLED display according to an exemplary embodiment.

FIG. 2 is a schematic top plan view of a display area of the OLED display of FIG. 1.

FIG. 3 is a cross-sectional view of FIG. 2, taken along the line III-III.

FIG. 4A to FIG. 4D sequentially illustrate masks used to iteratively form a conductive layer of a thin film encapsulation layer according to an exemplary embodiment.

FIG. 5 is a schematic layout view of the conductive layer formed using the masks of FIG. 4A to FIG. 4D.

FIG. 6 is an equivalent circuit diagram of a pixel circuit of the OLED display of FIG. 1 according to an exemplary embodiment.

FIG. 7 is a cross-sectional view of the OLED display of FIG. 1.

DETAILED DESCRIPTION

The present invention will be described more fully herein-after with reference to the accompanying drawings, in which exemplary embodiments of the invention are shown. As those skilled in the art would realize, the described embodiments may be modified in various different ways, all without departing from the spirit or scope of the present invention.

In the drawings, the thickness of layers, films, panels, regions, etc., are exaggerated for clarity. Like reference numerals designate like elements throughout the specification. It will be understood that when an element such as a

layer, film, region, or substrate is referred to as being “on” another element, it can be directly on the other element or intervening elements may also be present. In contrast, when an element is referred to as being “directly on” another element, there are no intervening elements present. Hereinafter, an organic light emitting diode (OLED) display according to exemplary embodiments will be described with reference to the drawings.

FIG. 1 is a schematic top plan view of a structure of an OLED display 101 according to an exemplary embodiment, FIG. 2 is a schematic top plan view of a display area DA of the OLED display 101 of FIG. 1, and FIG. 3 is a cross-sectional view of FIG. 2, taken along the line III-III.

As shown in FIG. 1, the OLED display 101 includes a substrate 111 divided into the display area DA and a non-display area NA. A plurality of pixels PE are formed in the display area DA of the substrate 111, and one of more driving circuits GD and DD are formed in the non-display area NA.

As shown in FIG. 2 and FIG. 3, the display area DA includes the substrate 111, an organic light emitting element 700 formed on the substrate 111, a buffering layer 250 formed on the organic light emitting element 700, and a thin film encapsulation layer 260 formed on the buffering layer 250. The organic light emitting element 700 is driven by a wiring portion including a thin film transistor (see FIG. 7) formed on the substrate 111.

The substrate 111 includes one or more of polymer, quartz, glass, metal, or the like, and is formed of a light transmissive material. The organic light emitting element 700 includes a first electrode 71, an organic emission layer 72, and a second electrode 73.

The buffering layer 250 is disposed between the organic light emitting element 700 and the thin film encapsulation layer 260 to protect the organic light emitting element 700 when the thin film encapsulation layer 260 is formed. The buffering layer 250 may be formed of a material that can be formed through an organic vapor deposition method like the organic emission layer 72. The material may be a material that forms an electron transport layer (ETL) of the organic light emitting element 700. For example, the material may include at least one of LiF, WO₃, and LiQ.

The thin film encapsulation layer 260 is an encapsulating member that encapsulates the organic light emitting element 700, and formed by layering at least one of an inorganic layer 2605, an organic layer 2607, a conductive layer 2603, and an oxide layer 2601. For example, the oxide layer 2601, the conductive layer 2603, the inorganic layer 2605, and the organic layer 2607 may be sequentially layered on the buffering layer 250, and the layering may be repeated two or more times as necessary. In addition, the oxide layer 2601 and the conductive layer 2603 are sequentially layered in that order in FIG. 3, but the conductive layer 2603 and the oxide layer 2601 may be sequentially layered in the other order in other embodiments. In the exemplary embodiment of FIG. 2 and FIG. 3, two of each of the layers are respectively formed, but one of each layer, or three or more of each layer may be formed in other embodiments.

The oxide layer 2601 may be, for example, an aluminum oxide. The conductive layer 2603 may include at least one of aluminum, tungsten, copper, and molybdenum. In addition, the conductive layer 2603 may include instead (or in addition to) a transparent conductive layer such as indium tin oxide. To form a conductive layer formed of an opaque metal, each layer should be sufficiently thin, for example, have a thickness of less than 50 Å, for light transmission. In addition, the entire thickness of the conductive layer 2603 should also be

sufficiently thin, for example, less than 200 Å, to permit light transmission when the conductive layer 2603 is layered in plural.

The conductive layer 2603 includes an application pad 26 for application of a voltage. The conductive layer 2603 may be layered in plural, and in this case, the application pad 26 is not overlapped as shown in FIG. 2. For convenience in description, a conductive layer 2603 having an application pad 26 on the left side (e.g., odd side) is referred to as a first conductive layer 2603a and a first application pad 26a, respectively, while a conductive layer 2603 having an application pad 26 on the right side (e.g., even side) is referred to as a second conductive layer 2603b and a second application pad 26b, respectively.

When the conductive layer 2603 is formed as in the exemplary embodiment of FIG. 1 to FIG. 3, impurities generated during a manufacturing process of the OLED display 101 can be effectively eliminated. In further detail, the first application pad 26a and the second application pad 26b are electrically connected to respective voltage sources through a voltage line 30, and the first conductive layer 2603a and the second conductive layer 2603b apply voltages, for example, constant voltages. The constant voltages may be DC or AC voltages. For example, the voltage between the first conductive layer 2603a and the second conductive layer 2603b may be some voltage lower than 50 V for burning the impurity when the constant voltages are DC voltages. In some embodiments, one of the first conductive layer 2603a or the second conductive layer 2603b may be formed as an additional ground line or as a ground electrode for supplying a ground voltage.

As described, when a voltage of, for example, several tens of volts is applied to the first and second conductive layers 2603a and 2603b, an electric field of several tens of volts is formed in the impurity and thus, the impurity is burned. Accordingly, the impurity in the thin film encapsulation layer 260 can be easily eliminated. Thus, a process for eliminating the impurity in the thin film encapsulation layer 260 can be performed after the thin film encapsulation process is completed in the manufacture of the OLED display 101.

Hereinafter, a method for manufacturing the conductive layer 2603 of FIG. 2 will be described in further detail with reference to FIG. 4A to FIG. 4D and FIG. 5.

FIG. 4A to FIG. 4D sequentially show masks used to iteratively form the conductive layer 2603 of the thin film encapsulation layer 260 according to an exemplary embodiment, and FIG. 5 is a schematic layout view of the conductive layer 2603 formed using the masks of FIG. 4A to FIG. 4D.

In FIG. 2, two conductive layers, specifically the first conductive layer 2603a and the second conductive layer 2603b, are formed in the OLED display. However, in the exemplary embodiment of FIG. 4 and FIG. 5, four conductive layers 2603 are exemplarily formed. For convenience in description, reference numerals a, b, c, and d are sequentially added according to an order of forming the conductive layer 2603.

First, as shown in FIG. 4A and FIG. 5, a first mask 500a is disposed on the substrate and then the first conductive layer 2603a is formed on the substrate using, for example, a sputtering method or a plasma coating method. A first opening 5a having the same shape as the first conductive layer 2603a, including the first application pad 26a, is formed in the first mask 500a. The first opening 5a is disposed to correspond to the display area DA (refer to FIG. 1), excluding an edge driver of the OLED display 101.

Then, an inorganic layer, an organic layer, and an oxide layer are sequentially layered. The layering order may be changed as necessary. Since the inorganic layer, the organic

layer, and the oxide layer do not include the first application pad **26a**, they can be formed using masks used to form corresponding organic and inorganic layers, and they are not layered on the first application pad **26a**.

Next, as shown in FIG. 4B and FIG. 5, the second mask **500b** is disposed and then the second conductive layer **2603b** is formed on the oxide layer through, for example, sputtering or plasma coating. The second mask **500b** includes a second opening **5b** that is the same as the second conductive layer **2603b**, including the second application pad **26b**. In addition, an inorganic layer, an organic layer, and an oxide layer are sequentially layered. The layering order may be changed as necessary.

Then, as shown in FIG. 4C and 5, the third conductive layer **2603c** is formed on the oxide layer where a third mask **500c** having a third opening **5c** is disposed, and then an inorganic layer, an organic layer, and an oxide layer are formed. Then, as shown in FIG. 4D and FIG. 5, a fourth mask **500d** having a fourth opening **5d** is disposed on the oxide layer and then the fourth conductive layer **2603d** is formed. After that, an organic layer and an inorganic layer may be additionally formed.

Meanwhile, as shown in FIG. 5, when four or more of conductive layers are formed, odd-numbered application pads **26a** and **26c** are electrically connected with each other through a wire **30a** and even-numbered application pads **26b** and **26d** are electrically connected with each other through a wire **30b** and then a constant voltage can be applied through the voltage line **30**. That is, the even-numbered application pads **26b** and **26d** are connected with a positive (+) electrode and the odd-numbered application pads **26a** and **26c** are connected with a negative (-) electrode such that the entire thin film encapsulation layer **260** can be aged at the same time.

In the above-described exemplary embodiment, the conductive layer **2603** is formed to correspond to the display area DA (refer to FIG. 1), excluding the edge driver of the display device, but the conductive layer may be formed only in an area, excluding an area that corresponds to an organic emission layer **72** of an organic light emitting element **700** of each pixel PE of the display device. Thus, light efficiency of the OLED display **101** can be increased, for example, by using a photosensitive pattern that is formed only on the organic emission layer **72**, and then the photosensitive pattern may be eliminated by etching.

Hereinafter, the OLED display **101** including the thin film encapsulation layer **260** will be described in further detail, focusing on a pixel PE.

FIG. 6 is an equivalent circuit diagram of a pixel circuit of the OLED display **101** of FIG. 1 according to an exemplary embodiment.

As shown in FIG. 6, one pixel PE has a 2Tr-1Cap (two transistor, one capacitor) structure with an organic light emitting element (for example, an OLED) **700**, two thin film transistors (TFTs) **10** and **20**, and a capacitor **80**. However, the present invention is not limited thereto. The OLED display **101** may be variously structured such that three or more thin film transistors and two or more capacitors are provided at one pixel PE together with corresponding control wiring. The additional thin film transistor and capacitors may form, for example, a compensation circuit.

The compensation circuit improves the uniformity of the OLED **700** formed at each pixel PE, and prevents the image quality from varying. The compensation circuit may include, for example, two to eight thin film transistors. Furthermore, driving circuits GD and DD (see FIG. 1) formed in the non-display area NA of the substrate **111** may include additional thin film transistors.

The OLED **700** includes an anode functioning as a hole injection electrode, a cathode functioning as an electron injection electrode, and an organic emission layer **72** (see FIG. 3) disposed between the anode and the cathode. The anode and the cathode may be the first electrode and the second electrode, respectively or vice versa, of FIG. 3.

In the exemplary embodiment of FIG. 6, one pixel PE includes a first thin film transistor **10** and a second thin film transistor **20**. The first thin film transistor **10** and the second thin film transistor **20** respectively include gate electrodes, semiconductor layers, source electrodes, and drain electrodes. In addition, a semiconductor layer of at least one of the first thin film transistor **10** and the second thin film transistor **20** includes an impurity-doped polycrystalline silicon layer. That is, at least one thin film transistor of the first thin film transistor **10** and the second thin film transistor **20** is a polysilicon thin film transistor.

FIG. 6 illustrates a gate line GL, a data line DL, a common power line VDD, and a capacitor line CL. However, the capacitor line CL may be omitted in other embodiments. A source electrode of the first thin film transistor **10** is connected to the data line DL, and a gate electrode of the first thin film transistor **10** is connected to the gate line GL. In addition, a drain electrode of the first thin film transistor **10** is connected to the capacitor line CL through the capacitor **80**. A node is formed between the drain electrode of the first thin film transistor **10** and the capacitor **80** so that a gate electrode of the second thin film transistor **20** is connected thereto. In addition, the common power line VDD is connected to a source electrode of the second thin film transistor **20** and a drain electrode thereof is connected with the anode of the organic light emitting element **700**.

The first thin film transistor **10** is used as a switching electrode that selects a pixel PE for light emission. When the first thin film transistor **10** is turned on, the capacitor **80** is charged and the amount of charge is proportional to a potential of a voltage applied from the data line DL. In addition, when a voltage increasing signal is input to the capacitor line CL with one frame cycle while the first thin film transistor **10** is turned off, a gate potential of the second thin film transistor **20**, with reference to the potential charged in the capacitor **80**, rises according to the voltage that is applied through the capacitor line CL. Then, the second thin film transistor **20** is turned on when the gate potential exceeds a threshold voltage. Afterwards, the voltage applied to the common power line VDD is applied to the organic light emitting element **700** through the second thin film transistor **20** and the organic light emitting element **700** emits light.

Hereinafter, an interlayer configuration of one pixel PE of the OLED display **101** according to the exemplary embodiment of FIG. 1 to FIG. 3 will be described in further detail with reference to FIG. 7.

FIG. 7 is a cross-sectional view of the OLED display **101** of FIG. 1.

FIG. 7 illustrates the second thin film transistor **20** of FIG. 6 and the organic light emitting element **700** of FIG. 2 according to a layering order. Hereinafter, the second thin film transistor **20** is referred to as a thin film transistor.

The substrate **111** may be an insulating substrate formed of glass, quartz, ceramic, or the like. A lower buffering layer **120** is formed on the substrate **111** to prevent permeation of undesired components such as an impurity or moisture and at the same time flatten the surface thereof.

A semiconductor **135** formed of polycrystalline silicon is formed on the lower buffering layer **120**. The semiconductor **135** is divided into a channel area **1355**, along with a source area **1356** and a drain area **1357** formed on respective sides of

the channel area **1355**. The channel area **1355** of the semiconductor **135** is polycrystalline silicon not doped with particles, that is, an intrinsic semiconductor. The source area **1356** and the drain area **1357** of the semiconductor **135** are polycrystalline silicon doped with a conductive impurity, that is, impurity semiconductors. The impurity doped to the source area **1356** and the drain area **1357** may be one of a p-type impurity and an n-type impurity.

A gate insulating layer **140** is formed on the semiconductor **135**. The gate insulation layer **140** may be a single layer or a multiple layer including at least one of tetra ethyl ortho silicate (TEOS), silicon nitride, and silicon oxide. A gate electrode **155** is formed on the gate insulating layer **140**. The gate electrode **155** overlaps the channel area **1355**.

An interlayer insulating layer **160** is formed on the gate electrode **155**. Like the gate insulation layer **140**, the interlayer insulation layer **160** may be formed of tetra ethyl ortho silicate (TEOS), silicon nitride, or silicon oxide. The interlayer insulating layer **160** and the gate insulating layer **140** include a source contact hole **166** and a drain contact hole **167** respectively exposing the source area **1356** and the drain area **1357**.

A source electrode **176** and a drain electrode **177** are formed on the interlayer insulating layer **160**. The source electrode **176** is connected with the source area **1356** through the source contact hole **166**, and the drain electrode **177** is connected with the drain area **1357** through the drain contact hole **167**. A protective layer **180** is formed on the interlayer insulating layer **160**. The protective layer **180** includes a contact hole **185** exposing the drain electrode **177**.

A pixel electrode **71** is formed on the protective layer **180** and connected with the drain electrode **177** through the contact hole **185**. The pixel electrode **71** may be the first electrode **71** of FIG. 3, and may be an anode of the organic light emitting element **700**.

A pixel defining layer **190** is formed on the pixel electrode **71**. The pixel defining layer **190** includes an opening **195** exposing the pixel electrode **71**. The pixel defining layer **190** may be formed by including a resin such as polyacrylates or polyimides and a silica-based inorganic material.

An organic emission layer **72** is formed in the opening **195** of the pixel defining layer **190**. The organic emission layer **72** may be formed as a multi-layer including one or more of an organic light emission layer (EML), a hole injection layer (HIL), a hole transport layer (HTL), an electron transport layer (ETL), and an electron injection layer (EIL). If the organic emission layer **72** includes all of these layers, the hole injection layer is disposed on the pixel electrode **71**, on which the hole transport layer, the organic light emission layer, the electron transport layer, and the electron injection layer are then sequentially stacked.

A common electrode **73** is formed on the pixel defining layer **190** and the organic emission layer **72**. The common electrode **73** may be the second electrode **73** of FIG. 2, and may be a cathode of the organic light emitting element **700**. Thus, the pixel electrode **71**, the organic emission layer **72**, and the common electrode **73** form the organic light emitting element **700**.

The OLED display **101** may be structured in any one of a front display type, a rear display type, and a one-panel dual display type, depending upon the light-emitting direction of the OLED **700**. If the OLED display **101** is structured as the front display type, the pixel electrode **71** may be formed with a reflective film and the common electrode **73** may be formed with a semitransparent film. If the OLED display **101** is structured as the rear display type, the pixel electrode **71** may be formed with a semitransparent film and the common elec-

trode **73** may be formed with a reflective film. If the OLED display **101** is structured as the one panel dual display type, each of the pixel electrode **71** and the common electrode **73** may be formed with a transparent film or a semitransparent film.

The reflective film and the semitransparent film are formed with at least one metallic material selected from magnesium (Mg), silver (Ag), gold (Au), calcium (Ca), lithium (Li), chromium (Cr), aluminum (Al), and alloys thereof. Whether a given film is a reflective film or a semitransparent film is determined depending upon the thickness thereof. The semitransparent film usually has a thickness of 200 nm or less. With the semitransparent film, the smaller the thickness is, the more light transmittance is increased and the more resistance is increased. The transparent film is formed with indium tin oxide (ITO), indium zinc oxide (IZO), zinc oxide (ZnO), or indium oxide (In₂O₃).

The buffering layer **250** is formed on the common electrode **73**, and the thin film encapsulation layer **260** is formed on the buffering layer **250**. The buffering layer **250** may be formed of the same material of the electron injection layer (EIL) of the organic light emitting element, and may include at least one of LiF, WO₃, and LiQ. When the buffering layer is formed of the electron injection layer (EIL), light efficiency of the OLED display **101** can be increased.

As shown in FIG. 3, the oxide layer **2601** formed on the buffering layer **250**, the conductive layer **2603** formed on the oxide layer **2601**, and the inorganic and organic layers **2605** and **2607** formed on the conductive layer are each layered two times such that the thin film encapsulation layer **260** is formed. In other embodiments, the conductive layer **2603** and then the oxide layer **2601** may be layered on the buffering layer **250**.

When the thin film encapsulation layer **260** is formed including the conductive layer **2603** as in the exemplary embodiment of FIG. 1 to FIG. 3, an impurity can be easily eliminated by applying a constant voltage (for example, a voltage less than 50 V) to the conductive layer **2603**.

While this disclosure has been described in connection with what is presently considered to be practical exemplary embodiments, it is to be understood that the invention is not limited to the disclosed embodiments, but, on the contrary, is intended to cover various modifications and equivalent arrangements included within the spirit and scope of the appended claims, and equivalents thereof.

<Description of some symbols>

5a: first opening	5b: second opening
5c: third opening	5d: fourth opening
10: first thin film transistor	20: second thin film transistor
26: application pad	26a: first application pad
26b: second application pad	26c: third application pad
26d: fourth application pad	30: voltage line
30a, 30b: wire	71: pixel electrode
72: organic emission layer	73: common electrode
80: capacitor	101: OLED display
111: substrate	
120: lower buffering layer	135: semiconductor
140: gate insulating layer	155: gate electrode
160: interlayer insulating layer	166: source contact hole
167: drain contact hole	176: source electrode
177: drain electrode	180: protective layer
190: pixel defining layer	195: opening
250: buffer layer	260: thin film encapsulation layer
500a: first mask	500b: second mask
500c: third mask	500d: fourth mask
700: organic light emitting element	1355: channel area
1356: source area	1357: drain area

<Description of some symbols>	
2601: oxide layer	2603: conductive layer
2603a: first conductive layer	2603b: second conductive layer
2603c: third conductive layer	2603d: fourth conductive layer
2605: inorganic layer	2607: organic layer

What is claimed is:

1. An organic light emitting diode (OLED) display comprising:
a substrate;
an organic light emitting element on the substrate and comprising a first electrode, an organic emission layer on the first electrode, and a second electrode on the organic emission layer; and
a pair of thin film conductive encapsulation layers sequentially formed on and encapsulating the organic light emitting element, each of the thin film conductive encapsulation layers having a voltage application pad.
2. The OLED display of claim 1, further comprising a buffering layer between the organic light emitting element and the thin film conductive encapsulation layers.
3. The OLED display of claim 2, wherein the organic light emitting element further comprises an electron injection layer (EIL), and the buffering layer comprises a same material as the EIL.
4. The OLED display of claim 3, wherein the buffering layer comprises at least one of LiQ, LiF, and WO₃.

5. The OLED display of claim 2, further comprising an oxide layer between at least one of the thin film conductive encapsulation layers and the buffering layer.
6. The OLED display of claim 5, wherein the oxide layer comprises an aluminum oxide.
7. The OLED display of claim 2, further comprising at least one of an organic layer or an inorganic layer on at least one of the thin film conductive encapsulation layers.
8. The OLED display of claim 1, wherein at least one of the thin film conductive encapsulation layers is formed on the organic light emitting element using a sputtering method or a plasma coating method.
9. The OLED display of claim 8, wherein the at least one of the thin film conductive encapsulation layers comprises at least one of aluminum, tungsten, copper, and molybdenum.
10. The OLED display of claim 9, wherein a thickness of the at least one of the thin film conductive encapsulation layers is less than 200 Å.
11. The OLED display of claim 8, wherein the at least one of the thin film conductive encapsulation layers comprises a transparent conductive layer.
12. The OLED display of claim 1, wherein the thin film conductive encapsulation layers are configured to receive a voltage difference applied to the voltage application pad of each of the thin film conductive encapsulation layers that is less than 50 V (volts) to burn impurities between the thin film conductive encapsulation layers.
13. The OLED display of claim 12, wherein the voltage difference is at least several tens of volts.

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专利名称(译)	有机发光二极管显示器		
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申请号	US13/585818	申请日	2012-08-14
[标]申请(专利权)人(译)	YOO宰豪		
申请(专利权)人(译)	YOO , JAE-HO		
当前申请(专利权)人(译)	三星DISPLAY CO. , LTD.		
[标]发明人	YOO JAE HO		
发明人	YOO, JAE-HO		
IPC分类号	H01L51/52 H01L51/56		
CPC分类号	H01L51/5256 H01L51/56 H01L2251/562		
优先权	1020120030132 2012-03-23 KR		
其他公开文献	US20130248890A1		
外部链接	Espacenet USPTO		

摘要(译)

提供了一种有机发光二极管 (OLED) 显示器。 OLED显示器包括基板 , 在基板上的有机发光元件以及在基板上并覆盖有机发光元件的薄膜封装层。薄膜封装层包括至少一个具有电压施加垫的导电层。

