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Jeon et al.

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

(76) Inventors: **Hee-Song Jeon**, Yongin-City (KR); **Soon-Ryong Park**, Yongin-City (KR)

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(57) **ABSTRACT**

An organic light emitting diode (OLED) display is provided. The OLED display includes a substrate main body, an OLED on the substrate main body, and a capping layer on the OLED. The capping layer includes a film having at least two layers of different refractive indexes.

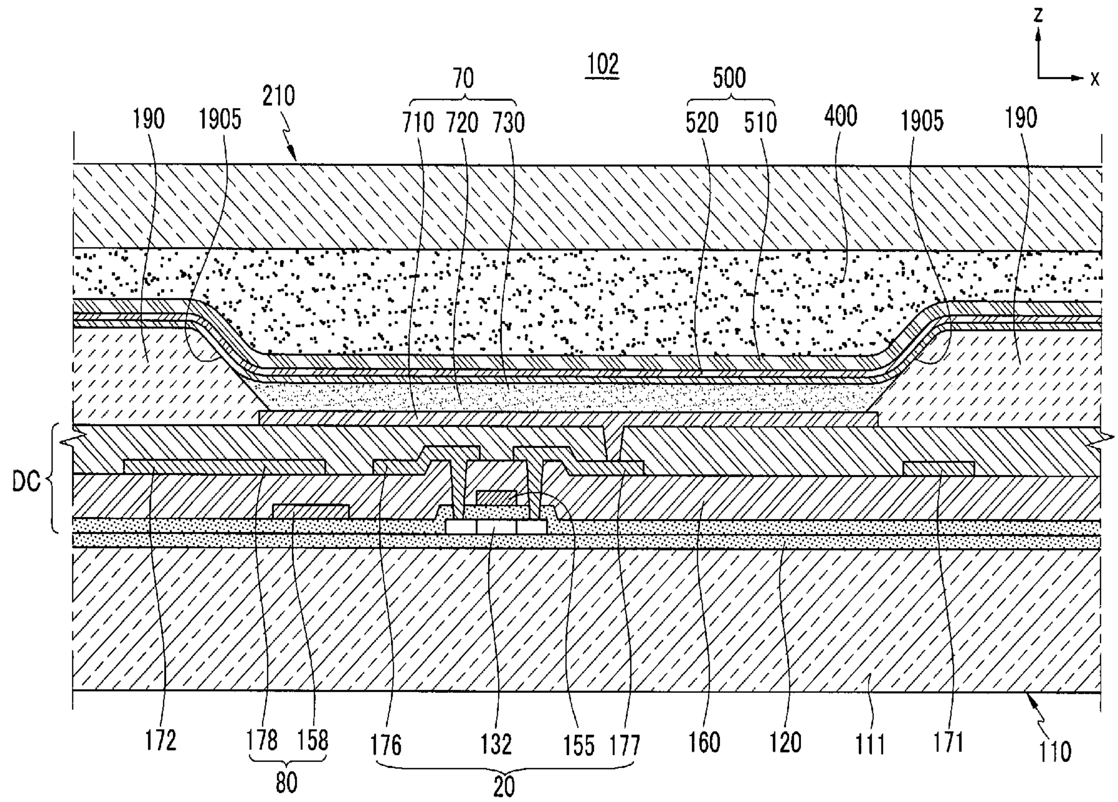
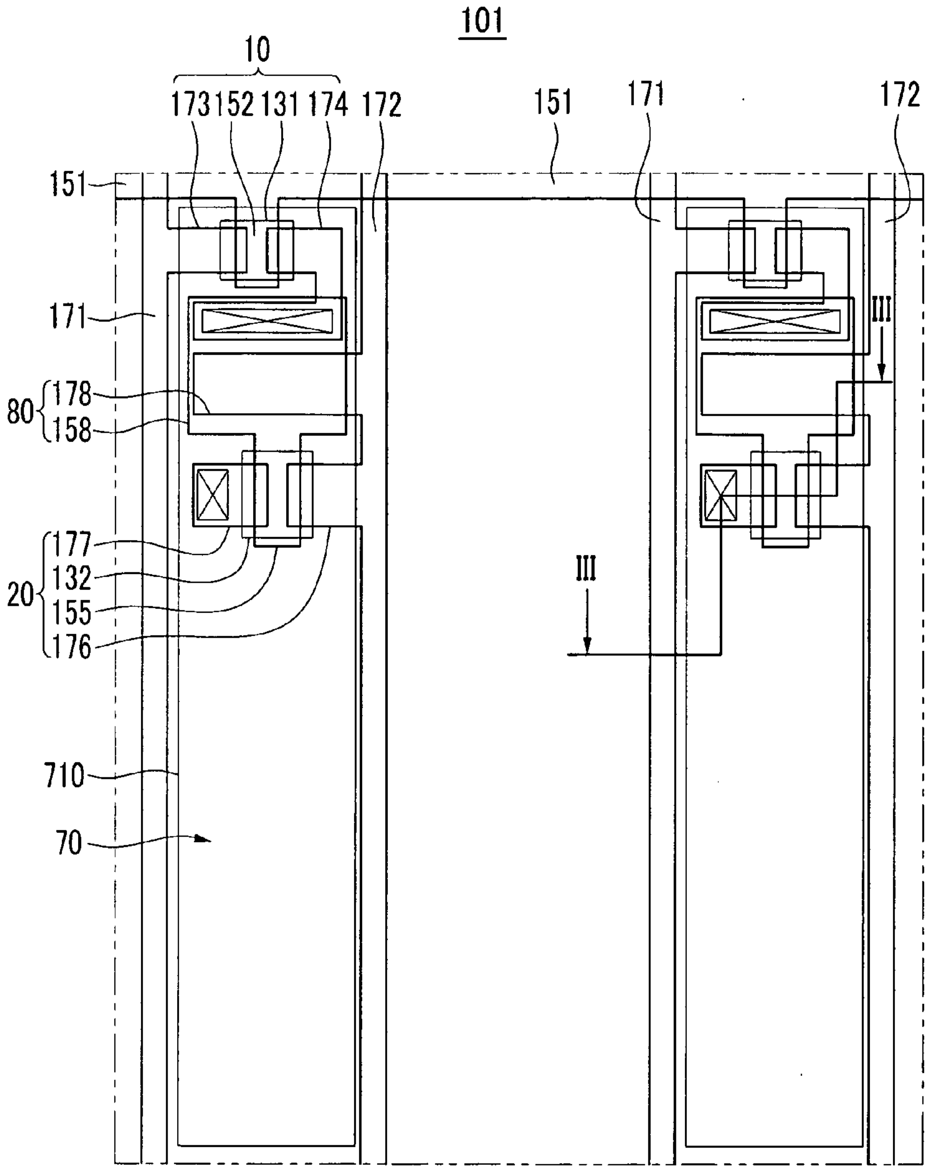


FIG.1


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

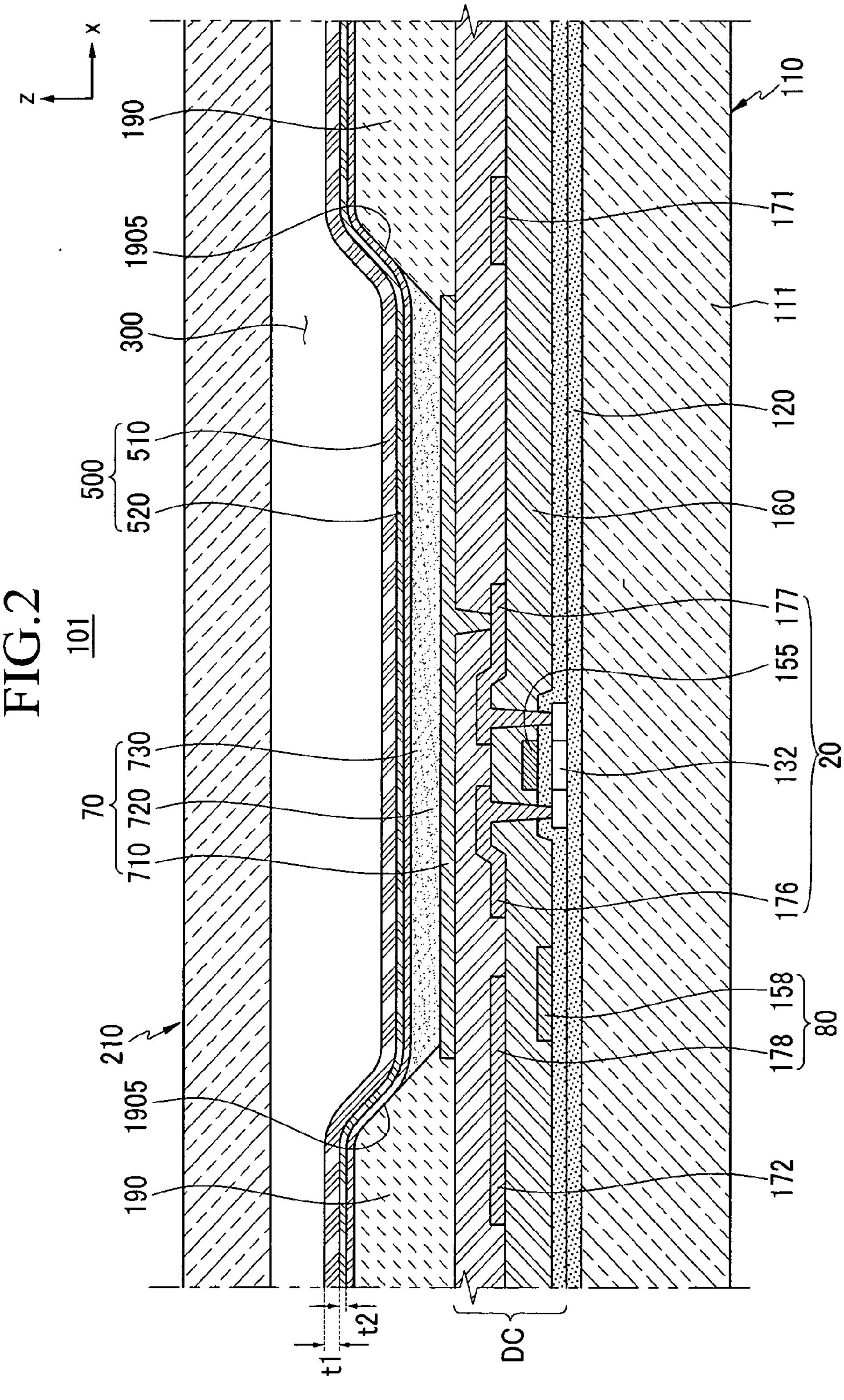
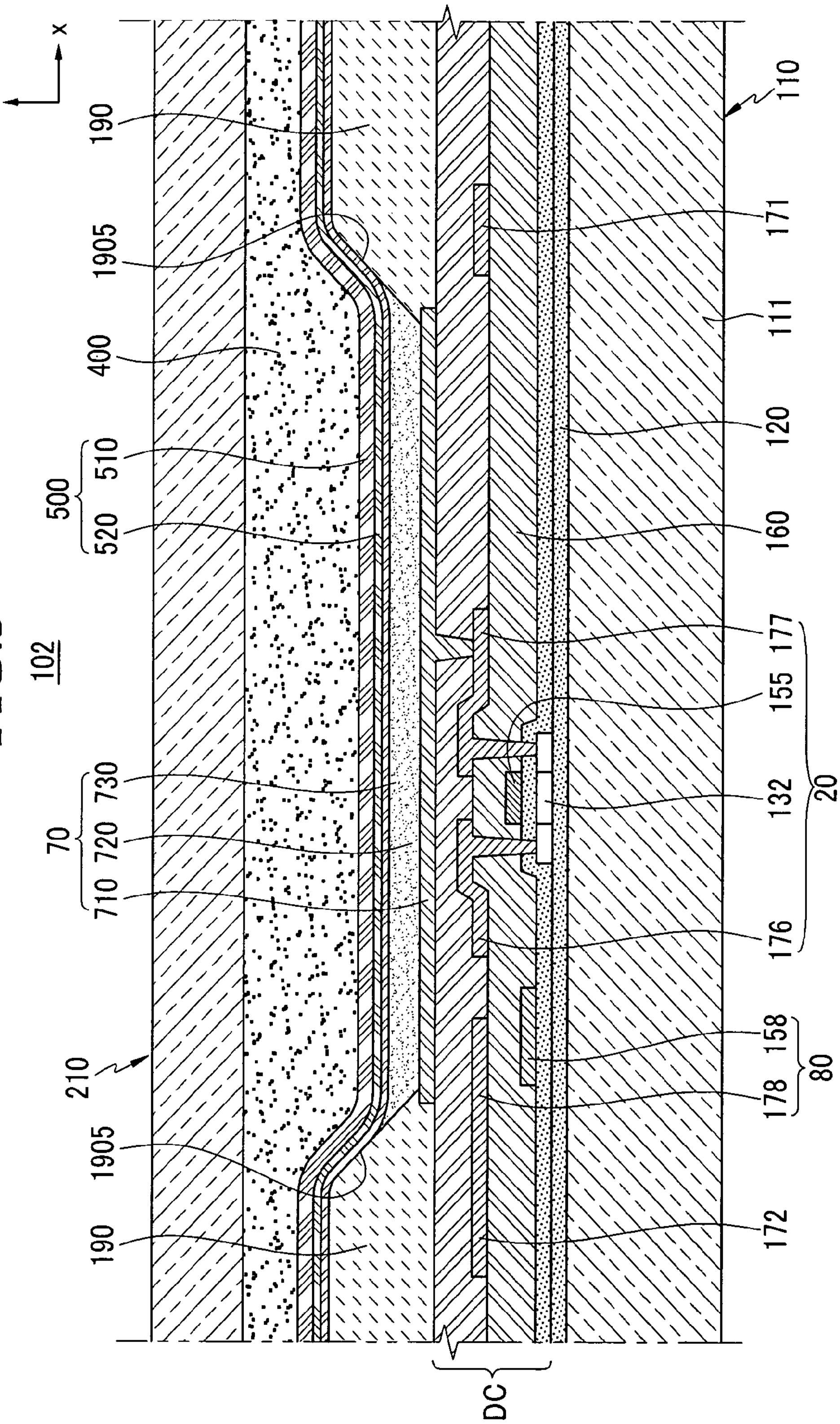

101
x
z
190
1905
300
500
510
520
70
730
720
710
210
1905
190
t1
t2
DC
110
171
111
120
160
177
155
132
20
176
158
80
178
172

FIG.2

FIG.3

102


z
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190
1905
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120
160
177
155
132
20
176
158
80
178
172
DC

ORGANIC LIGHT EMITTING DIODE DISPLAY

BACKGROUND

[0001] 1. Field

[0002] The described technology relates generally to an organic light emitting diode (OLED) display. More particularly, the described technology relates generally to an OLED display that improves light efficiency.

[0003] 2. Description of the Related Art

[0004] An OLED display is a self-luminance display device that displays an image with an OLED that emits light. Unlike a liquid crystal display (LCD), the OLED display does not require a separate light source and thus can have a relatively reduced thickness and weight. Further, the OLED display provides high quality characteristics, e.g., low power consumption, high luminance, and fast reaction speed.

[0005] The OLED generally has a hole injection electrode, an organic emission layer, and an electron injection electrode. The OLED emits light by energy that is generated when excitons that are formed by coupling of holes from the hole injection electrode and electrons from the electron injection electrode within the organic emission layer drop to a ground state.

[0006] In order to increase usability of the OLED display, various methods that can improve light efficiency by effectively extracting light that is generated in the organic light emitting layer are needed.

[0007] 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

[0008] Embodiments are therefore directed to an OLED display, which substantially overcomes one or more of the problems due to the limitations and disadvantages of the related art.

[0009] It is therefore a feature of an embodiment to provide an OLED display having improved light efficiency.

[0010] At least one of the above and other features and advantages may be realized by providing a substrate main body, an OLED on the substrate main body; and a capping layer that is formed on the OLED. The capping layer includes a multiple-layered film having different refractive indexes.

[0011] The capping layer may be formed by alternately stacking at least one high refractive film and at least one low refractive film. The high refractive film may be disposed at a top layer that is relatively farthest separated from the OLED.

[0012] The high refractive film may have a refractive index within a range that is greater than or equal to 1.7 and less than 2.7. The high refractive film may be made of at least one of an inorganic material and an organic material. The inorganic material may include at least one of zinc oxide, titanium oxide, zirconium oxide, silicon oxide, niobium oxide, tantalum oxide, tin oxide, nickel oxide, indium nitride, and gallium nitride. The organic material may be a polymer.

[0013] The low refractive film may have a refractive index within a range that is greater than 1.3 and less than 1.7. The low refractive film may be made of at least one of an inorganic material and an organic material. The inorganic material may include at least one of silicon oxide and magnesium fluoride. The organic material may be a polymer.

[0014] The OLED display may further include an encapsulation substrate that adheres and seals with the substrate main body to cover the OLED, wherein the encapsulation substrate and the OLED have a separation space therebetween.

[0015] The OLED display may further include a gas disposed in the separation space between the encapsulation substrate and the OLED. The gas may have a refractive index that is relatively lower than that of the high refractive film.

[0016] The OLED display may further include a non-gaseous filler disposed in the separation space between the encapsulation substrate and the OLED. The non-gaseous filler may have a refractive index that is relatively lower than that of the high refractive film. The non-gaseous filler may be an organic material, e.g., a polymer.

[0017] In the OLED display, the OLED may include a first electrode, an organic emission layer that is formed on the first electrode, and a second electrode that is formed on the organic light emitting layer and that is disposed relatively most adjacent to the capping layer. The second electrode may be made of one of a transparent material and a transflective material. The first electrode may be formed with a reflective layer.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] The above and other features and advantages will become more apparent to those of ordinary skill in the art by describing in detail exemplary embodiments with reference to the attached drawings, in which:

[0019] FIG. **1** illustrates a layout view of a pixel of an OLED display according to a first exemplary embodiment.

[0020] FIG. **2** illustrates a cross-sectional view of the pixel taken along line of FIG. **1**.

[0021] FIG. **3** illustrates a cross-sectional view of an OLED display according to a second exemplary embodiment.

DETAILED DESCRIPTION

[0022] Korean Patent Application No. 10-2009-0114806, filed on Nov. 25, 2009, in the Korean Intellectual Property Office, and entitled: "Organic Light Emitting Diode Display," is incorporated by reference herein in its entirety.

[0023] Exemplary embodiments will be described more fully hereinafter with reference to the accompanying drawings, in which exemplary embodiments 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.

[0024] The drawings and description are to be regarded as illustrative in nature and not restrictive. Like reference numerals designate like elements throughout the specification. Further, like reference numerals designate like elements in several exemplary embodiments and are representatively described in the first exemplary embodiment and elements different from those of the first exemplary embodiment will be described in a second exemplary embodiment.

[0025] In the drawings, the thickness of layers, films, panels, regions, etc., may be 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 intervening elements may also be present.

[0026] Hereinafter, a first exemplary embodiment will be described with reference to FIGS. **1** and **2**.

[0027] As shown in FIGS. **1** and **2**, an OLED display **101** according to the first exemplary embodiment may include a substrate main body **111**, a driving circuit DC, an OLED **70**, a capping layer **500**, and an encapsulation substrate **210**. The OLED display **101** may further include a buffer layer **120** and a pixel defining film **190**.

[0028] The substrate main body **111** may be an insulation substrate, e.g., glass, quartz, ceramic, or plastic. However, the first exemplary embodiment is not limited thereto, and the substrate main body **111** may be formed with a conductive substrate, e.g., a metal substrate such as stainless steel.

[0029] The buffer layer **120** may be disposed on the substrate main body **111**. Further, the buffer layer **120** may be formed with at least one of various inorganic films and organic films. The buffer layer **120** may serve to planarize a surface while preventing undesirable components, e.g., impurities or moisture, from penetrating to the driving circuit DC or the OLED **70**. However, the buffer layer **120** is not always necessary and may be omitted according to kind and process conditions of the substrate main body **111**.

[0030] The driving circuit DC driving the OLED **70** may be on the buffer layer **120** and may include a plurality of thin film transistors **10** and **20**. That is, the OLED **70** displays an image by emitting light according to a driving signal that is received from the driving circuit DC.

[0031] The OLED **70** may include a first electrode **710**, e.g., an anode that injects holes, a second electrode **730**, e.g., a cathode that injects electrons, and an organic emission layer **720** between the first electrode **710** and the second electrode **730**. That is, the first electrode **710**, the organic emission layer **720**, and the second electrode **730** may be sequentially stacked to form the OLED **70**. However, the first exemplary embodiment is not limited thereto. For example, the first electrode **710** may be a cathode and the second electrode **730** may be an anode.

[0032] In the first exemplary embodiment, the first electrode **710** is formed with a reflective layer and the second electrode **730** is formed with a transflective layer. Therefore, light generated in the organic emission layer **720** is emitted by passing through the second electrode **730**. That is, in the first exemplary embodiment, the OLED display **101** has a front light emitting structure.

[0033] A reflective layer and a transflective layer may be formed using at least one of magnesium (Mg), silver (Ag), gold (Au), calcium (Ca), lithium (Li), chromium (Cr), and aluminum (Al), or alloys thereof In this case, whether the layer is reflective or transflective is determined by its thickness. As the thickness of such a layer decreases, transmittance of light increases and, as the thickness of such a layer increases, transmittance of light decreases. In general, such a layer will be reflective if it is thicker than about 200 nm or less.

[0034] Further, the first electrode **710** may further include a transparent conductive layer. That is, the first electrode **710** may have a multilayer structure including a reflective layer and a transparent conductive layer. The transparent conductive layer of the first electrode **710** may be disposed between the reflective layer and the organic emission layer **720**. Further, the first electrode **710** may be a three layer structure in which the transparent conductive layer, the reflective layer, and the transparent conductive layer are sequentially stacked.

[0035] The transparent conductive layer may be made of a transparent material having a relatively high work function, e.g., indium tin oxide (ITO), indium zinc oxide (IZO), zinc oxide (ZnO), or indium oxide (In_2O_3). Therefore, holes may be smoothly injected through the first electrode **710**.

[0036] The second electrode **730** may be formed with a transparent conductive layer. When the second electrode **730** is formed with a transparent conductive layer, the second electrode **730** may serve as an anode that injects holes. In this case, the first electrode **710** may serve as a cathode formed with only a reflective layer.

[0037] Further, the organic emission layer **720** may be a multilayer structure including at least one of an emission layer, a hole injection layer (HIL), a hole-transporting layer (HTL), an electron-transporting layer (ETL), and an electron-injection layer (EIL). Other than the emission layer, the remaining layers may be omitted as needed. When the organic emission layer **720** includes all the above-described layers, the HIL is disposed on the first electrode **710**, which is an anode, and the HTL, the emission layer, the ETL, and the EIL are sequentially stacked on the HIL. Further, the organic emission layer **720** may further include other layers, as needed.

[0038] The pixel defining film **190** has an opening **1905**. The opening **1905** of the pixel defining film **190** exposes a portion of the first electrode **710**. The first electrode **710**, the organic emission layer **720**, and the second electrode **730** are sequentially stacked within the opening **1905** of the pixel defining film **190**. Here, the second electrode **730** is formed on the pixel defining film **190** as well as the organic emission layer **720**. Layers of the organic emission layer **720**, except for the emission layer, may be disposed between the pixel defining film **190** and the second electrode **730**. The OLED **70** emits light in the organic emission layer **720** within the opening **1905** of the pixel defining film **190**. That is, the opening **1905** of the pixel defining film **190** defines a light emitting area.

[0039] The capping layer **500** may be on the OLED **70**. The capping layer **500** may serve to assist in effectively emitting light generated in the organic emission layer **720** while protecting the OLED **70** from external influences. The capping layer **500** may include a multiple-layered film, e.g., at least two layers having different refractive indexes. Accordingly, the capping layer **500** improves light efficiency by increasing an extraction ratio of light emitted from the organic emission layer **720** of the OLED **70**.

[0040] Specifically, the capping layer **500** may include at least one high refractive film **510** and at least one low refractive film **520**, i.e., the film **520** has a lower refractive index than the film **510**, that are alternately stacked. FIG. **2** illustrates one high refractive film **510** and one low refractive film **520**, but the first exemplary embodiment is not limited thereto.

[0041] Further, the high refractive film **510** is disposed at a top layer that is furthest separated from the OLED **70**. That is, the top layer of the capping layer **500** is formed with the high refractive film **510**.

[0042] The high refractive film **510** may have a refractive index within a range that is greater than or equal to 1.7 and less than 2.7. Further, the high refractive film **510** is made of at least one of an inorganic material and an organic material. That is, the high refractive film **510** may be formed with an inorganic film, an organic film, or an organic film containing inorganic particles.

[0043] An inorganic material that can be used for the high refractive film **510** may be, for example, zinc oxide, titanium oxide, zirconium oxide, silicon oxide, niobium oxide, tantalum oxide, tin oxide, nickel oxide, indium nitride, and gallium nitride.

[0044] An organic material that can be used for the high refractive film **510** may be, e.g., a polymer. A general organic material that can be used as the capping layer **500** may be, for example, acrylic, polyimide, and polyamide. An organic material that can be used for the high refractive film **510** includes poly(3,4-ethylenedioxythiophene, PEDOT, 4,4'-bis [N-(3-metylphenyl-N-phenyl amino] biphenyl (TPD, 4,4',4"-tris[(3-metylphenyl)phenyl amino] triphenylamine (m-MTDATA) 1,3,5-tris [N,N-bis(2-metylphenyl-amino]-benzene (o-MTDAB)1,3,5-tris[N,N-bis(3-metylphenyl-amino]-benzene(m-MTDAB)1,3,5-tris[N,N-bis(4-metylphenyl)-amino]-benzene(p-MTDAB),4,4'-bis[N,N-bis(3-metylphenyl)-amino]-diphenylmethane(BPPM),4,4'-dicarbazolyl-1,1'-biphenyl(CBP), 4,4',4"-tris(N-carbazol) triphenylamine(TCTA),2,2',2"-(1,3,5-benzentolyl)tris-1-[phenyl-1H-benzoimidazol](TPBI), and 3-(4-biphenyl)-4-phenyl-5-t-butylphenyl-1,2,4-triazole (TAZ).

[0045] The low refractive film **520** may have a refractive index within a range of greater than 1.3 and less than 1.7. Further, the low refractive film **520** may be made of at least one of an inorganic material and an organic material. That is, the low refractive film **520** may be formed with an inorganic film, an organic film, or an organic film containing inorganic particles.

[0046] An inorganic material that can be used for the low refractive film **520** may be, for example, silicon oxide and magnesium fluoride. An organic material that can be used for the low refractive film **520** may be a polymer. An organic material that may be used for the low refractive film **520** may be, for example, acrylic, polyimide, polyamide, or Alq3 (Tris (8-hydroxyquinolinato)) aluminum.

[0047] Further, in the first exemplary embodiment, materials that can be used for the high refractive film **510** and the low refractive material film **520** are not limited to the above-described materials. Therefore, the high refractive film **510** and the low refractive film **520** may be made of various materials that are known to a person of ordinary skill in the art.

[0048] The low refractive film **520** may have a thickness t**2** within a range of about 20 to 30 nm, and the high refractive film **510** may have a thickness t**1** within a range of about 110 to 120 nm. When thicknesses of the low refractive film **520** and the high refractive film **510** are in the above-described ranges, light efficiency of light emitted from the organic emission layer **720** and that passes through the capping layer **500** may increase by more than 90%. However, the first exemplary embodiment is not limited to the above-described description. Therefore, a thickness of the low refractive film **520** and the high refractive film **510** can be appropriately adjusted, as needed.

[0049] The encapsulation substrate **210** is a transparent insulation substrate, e.g., glass, quartz, ceramic, or plastic substrate. The encapsulation substrate **210** may adhere to and seal the substrate main body **111** to cover the OLED **70**. In this case, the encapsulation substrate **210** and the OLED **70** are separated from each other. A space between the encapsulation substrate **210** and the substrate main body **111** is sealed through a sealant in a periphery thereof (not shown).

[0050] Further, a gas **300**, e.g., air, may be disposed in the separation space of the encapsulation substrate **210** and the OLED **70**. The gas **300** may have a refractive index lower than a high refractive film. For example, when the gas **300** is air, the refractive index is about 1. By such a configuration, the OLED display **101** according to the first exemplary embodiment can improve light efficiency through the capping layer **500**.

[0051] Due to a refractive index difference between the high refractive film **510** and the low refractive film **520** of the capping layer **500**, a portion of light emitted from the organic emission layer **720** transmits through the capping layer **500** and another portion of the emitted light is reflected by the capping layer **500**. Specifically, light is reflected at an interface of the high refractive film **510** and the low refractive film **520** and at an interface of the high refractive film **510** and the gas **300**.

[0052] Light that is reflected by the capping layer **500** is reflected again at the first electrode **710** or the second electrode **730** and is amplified while repeating reflection. Further, light may be amplified while repeating reflection within the capping layer **500**. That is, reflection may be repeated between an interface of the high refractive film **510** and the low refractive film **520** and an interface of the high refractive film **510** and the gas **300**, thereby recovering light that would otherwise be lost due to reflection at the viewing surface back towards the OLED **70**. The OLED display **101** effectively amplifies light through such a resonance effect, thereby improving light efficiency, i.e., the light extraction ratio.

[0053] Further, because light is reflected at an interface of the high refractive film **510** and the low refractive film **520** by a refractive index difference of the high refractive film **510** and the low refractive film **520**, it is preferable that the high refractive film **510** and the low refractive film **520** have an appropriate refractive index difference, e.g., set such that a desired proportion of light is reflected at the interface. Further, the gas **300** contacting the high refractive film **510** may be regarded as a low refractive material.

[0054] Therefore, each of the high refractive film **510** and the low refractive film **520** has a refractive index of a determined range in consideration of a refractive index of the gas **300** and characteristics of a material that is used for manufacturing each of the refractive films **510** and **520**. That is, the high refractive film **510** may have a refractive index greater than or equal to 1.7 and less than 2.7 according to a component that is used as a material of the high refractive film **510**. The low refractive film **520** has a refractive index greater than 1.3 and less than 1.7 according to a component that is used as a material of the low refractive film **520**. In this case, even if the same material is used, the high refractive film **510** and the low refractive film **520** may have different refractive indexes according to a manufacturing method.

[0055] Hereinafter, a structure of the driving circuit DC and the OLED **70** will be described in detail.

[0056] In FIGS. **1** and **2**, the active matrix (AM) OLED display **101** of a 2Tr-1Cap structure having two thin film transistors (TFT) **10** and **20** and one capacitor **80** in one pixel is described, but the first exemplary embodiment is not limited thereto. Therefore, the OLED display **101** can have three or more TFTs and two or more capacitors in one pixel, and may have various structures as separate wiring is further formed. Here, a pixel is a minimum unit that displays an image, and the OLED display **101** displays an image through a plurality of pixels.

[0057] A switching TFT **10**, a driving TFT **20**, a capacitor **80**, and the OLED **70** are each formed in each pixel. Here, a configuration including the switching TFT **10**, the driving TFT **20**, and the capacitor **80** is referred to as a driving circuit DC. In the pixel, a gate line **151** that is disposed in one direction, and a data line **171** and a common power source line **172** that are insulated from and intersect the gate line **151** are also formed. A pixel is defined by the gate line **151**, the data line **171**, and the common power source line **172** as the boundary, but a pixel is not limited thereto.

[0058] The OLED **70** includes the first electrode **710**, the organic emission layer **720** on the first electrode **710**, and the second electrode **730** on the organic emission layer **720**. Holes and electrons from the first electrode **710** and the second electrode **730**, respectively, are injected into the organic emission layer **720**. When excitons formed by coupling of the injected holes and electrons drop from an exited state to a ground state, light is emitted.

[0059] The capacitor **80** may include a pair of capacitor plates **158** and **178** with an interlayer insulating layer **160** interposed therebetween. Here, the interlayer insulating layer **160** is a dielectric material. A capacitor capacity is determined by charges that are stored in the capacitor **80** and a voltage between both capacitor plates **158** and **178**.

[0060] The switching TFT **10** may include a switching semiconductor layer **131**, a switching gate electrode **152**, a switching source electrode **173**, and a switching drain electrode **174**. The driving TFT **20** may include a driving semiconductor layer **132**, a driving gate electrode **155**, a driving source electrode **176**, and a driving drain electrode **177**.

[0061] The switching TFT **10** may serve as a switch that selects a pixel to emit light. 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 separated from the switching source electrode **173** and is connected to one capacitor plate **158**.

[0062] The driving TFT **20** applies a driving power source for allowing light emitting of the organic emission layer **720** of the OLED **70** within the selected pixel to the first electrode **710**. The driving gate electrode **155** is connected to a capacitor plate **158** that is connected to the switching drain electrode **174**. The driving source electrode **176** and the other capacitor plate **178** are each connected to the common power source line **172**. The driving drain electrode **177** is connected to the first electrode **710** of the OLED **70** through a contact hole.

[0063] By such a structure, the switching TFT **10** operates by a gate voltage that is applied to the gate line **151** and thus performs a function of transferring a data voltage that is applied to the data line **171** to the driving TFT **20**. A voltage corresponding to a difference between a common voltage that is applied from the common power source line **172** to the driving TFT **20** and a data voltage that is transferred from the switching TFT **10** is stored in the capacitor **80**, and a current corresponding to the voltage that is stored in the capacitor **80** flows to the OLED **70** through the driving TFT **20**, whereby the OLED **70** emits light.

[0064] Hereinafter, a second exemplary embodiment will be described with reference to FIG. **3**. As shown in FIG. **3**, an OLED display **102** according to the second exemplary embodiment includes a non-gaseous filler **400** in the separation space between the OLED **70** and the encapsulation substrate **210**. The non-gaseous filler **400** fills the inner space of the OLED display **102** instead of the gas **300**.

[0065] The non-gaseous filler **400** may be made of an organic material, e.g., polymer having a refractive index of 1.7 or less. That is, the non-gaseous filler **400** may have a refractive index that is lower than a high refractive film **510** of a capping layer **500**. By such a configuration, the OLED display **102** according to the second exemplary embodiment can improve light efficiency through the capping layer **500**. Further, because the non-gaseous filler **400** fills the space within the OLED display **102** with a non-gaseous material, mechanical strength and durability of the OLED display **102** can be improved.

[0066] Exemplary embodiments have been disclosed herein, and although specific terms are employed, they are used and are to be interpreted in a generic and descriptive sense only and not for purpose of limitation. Accordingly, it will be understood by those of ordinary skill in the art that various changes in form and details may be made without departing from the spirit and scope of the present invention as set forth in the following claims.

What is claimed is:

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

a substrate main body;

an OLED on the substrate main body; and

a capping layer on the OLED, wherein the capping layer includes a film having at least two layers with different refractive indexes.

2. The OLED display as claimed in claim **1**, wherein the film is an alternating stack of at least one high refractive film and at least one low refractive film.

3. The OLED display as claimed in claim **2**, wherein the high refractive film is at a top layer of the capping layer furthest from the OLED.

4. The OLED display as claimed in claim **3**, wherein the high refractive film has a refractive index within a range that is greater than or equal to 1.7 and less than 2.7.

5. The OLED display as claimed in claim **4**, wherein the high refractive film is made of at least one of an inorganic material and an organic material.

6. The OLED display as claimed in claim **5**, wherein the inorganic material comprises at least one of zinc oxide, titanium oxide, zirconium oxide, silicon oxide, niobium oxide, tantalum oxide, tin oxide, nickel oxide, indium nitride, and gallium nitride.

7. The OLED display as claimed in claim **5**, wherein the organic material is a polymer.

8. The OLED display as claimed in claim **3**, wherein the low refractive film has a refractive index of a range that is greater than 1.3 and less than 1.7.

9. The OLED display as claimed in claim **8**, wherein the low refractive film includes at least one of an inorganic material and an organic material.

10. The OLED display as claimed in claim **9**, wherein the inorganic material comprises at least one of silicon oxide and magnesium fluoride.

11. The OLED display as claimed in claim **9**, wherein the organic material is a polymer.

12. The OLED display as claimed in claim **3**, further comprising an encapsulation substrate that adheres to and seals the substrate main body to cover the OLED, the encapsulation substrate and the OLED having a separation space between them.

13. The OLED display as claimed in claim **12**, further comprising a gas in the separation space between the encapsulation substrate and the OLED.

14. The OLED display as claimed in claim **13**, wherein the gas has a refractive index lower than that of the high refractive film.

15. The OLED display as claimed in claim **12**, further comprising a non-gaseous filler in the separation space between the encapsulation substrate and the OLED.

16. The OLED display as claimed in claim **15**, wherein the non-gaseous filler has a refractive index lower than that of the high refractive film.

17. The OLED display as claimed in claim **16**, wherein the non-gaseous filler is made of an organic material.

18. The OLED display as claimed in claim **17**, wherein the organic material is a polymer.

19. The OLED display as claimed in claim **1**, wherein the OLED comprises:

a first electrode;

an organic emission layer on the first electrode; and

a second electrode on the organic light emitting layer and that is disposed relatively most adjacent to the capping layer, wherein the second electrode is made of one of a transparent material and a transflective material.

20. The OLED display as claimed in claim **18**, wherein the first electrode is formed with a reflective layer.

* * * * *

专利名称(译)	有机发光二极管显示器		
公开(公告)号	US20110121271A1	公开(公告)日	2011-05-26
申请号	US12/923067	申请日	2010-08-31
[标]申请(专利权)人(译)	荣熙的歌 PARK SOON RYONG		
申请(专利权)人(译)	全度熙宋 PARK SOON-RYONG		
当前申请(专利权)人(译)	全度熙宋 PARK SOON-RYONG		
[标]发明人	JEON HEE SONG PARK SOON RYONG		
发明人	JEON, HEE-SONG PARK, SOON-RYONG		
IPC分类号	H01L51/50		
CPC分类号	H01L51/5218 H01L51/5275 H01L51/5253 H01L51/524		
优先权	1020090114806 2009-11-25 KR		
外部链接	Espacenet USPTO		

摘要(译)

提供有机发光二极管（OLED）显示器。 OLED显示器包括基板主体，基板主体上的OLED和OLED上的覆盖层。覆盖层包括具有至少两层不同折射率的膜。