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(54) ORGANIC LIGHT EMITTING DIODE DISPLAY

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(57) **ABSTRACT**

An OLED display including: a substrate main body; a first transflective electrode formed on the substrate main body; an organic emission layer formed on the first transflective electrode; a second transflective electrode formed on the organic emission layer; and a dual brightness enhancement film (DBEF) disposed on a dual brightness enhancement film (DBEF) on at least one of a side of the first transflective electrode facing away from the organic emission layer, or a side of the second transflective electrode facing away from the organic emission layer.

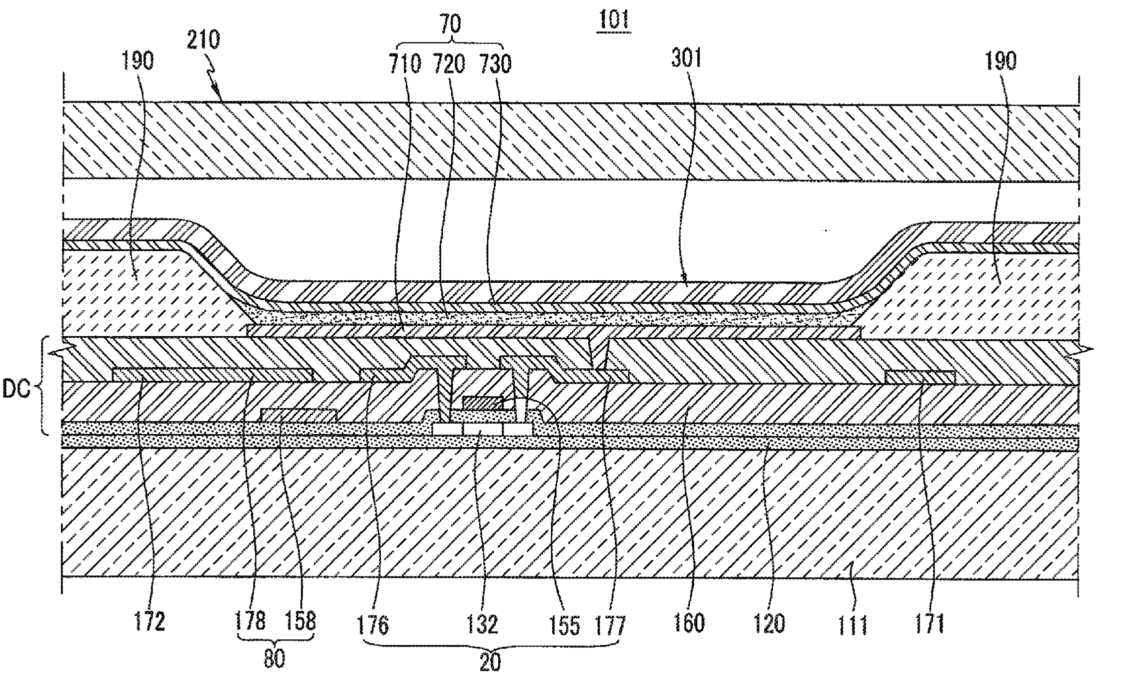


FIG.1

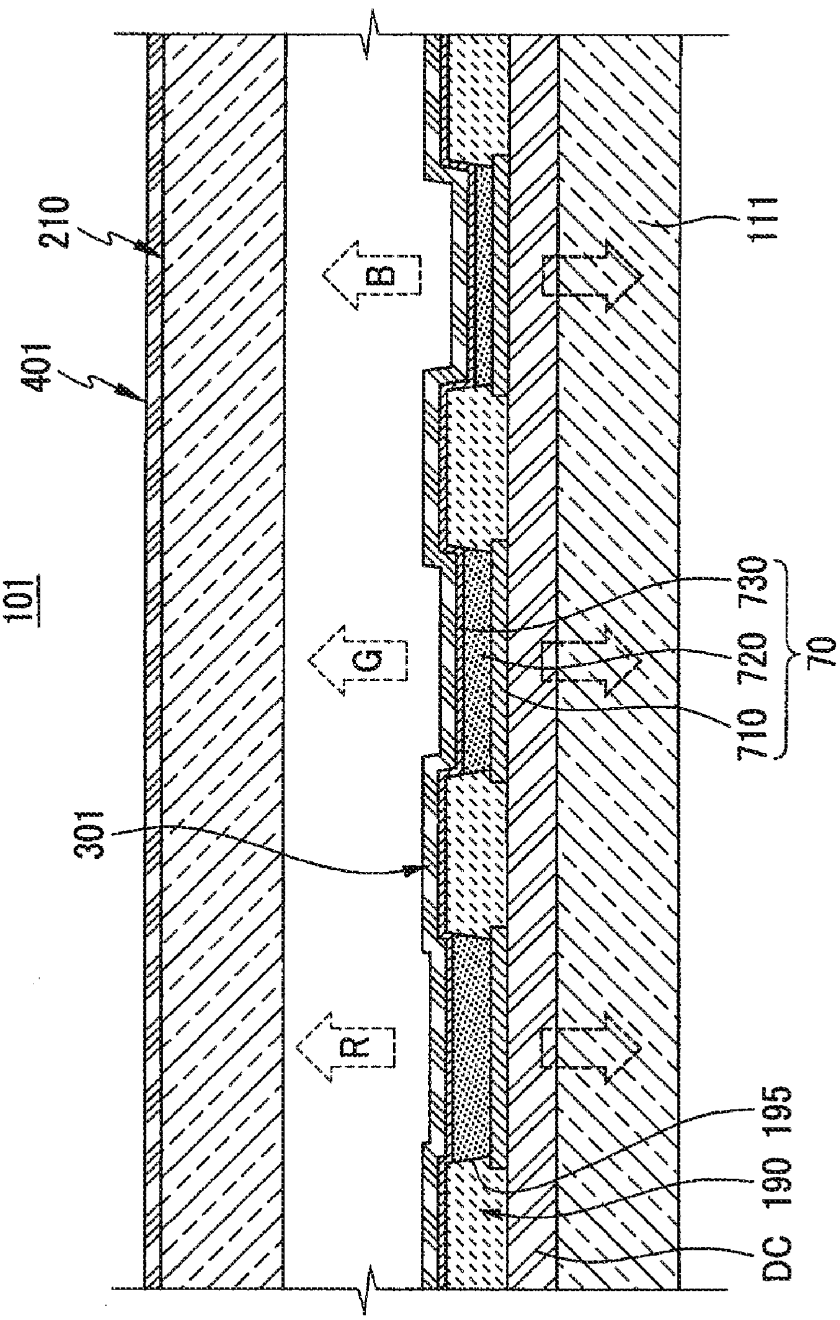


FIG.2

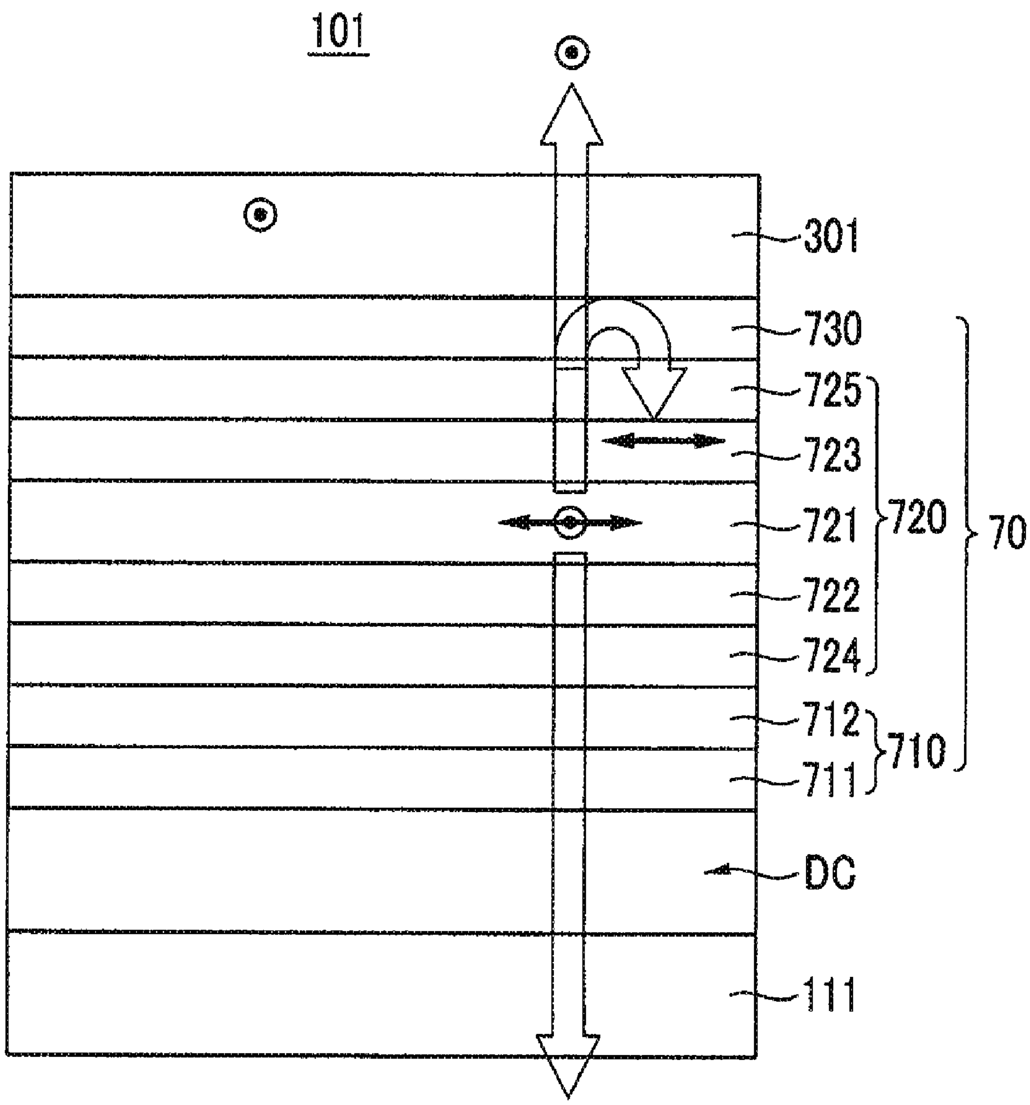


FIG.3

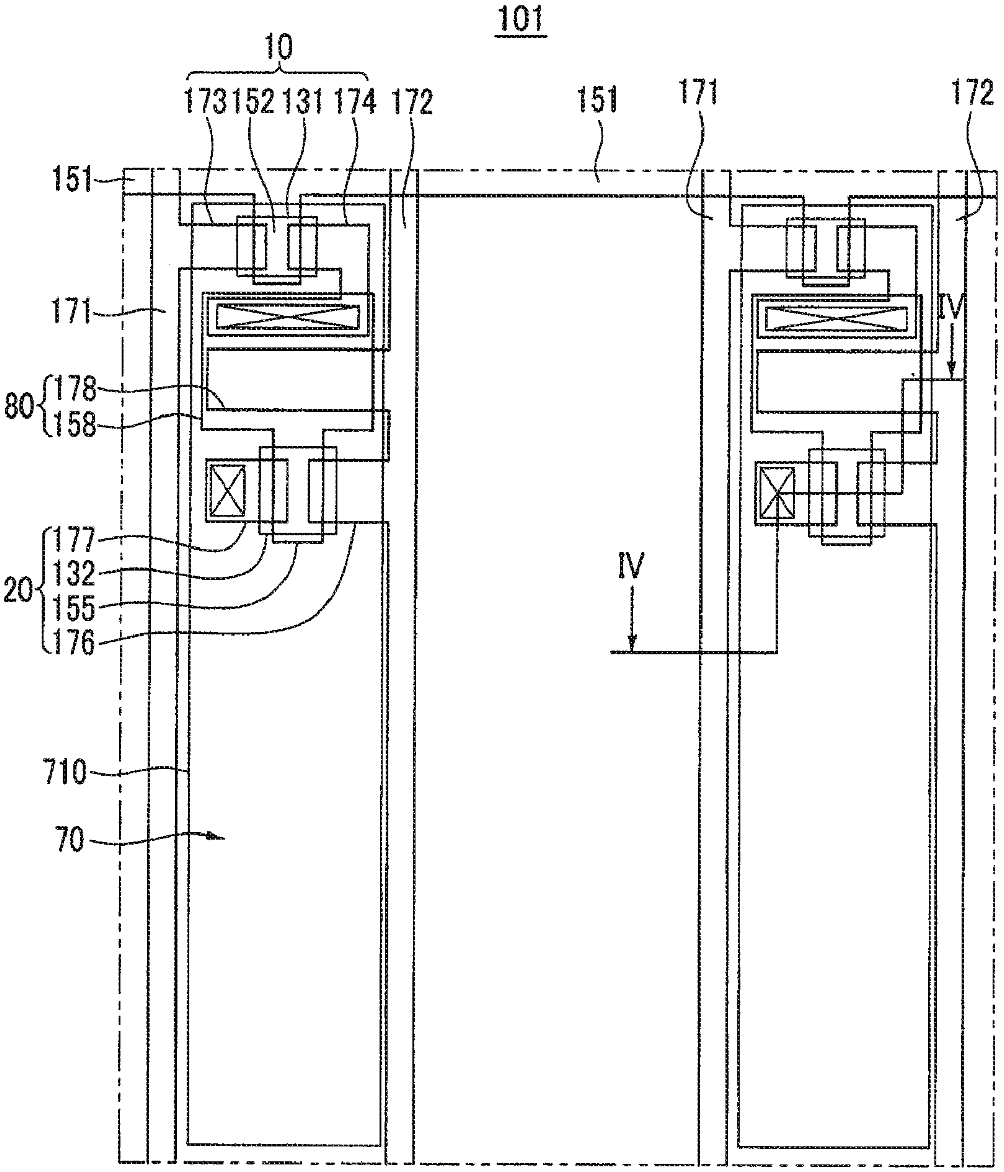

101
10
173
152
131
174
172
151
171
172
151
171
IV
80
178
158
177
132
20
155
176
IV
710
70

FIG.4

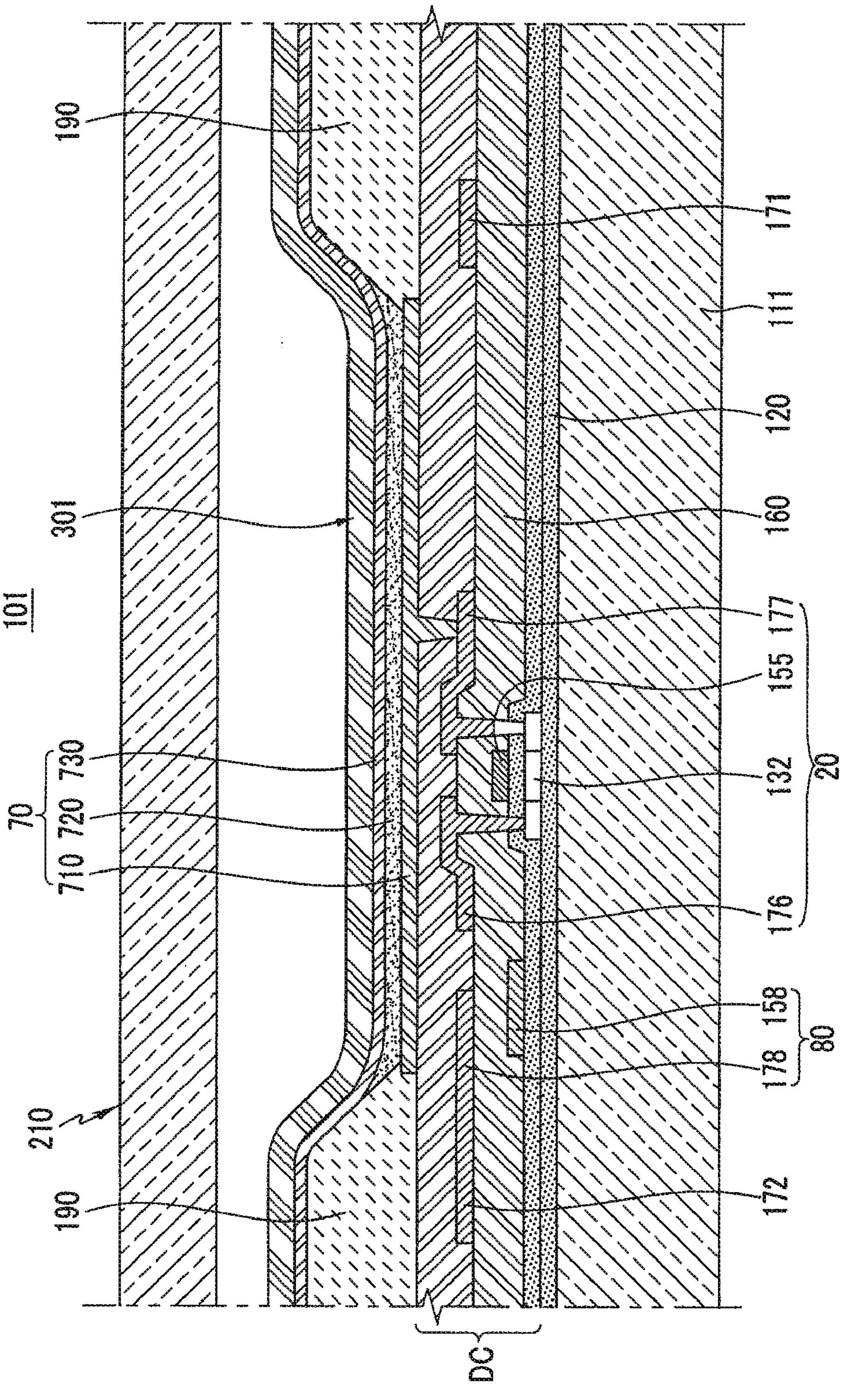
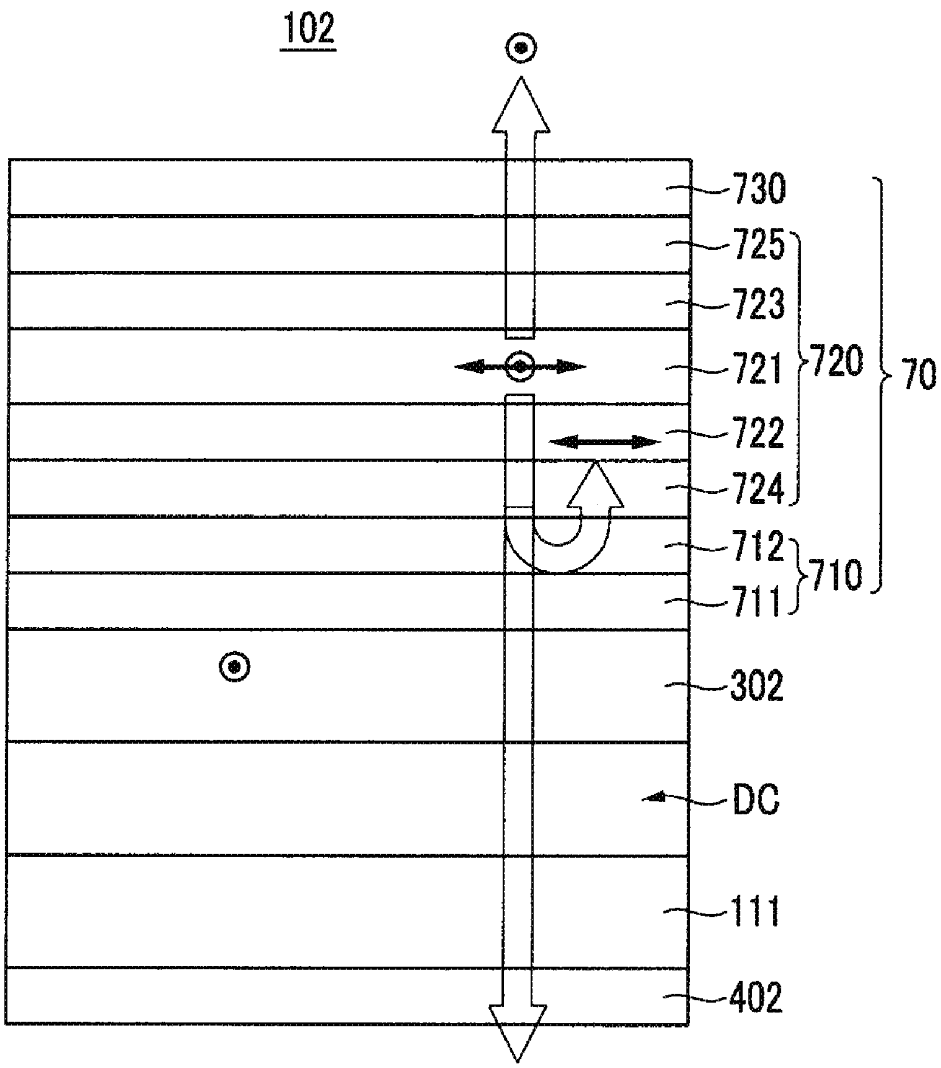

101
190
301
70
730
720
710
210
190
171
111
120
160
177
155
132
20
176
158
178
80
172
DC

FIG.5



ORGANIC LIGHT EMITTING DIODE DISPLAY

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims priority to and the benefit of Korean Patent Application No. 10-2010-0004502, filed in the Korean Intellectual Property Office on Jan. 18, 2010, the entire content of which is incorporated herein by reference.

BACKGROUND

[0002] 1. Field

[0003] The following description relates generally to an organic light emitting diode (OLED) display. More particularly, it relates to a dual-side emission type of OLED display.

[0004] 2. Description of the Related Art

[0005] An organic light emitting diode (OLED) display is a self emissive display device that displays images with organic light emitting diodes. The organic light emitting diode emits light by way of energy generated when excitons (the excitons being combinations of electrons and holes) within an organic emission layer fall from an excited state to a ground state, and the OLED display displays an image using the light.

[0006] When the OLED display is used in a bright area, black color expression and contrast thereof become poor due to the reflection of external light. In order to solve such a problem, polarizing and phase retardation plates are provided on the organic light emitting diode so as to suppress the reflection of external light. However, when the polarizing and phase delay plates are used, some of the light generated from the organic emission layer is lost or eliminated when the light is emitted to the outside of the OLED display through the polarizing and the phase delay plates.

[0007] The OLED display is a self emissive display that does not use an external light source so that it can display an image on both sides concurrently or simultaneously. However, when the conventional polarizing plate and the phase delay plate are applied to the dual-side emission type of OLED display, loss of light generated from the organic emission layer is further increased.

[0008] The above information disclosed in this Background section is only for enhancement of understanding of the background of the described technology 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

[0009] Exemplary embodiments have been made in an effort to provide a dual-side emission type of OLED display with improved light efficiency.

[0010] An OLED display according to an exemplary embodiment includes: a substrate main body; a first transflective electrode on the substrate main body; an organic emission layer on the first transflective electrode; a second transflective electrode on the organic emission layer; and a dual brightness enhancement film (DBEF) on at least one of a side of the first transflective electrode facing away from the organic emission layer, or a side of the second transflective electrode facing away from the organic emission layer.

[0011] In one embodiment, the first and second transflective electrodes include a transparent conductive material. The transparent conductive material may comprise at least one of indium tin oxide (ITO), indium zinc oxide (IZO), zinc oxide (ZnO), or indium oxide (In_2O_3). In one embodiment, one of the first and second transflective electrodes for injecting holes into the organic emission layer comprises the transparent conductive material.

[0012] In one embodiment, the first and second transflective electrodes comprise a transflective metal. The transflective metal may comprise magnesium (Mg), silver (Ag), gold (Au), calcium (Ca), lithium (Li), chromium (Cr), aluminum (Al), or an alloy thereof. In one embodiment, the transflective metal has a thickness of 5 nm to 50 nm.

[0013] In one embodiment, the first and second transflective electrodes comprise a transparent conductive material and a transflective metal

[0014] In one embodiment, the DBEF is configured to pass light parallel with a polarization axis and to reflect light not parallel with the polarization axis.

[0015] In one embodiment, an encapsulation member is disposed facing the substrate main body and covering the first transflective electrode, the organic emission layer, and the second transflective electrode. Here, light generated from the organic emission layer may be emitted in a direction to the substrate main body or the encapsulation member to display an image. The DBEF may be on the second transflective electrode. In one embodiment, a polarizing plate is attached to the encapsulation member, and the polarizing plate has a polarization axis parallel with the DBEF. The DBEF may be disposed below the first transflective electrode. In one embodiment, a polarizing plate is further attached with the substrate main body, and the polarizing plate has a polarization axis parallel with the DBEF.

[0016] According to the exemplary embodiments, the OLED display can improve light efficiency while displaying an image on both sides.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] FIG. **1** is a partial cross-sectional view of an OLED display according to a first exemplary embodiment.

[0018] FIG. **2** is an enlarged cross-sectional view of an organic light emitting element of FIG. **1**.

[0019] FIG. **3** is a layout view of a pixel circuit of the OLED display of FIG. **1**.

[0020] FIG. **4** is a cross-sectional view of FIG. **3**, taken along the line IV-IV.

[0021] FIG. **5** is a partial cross-sectional view of an OLED display according to a second exemplary embodiment.

DETAILED DESCRIPTION

[0022] The present invention will be described more fully hereinafter 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.

[0023] Like reference numerals designate like elements throughout the specification. In exemplary embodiments other than the first exemplary embodiment among several exemplary embodiments, elements different from those of the first exemplary embodiment will be described.

[0024] Furthermore, as the size and thickness of the respective structural components shown in the drawings are arbitrarily illustrated for explanatory convenience, the present invention is not necessarily limited to as illustrated.

[0025] In the drawings, the thickness of layers, films, panels, regions, etc., are exaggerated for clarity. In the drawings, for better understanding and ease of description, thicknesses of some layers and areas are excessively displayed. 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 one or more intervening elements therebetween may also be present.

[0026] Hereinafter, referring to FIG. **1** to FIG. **4**, an OLED display **101** according to a first exemplary embodiment will be described.

[0027] As shown in FIG. **1**, the OLED display **101** according to the first exemplary embodiment includes a substrate main body **111**, a driving circuit (DC), an organic light emitting element **70**, a dual brightness enhancement film (DBEF) **301**, and an encapsulation member **210**. In addition, the OLED display **101** further includes a polarizing plate **401**.

[0028] The substrate main body **111** may be formed of a transparent insulating material made of glass, quartz, or ceramic, or may be formed of a transparent flexible substrate made of plastic.

[0029] The driving circuit DC is formed on the substrate main body **111**. The driving circuit DC includes thin film transistors **10** and **20** (refer to FIG. **3**) and a capacitor **80** (refer to FIG. **3**), and drives the organic light emitting element **70**. That is, the organic light emitting element **70** displays an image by emitting light according to a driving signal transmitted from the driving circuit DC.

[0030] The organic light emitting element **70** includes a first transflective electrode **710**, an organic emission layer **720**, and a second transflective electrode **730**. The OLED display **101** according to the first exemplary embodiment is a dual-side emission type of OLED display. That is, as marked with arrows in FIG. **1**, light generated from the organic light emitting element **70** is passed through both the substrate main body **111** and the encapsulation member **210** and then emitted out of the OLED display **101**.

[0031] The first transflective electrode **710** and the second transflective electrode **730** include a transparent conductive material and/or a transflective metal.

[0032] The transparent conductive material includes indium tin oxide (ITO), indium zinc oxide (IZO), zinc oxide (ZnO), and/or indium oxide (In2O3).

[0033] The transflective metal is made of magnesium (Mg), silver (Ag), gold (Au), calcium (Ca), lithium (Li), chromium (Cr), aluminum (Al), or an alloy thereof.

[0034] The transflective metal has a thickness between 5 nm and 50 nm. Transmittance and reflectance of the light are changed according to the thickness of the transflective metal. In more detail, transmittance of the light is increased as the thickness of the transflective metal is decreased, and is decreased as the thickness of the transflective metal is increased. When the thickness of the transflective metal is greater than 50 nm, the transmittance of the light is excessively decreased so that it may not be appropriate for the dual-side emission type of OLED display. By contrast, when the thickness of the transflective metal is smaller than 5 nm, electric characteristics become deteriorated.

[0035] In the first exemplary embodiment, the first transflective electrode **710** is an anode which is a hole injection electrode, and the second transflective electrode **720** is a cathode which is an electron injection electrode.

[0036] As shown in FIG. **2**, the first transflective electrode **710** includes a transflective layer **711** made of a transflective metal, and a transparent layer **712** made of a transparent conductive material. In addition, the second transflective electrode **730** is made of a transflective metal.

[0037] Both the transflective layer **711** of the first transflective electrode **710** (made of the transflective metal) and the second transflective electrode **730** have relatively low work functions. Therefore, the second transflective electrode **730**, which is the electron injection electrode, can efficiently perform electron injection. However, it may be difficult for the first transflective electrode **710**, which is the hole injection electrode, with just the transflective layer **711** to perform efficient hole injection. Thus, the transparent layer **712** having a relatively high work function is disposed between the transflective layer **711** and the organic emission layer **720** for efficient hole injection of the first transflective electrode **710**.

[0038] However, the first exemplary embodiment is not limited to the above description. That is, the first transflective electrode **710** may be a cathode which is an electron injection electrode, and the second transflective electrode **730** may be an anode which is a hole injection electrode. In this case, the structures of the first transflective electrode **710** and the second transflective electrode **730** may be switched.

[0039] The organic emission layer **720** has a multi-layered structure including an emission layer **721** and at least one of a hole injection layer (HIL) **724**, a hole transport layer (HTL) **722**, an electron transport layer (ETL) **723**, and an electron injection layer (EIL) **725**. Excluding the emission layer **721**, the other layers **722**, **723**, **724**, and **725** may be omitted as necessary. If the organic emission layer **720** includes all the layers **721**, **722**, **723**, **724**, and **725**, the hole injection layer (HIL) **724** is disposed on the transparent layer, which is the hole injection electrode, and the hole transport layer (HTL) **722**, the emission layer **721**, the electron transport layer (ETL) **723**, and the electron injection layer (EIL) **725** are sequentially stacked thereon. Alternatively, the organic emission layer **720** may include other layers as necessary.

[0040] Since the organic emission layer **720** is disposed between the first transflective electrode **710** and the second transflective electrode **730**, the OLED display **101** can improve use efficiency of light, that is, luminance of light, using the microcavity effect. The microcavity effect can be maximized by controlling a distance between the first transflective electrode **710** and the second transflective electrode **730** of the organic light emitting element **70**. In addition, the distance between the first and second transflective electrodes **710** and **730** for increasing and maximizing the microcavity may be changed according to a color of light emitted from the organic light emitting element **70**.

[0041] Here, the distance between the two electrodes **710** and **730** becomes the largest in an organic light emitting element **70** that emits red-based light, and becomes the smallest in an organic light emitting element **70** that emits blue-based light.

[0042] Therefore, luminance efficiency with respect to the power can be effectively improved by arranging cavities having different thicknesses according to a color of emitted light in the organic light emitting element **70**. That is, the thickest cavity layer may be disposed at the organic light emitting element **70** that emits red-based light and the thinnest cavity layer may be disposed at the organic light emitting element **70** that emits blue-based light, or the thinnest cavity layer may be omitted.

[0043] Thus, as shown in FIG. 1, the organic light emitting element 70 that emits red-based light is relatively thick, and the organic light emitting element 70 that emits blue-based light is relatively thin in the OLED display according to the first exemplary embodiment.

[0044] Alternatively, the cavity layer may be individually formed between the first and second transflective electrodes 710 and 730, and the hole injection layer (HIL) 724, the hole transport layer (HTL) 722, the electron transport layer (ETL) 723, and/or the electron injection layer (EIL) 725 of the organic emission layer 720 may be formed to be thick or have the suitable thickness so as to be used as a cavity layer. In addition, the transparent layer 712 of the first transflective electrode 710 of the organic light emitting element 70 may be formed to be thick so as to be used as a cavity layer.

[0045] The DBEF 301 is formed on the second transflective electrode 730. The DBEF 301 passes light that is parallel with a polarization axis and reflects light that is not parallel with the polarization axis. Thus, light passed through the DBEF 301 is linearly polarized in a polarization axis direction of the DBEF 301.

[0046] The DBEF 301 can be manufactured using various suitable methods. For example, the DBEF 301 may be made of a mixture of a polymer and nanowires, or may be made by using cholesteric liquid crystal and/or nematic liquid crystal.

[0047] The encapsulation member 210 is disposed facing the substrate main body 111 to cover the organic light emitting element 70 and the driving circuit. Although it is not shown, the substrate main body 111 and the encapsulation member 210 are attached to each other in a vacuum-tight manner by a sealant formed along the edge of the encapsulation member 210. The encapsulation member 210 may be formed of a transparent insulating substrate made of glass, quartz, ceramic, or plastic.

[0048] However, the first exemplary embodiment is not limited to the above description. That is, the encapsulation member 210 may have an encapsulation thin film structure having a transparent organic and/or inorganic layer or having transparent insulating organic and/or inorganic layers that are stacked together.

[0049] The polarizing plate 401 is attached to the encapsulation member 210. In this case, a polarization axis of the polarizing plate 401 is arranged in the same manner as the polarizing axis of the DBEF 301. Further, in FIG. 1, the polarizing plate 401 is attached on the encapsulation member 210, but the first exemplary embodiment is not limited thereto. Thus, the polarizing plate 401 may be attached to a side that faces the DBEF 301 of the encapsulation member 210, that is, below the encapsulation member 210. Alternatively, the polarizing plate 401 may be disposed above the DBEF 301, and may be omitted as necessary.

[0050] The OLED display 101 further includes a pixel defining layer 190 having an opening 195 that exposes at least a part of the first transflective electrode 710.

[0051] With the above configuration, the OLED display 101 according to the first exemplary embodiment can improve light efficiency while displaying an image on both sides.

[0052] In addition, the OLED display can improve visibility by suppressing reflection of external light and minimize or reduce loss of light emitted to the outside from the organic light emitting element 70.

[0053] Hereinafter, referring to FIG. 2, the operation effect of the dual-side emission type of OLED display 101 including the DBEF 301 according to the first exemplary embodiment will be described in more detail.

[0054] As shown in FIG. 2, a part of light generated from the emission layer 721 passes the first and second transflective electrodes 710 and 730, and another part of the light is iteratively reflected between the first and second transflective electrodes 710 and 730. Through such a microcavity effect, the OLED display 101 can improve light efficiency.

[0055] The light having passed through the first transflective electrode 710 is partially passed through the DBEF 301 and partially reflected thereby. In more detail, light of which the phase is parallel with the polarization axis of the DBEF 301 is passed, and light of which the phase that is not parallel with the polarization axis of the DBEF 301 is reflected. The light reflected by the DBEF 301 is passed through the first and second transflective electrodes 710 and 730 and then emitted to the opposite direction, or reflects between the first transflective electrode 710 and the second transflective electrode 730. Accordingly, reflectance is increased by the DBEF 301 and thus the microcavity effect is increased and/or maximized.

[0056] As described, the OLED display according to the first exemplary embodiment emits linearly polarized light in one direction and emits light containing a linear polarization component in the other direction.

[0057] In addition, as shown in FIG. 1, reflection of the external light can be reduced by disposing the polarizing plate 401 on (above or with) the DBEF 301. Since the polarizing plate 401 passes light that is parallel with the polarizing axis and absorbs light that is not parallel with the polarizing axis, a large amount of external light toward the organic emission layer 720 is absorbed while passing through the polarizing plate 401. By contrast, light generated from the organic emission layer 720 and passed through the polarizing plate 401 passes first through the DBEF 301 having a polarizing axis that is the same as the polarizing axis of the polarizing plate 401 so that light loss can be increased or minimized.

[0058] Hereinafter, an internal structure of the OLED display 101 will be described in more detail with reference to FIG. 3 and FIG. 4. FIG. 3 is a layout view of a pixel structure, and FIG. 4 is a cross-sectional view of FIG. 3, taken along the line IV-IV. Here, a pixel is a minimum unit of the OLED display 101 for displaying an image.

[0059] In addition, illustrated in FIG. 3 and FIG. 4 is an active matrix (AM) type of OLED display 101 with a 2Tr-1Cap structure where a pixel is provided with two thin film transistors (TFT) 10 and 20 and one capacitor 80, but the present invention is not limited thereto. That is, the organic light emitting diode display 101 may have three or more thin film transistors and two or more capacitors at each pixel, and various other structures with separate wires. Here, a pixel refers to a minimum image displaying unit, and is disposed at each pixel region. The OLED display 101 displays images through a plurality of pixels

[0060] As shown in FIG. 3 and FIG. 4, the OLED display 101 includes a switching thin film transistor 10, a driving thin film transistor 20, a capacitor 80, and an organic light emitting diode (OLED) 70, which are formed at each pixel. Here, the driving circuit DC refers to the structure with the switching thin film transistor 10, the driving thin film transistor 20, and the capacitor 80. The display substrate 101 further includes gate lines 151 arranged to extend in a first direction, and data and common power lines **171** and **172** arranged to extend in a second direction crossing the first direction of the gate lines **151** in an insulated manner.

[0061] One pixel is defined by the gate lines **151**, and the data and common power lines **171** and **172** as a boundary, but is not limited thereto.

[0062] As described above, the OLED **70** includes the first transflective electrode **710**, the organic emission layer **720** formed on the first transflective electrode **710**, and the second transflective electrode **730** formed on the organic emission layer **720**. Holes and electrons from the first transflective electrode **710** and the second transflective electrode **730** are injected into the organic emission layer **720**. The light emission occurs when the excitons (being the combinations of holes and electrons drop) from the excited state to the ground state.

[0063] The capacitor **80** includes a pair of capacitor plates **158** and **178** arranged with an interlayer insulating layer **160** therebetween. Here, the interlayer insulating layer **160** is a dielectric material. Charges charged in the capacitor **80** and a voltage between the two capacitor plates **158** and **178** determine capacitance.

[0064] The switching thin film transistor **10** includes a switching semiconductor layer **131**, a switching gate electrode **152**, a switching source electrode **173**, and a switching drain electrode **174**. The driving thin film transistor **20** includes a driving semiconductor layer **132**, a driving gate electrode **155**, a driving source electrode **176**, and a driving drain electrode **177**.

[0065] The switching thin film transistor **10** is used as a switch to select a pixel for light emission. The switching gate electrode **152** is connected to the gate line **151**. The switching source electrode **173** is connected to the data line **171**. The switching drain electrode **174** is distanced from the switching source electrode **173** and is connected to the capacitor plates **158**.

[0066] The driving thin film transistor **20** applies driving power to the pixel electrode **710** for light emission of an organic emission layer **720** of an OLED **70** in the selected pixel. The driving gate electrode **155** is connected with the capacitor plate **158** that is connected with the switching drain electrode **174**. The driving source electrode **176** and the capacitor plate **178** are respectively connected with the common power line **172**. The driving drain electrode **177** is connected to the pixel electrode **710** of the OLED **70** through a contact hole.

[0067] With such a structure, the switching thin film transistor **10** is driven by a gate voltage applied to the gate line **151** to transmit a data voltage applied to the data line **171** to the driving thin film transistor **20**. A voltage corresponding to a voltage difference between a common voltage applied to the driving thin transistor **20** from the common power line **172** and the data voltage transmitted from the switching thin film transistor **10** is stored in the capacitor **80**, and a current corresponding to the voltage stored in the capacitor **80** flows to the OLED **70** through the driving thin film transistor **20** such that the OLED **70** emits light.

[0068] In addition, the use efficiency of light generated from the OLED **70** can be effectively improved by the DBEF **301**.

[0069] Hereafter, an OLED display **102** according to a second exemplary embodiment will be described with reference to FIG. **5**.

[0070] As shown in FIG. **5**, in an OLED display **102** according to the second exemplary embodiment, a DBEF **302** is disposed below a first transflective electrode **710**. A polarizing plate **402** is attached on (under or with) a substrate main body **111**. A polarization axis of the DBEF **302** and a polarization axis of the polarizing plate **402** are parallel with each other.

[0071] With such a configuration, the OLED display **102** according to the second exemplary embodiment can improve light efficiency while displaying an image on both sides.

[0072] In addition, visibility can be improved by suppressing reflection of external light and loss of light emitted to the outside from an OLED **70** can be minimized.

[0073] An operation effect of the dual-side emission type of OLED display **102** including the DEBF **302** according to the second exemplary embodiment is substantially the same as in the first exemplary embodiment.

[0074] Hereinafter, an experimental example and a comparative example according to the first exemplary embodiment will be compared with reference to FIG. **1**.

[0075] The experimental example and the comparative example have the same configuration, excluding whether a DBEF **301** is included or not. In more detail, a transflective layer **711** of a first transflective electrode **710** was formed of silver (Ag) with a thickness of 15 nm, and a transparent layer **712** of the first transflective electrode **710** was formed of ITO with a thickness of 7 nm. A hole injection layer (HIL) **724**, a hole transport layer (HTL) **722**, an electron transport layer (ETL) **723**, and an electron injection layer (EIL) **725** respectively had thicknesses of 40 nm, 68 nm, 36 nm, and 1.5 nm. According to a color, a red-based emission layer **721** had a thickness of 40 nm and green-based and blue-based emission layers **721** respectively had thicknesses of 20 nm. In addition, an OLED **70** emitting red-based light used a cavity layer having a thickness of 72 nm, an OLED **70** emitting green-based light used a cavity layer having a thickness of 40 nm, and an OLED **70** emitting blue-based light did not use a cavity layer. A second transflective electrode **730** was formed of magnesium (Mg) and silver (Ag) with a thickness of 10 nm.

[0076] Color-specific luminance of the experimental example and the comparative example are as shown in Table 1.

TABLE 1

	Luminance (cd/m2) of Experimental Example			Luminance (cd/m2) of Comparative Example		
Color	rear	front	sum	rear	front	total
red	6.74	21.03	27.77	7.89	13.47	21.36
green	5.55	22.23	27.78	12.16	11.10	23.26
blue	0.70	3.05	3.75	2.12	1.39	3.51

[0077] As shown in Table 1, the experimental example provided with the DBEF **301** according to the first exemplary embodiment had luminance that was improved by about 30% with respect to the luminance of the comparative example.

[0078] 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.

DESCRIPTION OF CERTAIN SYMBOLS

[0079] **10**, **20**: thin film transistor

[0080] **70**: organic light emitting element

[0081] **101**, **102**: OLED display

[0082] **111**: substrate main body

[0083] **190**: pixel defining layer

[0084] **195**: opening

[0085] **210**: encapsulation member

[0086] **301**: DBEF

[0087] **710**: first transflective electrode

[0088] **711**: transflective layer

[0089] **712**: transparent layer

[0090] **720**: organic emission layer

[0091] **721**: emission layer

[0092] **722**: hole transport layer (HTL)

[0093] **723**: electron transport layer (ETL)

[0094] **724**: hole injection layer (HIL)

[0095] **725**: electron injection layer (EIL)

[0096] **730**: second transflective electrode

[0097] **401**, **402**: polarizing plate

What is claimed is:

1. An organic light emitting diode (OLED) display comprising:

a substrate main body;

a first transflective electrode on the substrate main body;

an organic emission layer on the first transflective electrode;

a second transflective electrode on the organic emission layer; and

a dual brightness enhancement film (DBEF) on at least one of a side of the first transflective electrode facing away from the organic emission layer, or a side of the second transflective electrode facing away from the organic emission layer.

2. The OLED display of claim **1**, wherein the first and second transflective electrodes comprise a transparent conductive material.

3. The OLED display of claim **2**, wherein the transparent conductive material comprises at least one of indium tin oxide (ITO), indium zinc oxide (IZO), zinc oxide (ZnO), or indium oxide (In_2O_3).

4. The OLED display of claim **3**, wherein one of the first and second transflective electrodes for injecting holes into the organic emission layer comprises the transparent conductive material.

5. The OLED display of claim **1**, wherein the first and second transflective electrodes comprise a transflective metal.

6. The OLED display of claim **5**, wherein the transflective metal comprises magnesium (Mg), silver (Ag), gold (Au), calcium (Ca), lithium (Li), chromium (Cr), aluminum (Al), or an alloy thereof.

7. The OLED display of claim **6**, wherein the transflective metal has a thickness of 5 nm to 50 nm.

8. The OLED display of claim **1**, wherein the first and second transflective electrodes comprise a transparent conductive material and a transflective metal.

9. The OLED display of claim **1**, wherein the DBEF is configured to pass light parallel with a polarization axis and to reflect light not parallel with the polarization axis.

10. The OLED display of claim **1**, further comprising an encapsulation member disposed facing the substrate main body and covering the first transflective electrode, the organic emission layer, and the second transflective electrode.

11. The OLED display of claim **10**, wherein light generated from the organic emission layer is emitted in a direction to the substrate main body or the encapsulation member to display an image.

12. The OLED display of claim **10**, wherein the DBEF is on the second transflective electrode.

13. The OLED display of claim **12**, further comprising a polarizing plate attached to the encapsulation member,

wherein the polarizing plate has a polarization axis parallel with the DBEF.

14. The OLED display of claim **10**, wherein the DBEF is disposed below the first transflective electrode.

15. The OLED display of claim **14**, further comprising a polarizing plate attached with the substrate main body,

wherein the polarizing plate has a polarization axis parallel with the DBEF.

16. An organic light emitting diode (OLED) display comprising:

a first transflective electrode;

a second transflective electrode;

an organic emission layer between the first transflective electrode and the second transflective electrode; and

a dual brightness enhancement film (DBEF) on at least one of a side of the first transflective electrode facing away from the organic emission layer, or a side of the second transflective electrode facing away from the organic emission layer.

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摘要(译)

一种OLED显示器，包括：基板主体;第一透射反射电极形成在基板主体上;形成在第一透射反射电极上的有机发光层;形成在有机发光层上的第二透反电极;双亮度增强膜（DBEF）设置在双亮度增强膜（DBEF）上，所述双亮度增强膜（DBEF）位于所述第一透反电极的背离所述有机发光层的一侧或所述第二透反电极的背离所述有机发光层的一侧的至少一侧上。有机发光层。