US 20200203448A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2020/0203448 A1**

KIM et al. (43) **Pub. Date: Jun. 25, 2020**

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

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(21) Appl. No.: **16/714,789**

(22) Filed: **Dec. 15, 2019**

(30) **Foreign Application Priority Data**

Dec. 24, 2018 (KR) 10-2018-0168725

Publication Classification

(51) **Int. Cl.**

H01L 27/32	(2006.01)
H01L 51/52	(2006.01)
H01L 51/56	(2006.01)

(52) **U.S. Cl.**

CPC ***H01L 27/3246*** (2013.01); ***H01L 27/3211*** (2013.01); ***H01L 51/5209*** (2013.01); *G09G 3/3266* (2013.01); *H01L 2227/323* (2013.01); *H01L 27/3272* (2013.01); *H01L 27/3248* (2013.01); ***H01L 51/56*** (2013.01)

(57) **ABSTRACT**

An organic light-emitting display comprises a substrate having a plurality of subpixels arranged in a row direction and a column direction crossing the row direction; a plurality of first electrodes respectively allocated to the plurality of subpixels and comprising a first sub-electrode arranged in a (3n−2) column, a second sub-electrode arranged in a (3n−1) column, and a third sub-electrode arranged in a 3n column (where n is a natural number of 1 or more); and a bank having an opening exposing the plurality of first electrodes, wherein the first sub-electrode has a convex part protruded toward the third sub-electrode that has a concave part corresponding to the convex part.

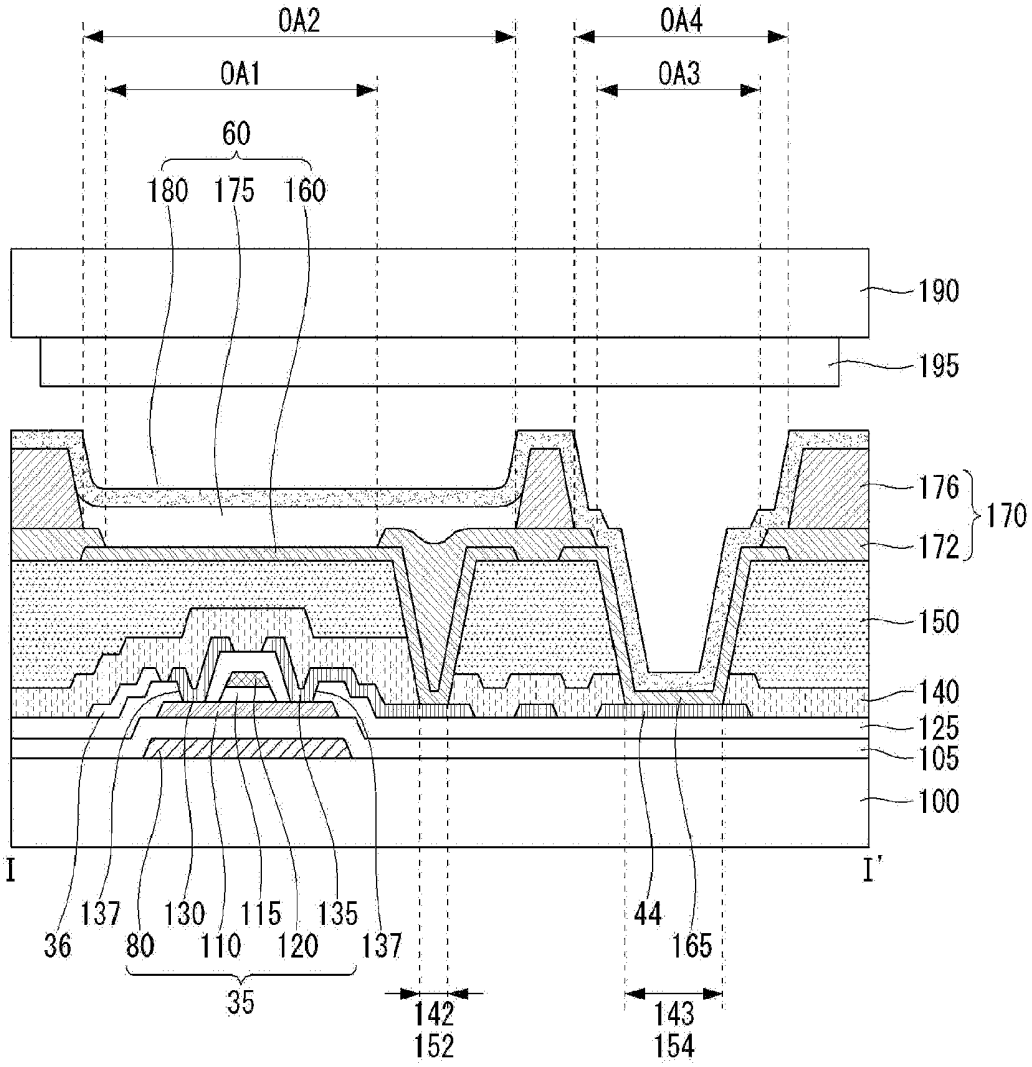


FIG. 1

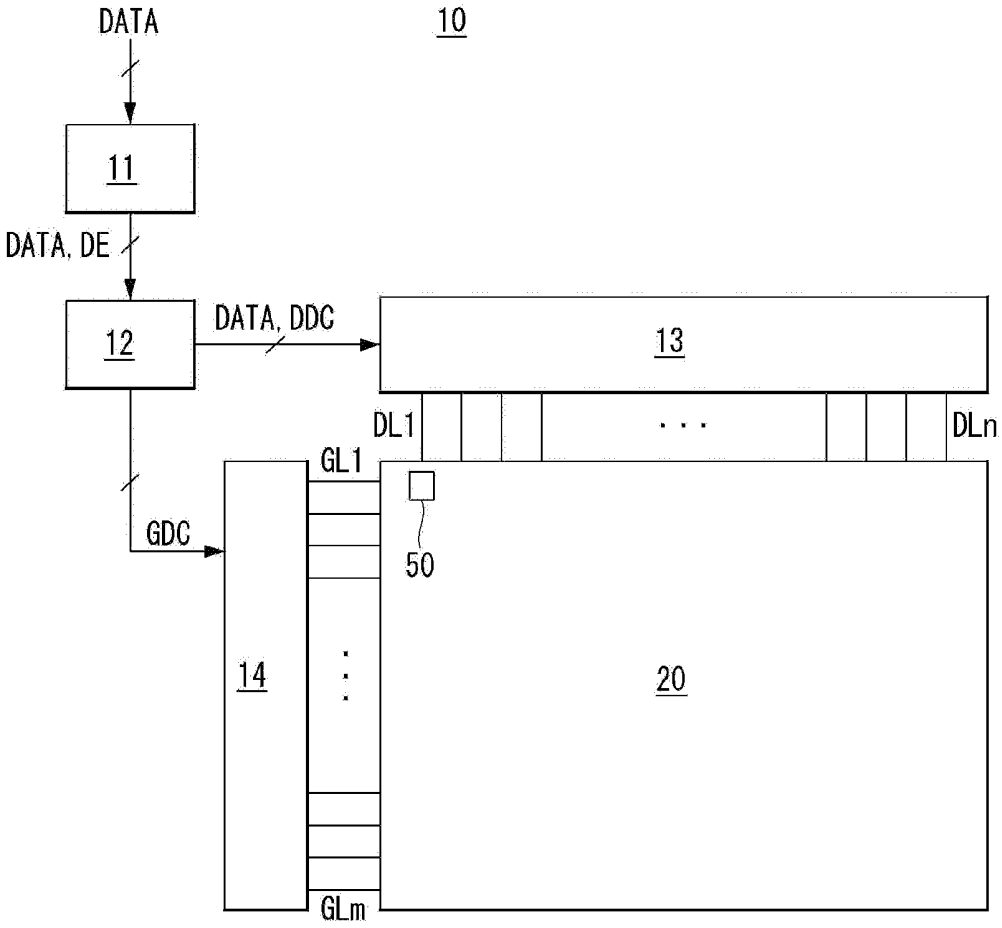


FIG. 2

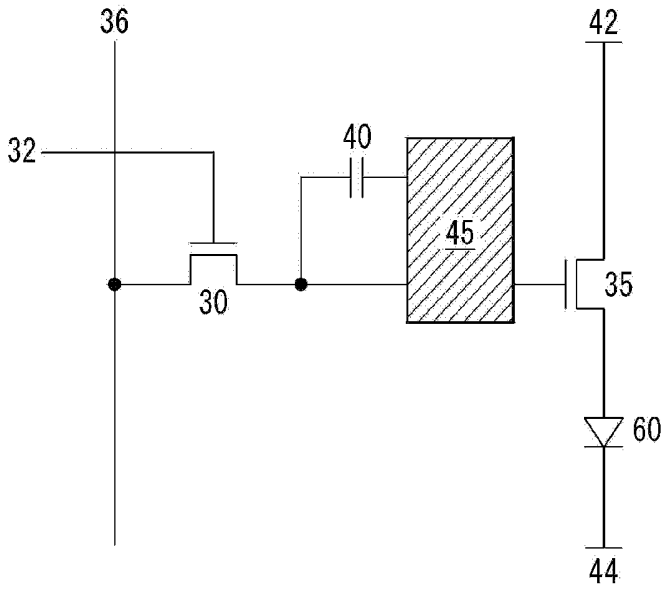


FIG. 3

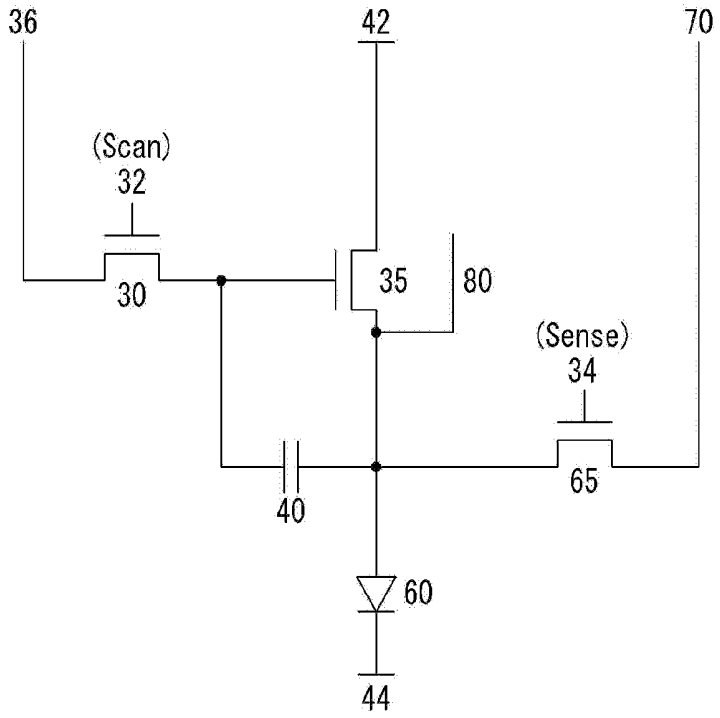


FIG. 4

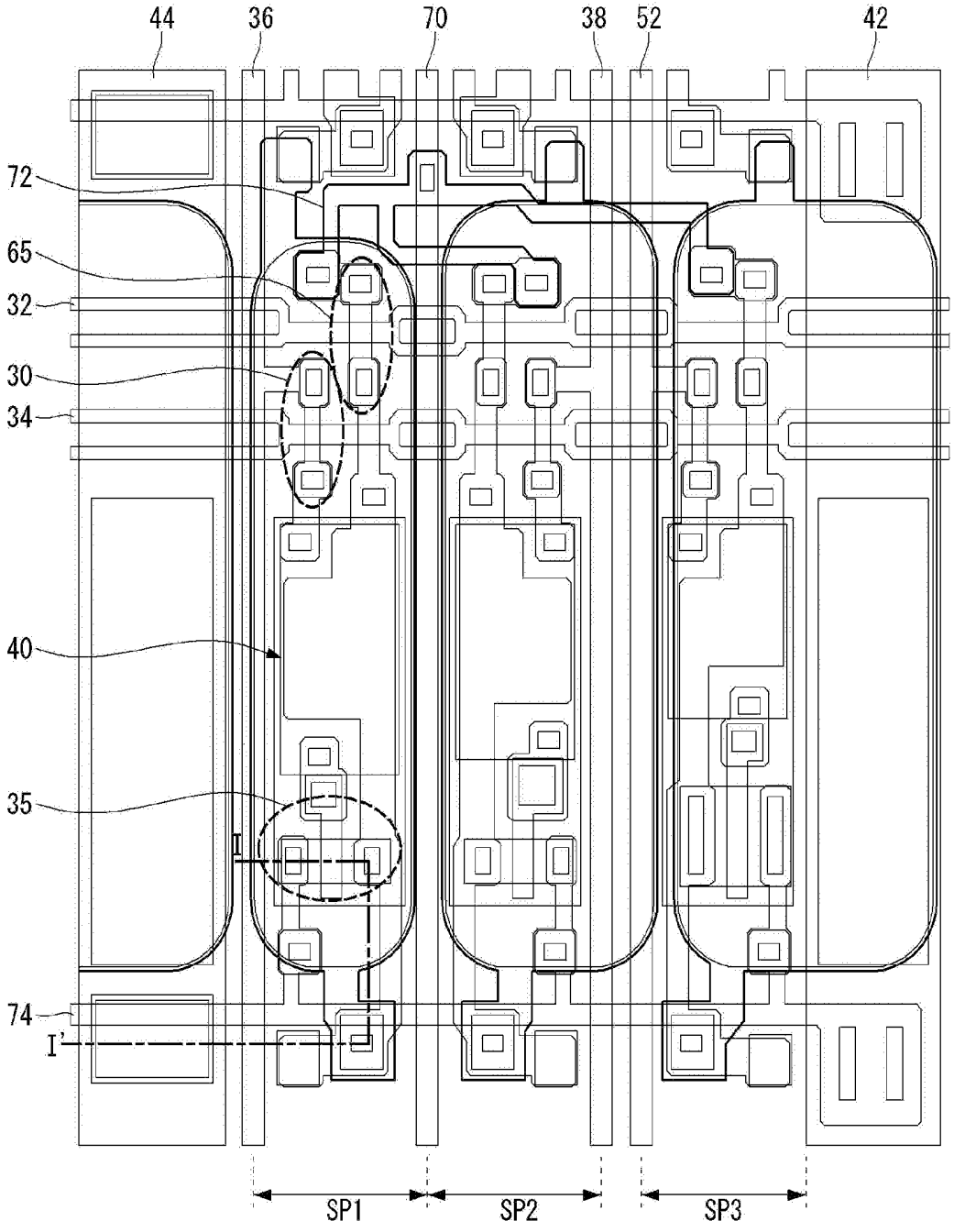


FIG. 5

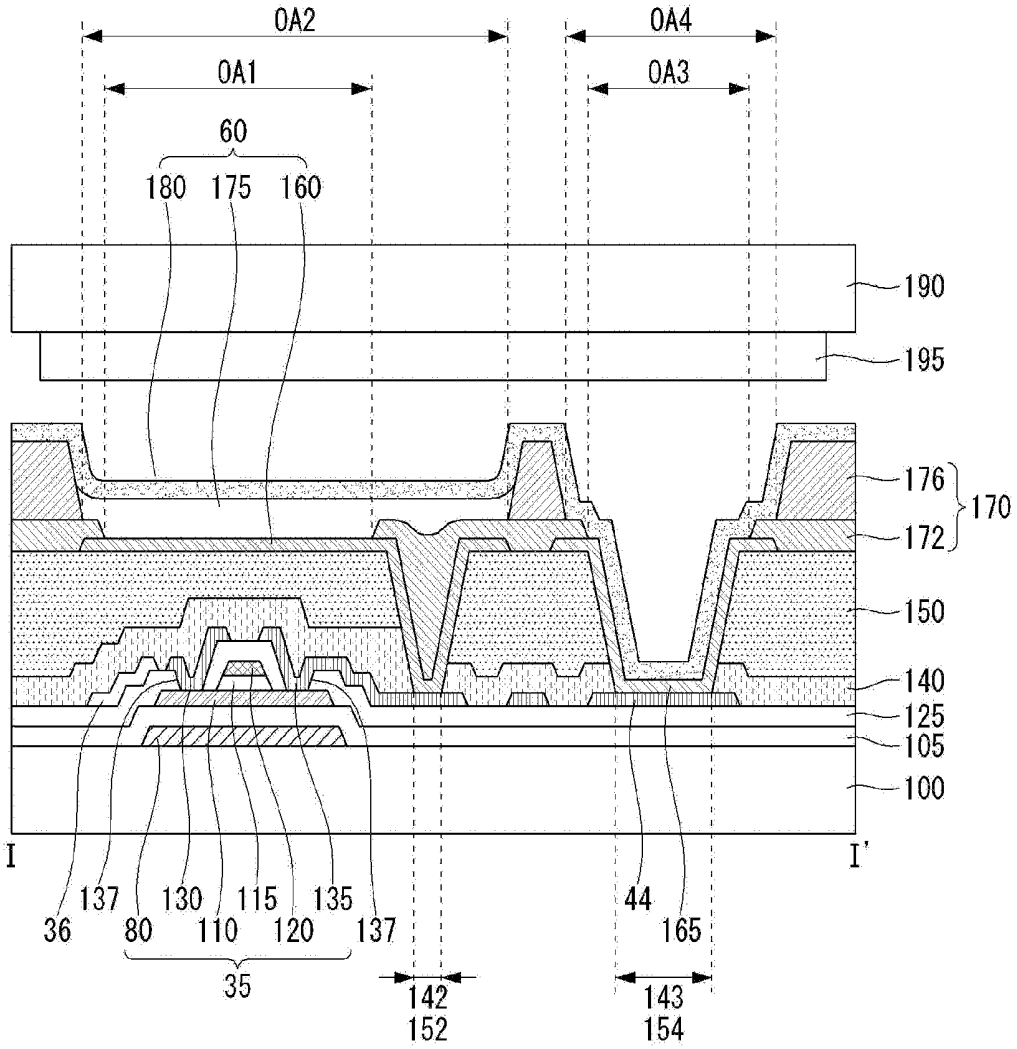

OA2
OA4
OA1
OA3
60
180
175
160
190
195
176
170
172
150
140
125
105
100
I
I'
36
137
80
130
110
115
120
135
137
35
142
152
44
165
143
154

FIG. 6

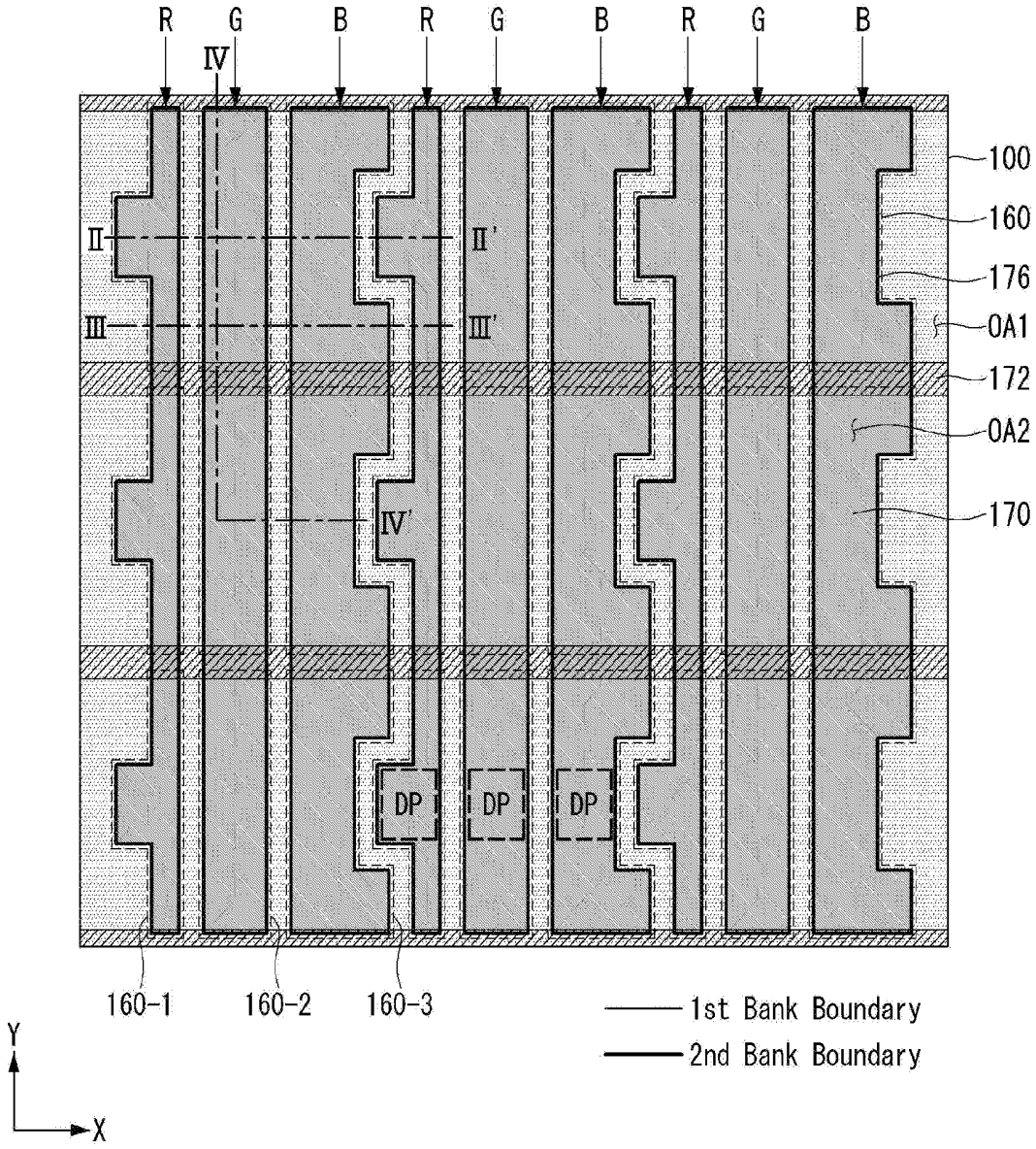
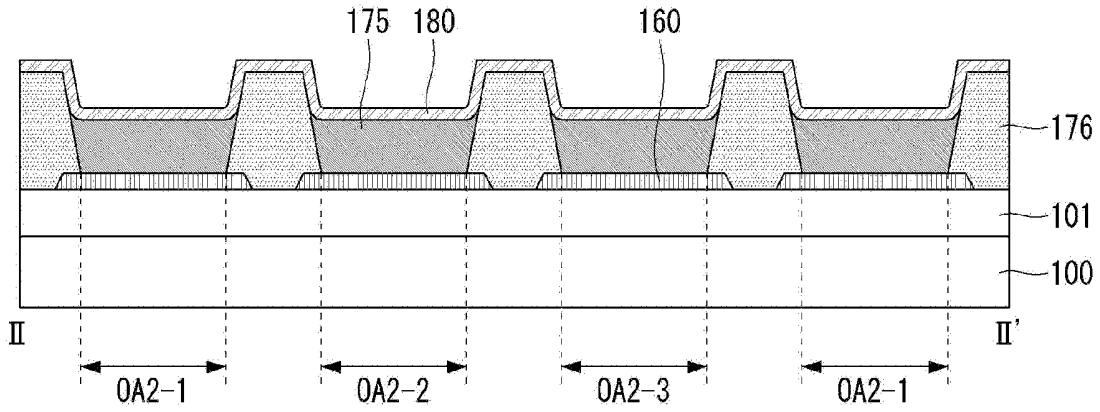
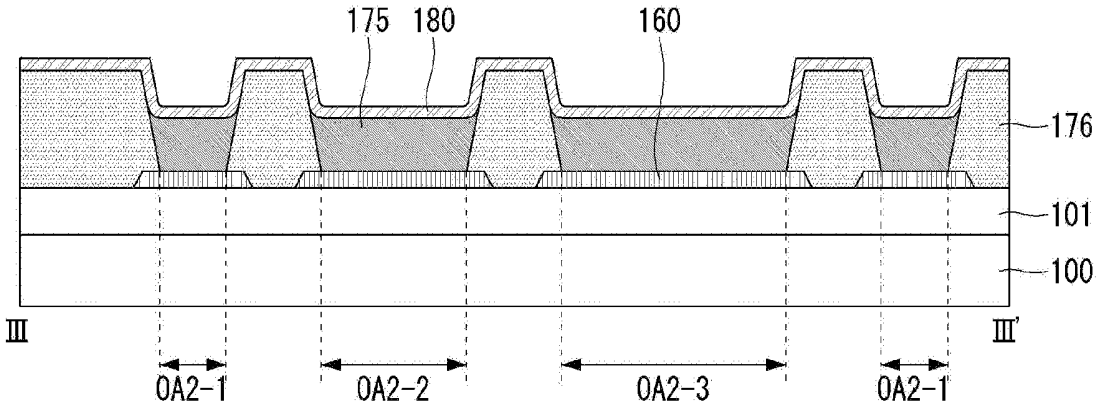

R
G
B
R
G
B
R
G
B
Ⅳ
100
160
176
OA1
172
OA2
170
Ⅱ
Ⅱ'
Ⅲ
Ⅲ'
Ⅳ'
DP
DP
DP
160-1
160-2
160-3
1st Bank Boundary
2nd Bank Boundary
Y
X

FIG. 7


175
180
160
176
101
100
II
II'
OA2-1
OA2-2
OA2-3
OA2-1


175
180
160
176
101
100
III
III'
OA2-1
OA2-2
OA2-3
OA2-1

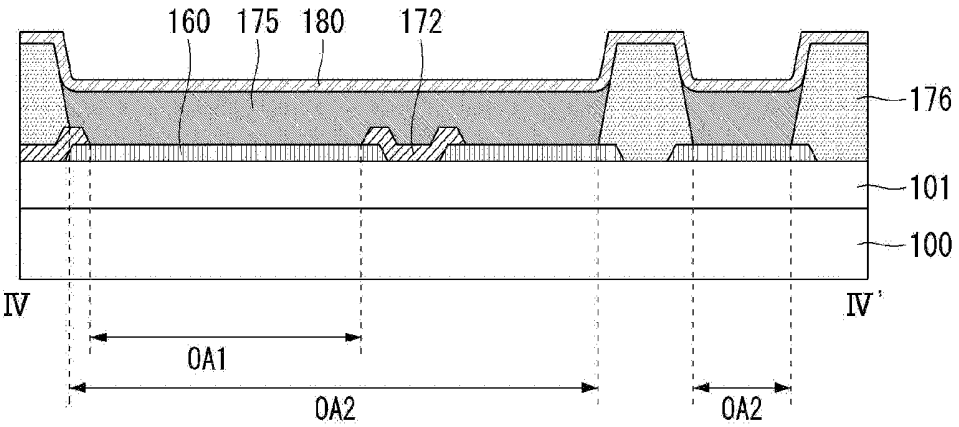

160
175
180
172
176
101
100
IV
IV'
OA1
OA2
OA2

FIG. 8

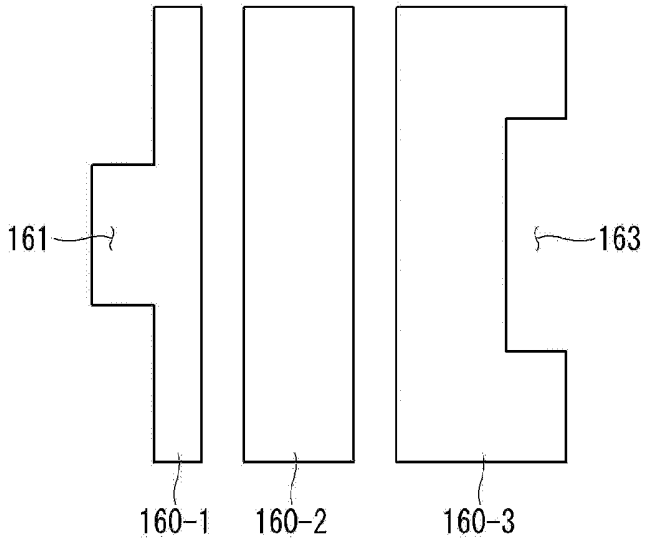


FIG. 9

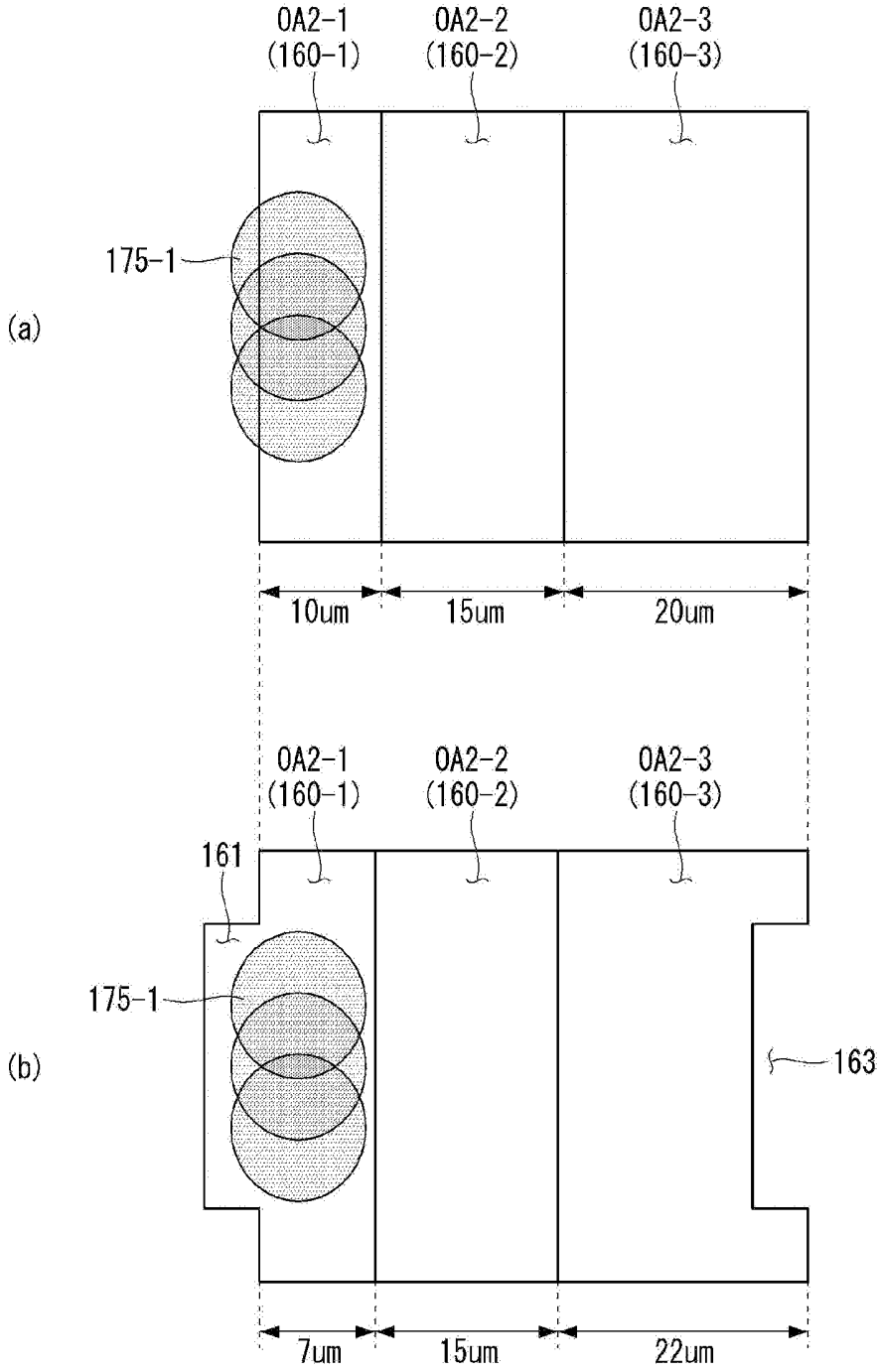

OA2-1
(160-1)
OA2-2
(160-2)
OA2-3
(160-3)
175-1
(a)
10um
15um
20um
OA2-1
(160-1)
OA2-2
(160-2)
OA2-3
(160-3)
161
175-1
(b)
163
7um
15um
22um

FIG. 10A

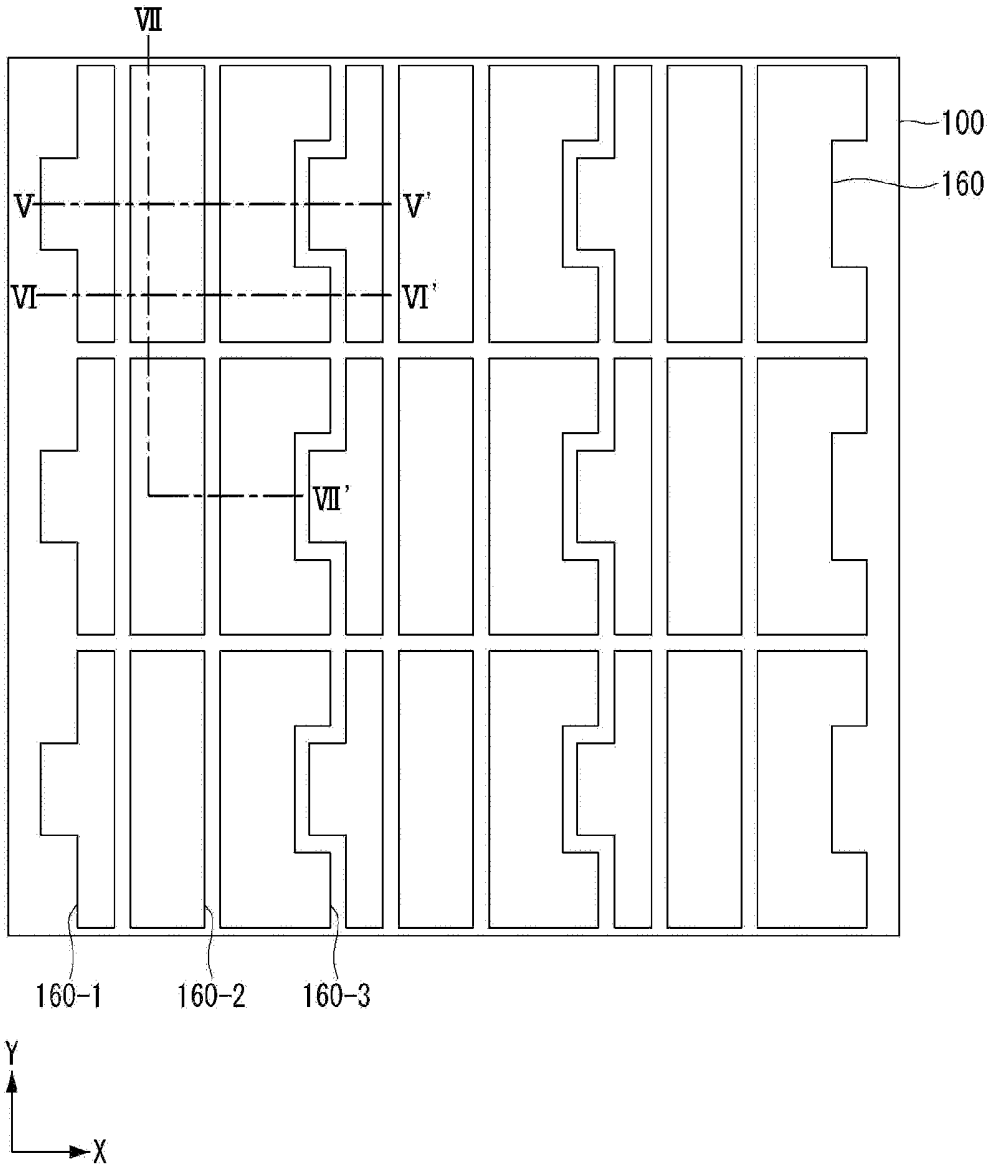


FIG. 10B

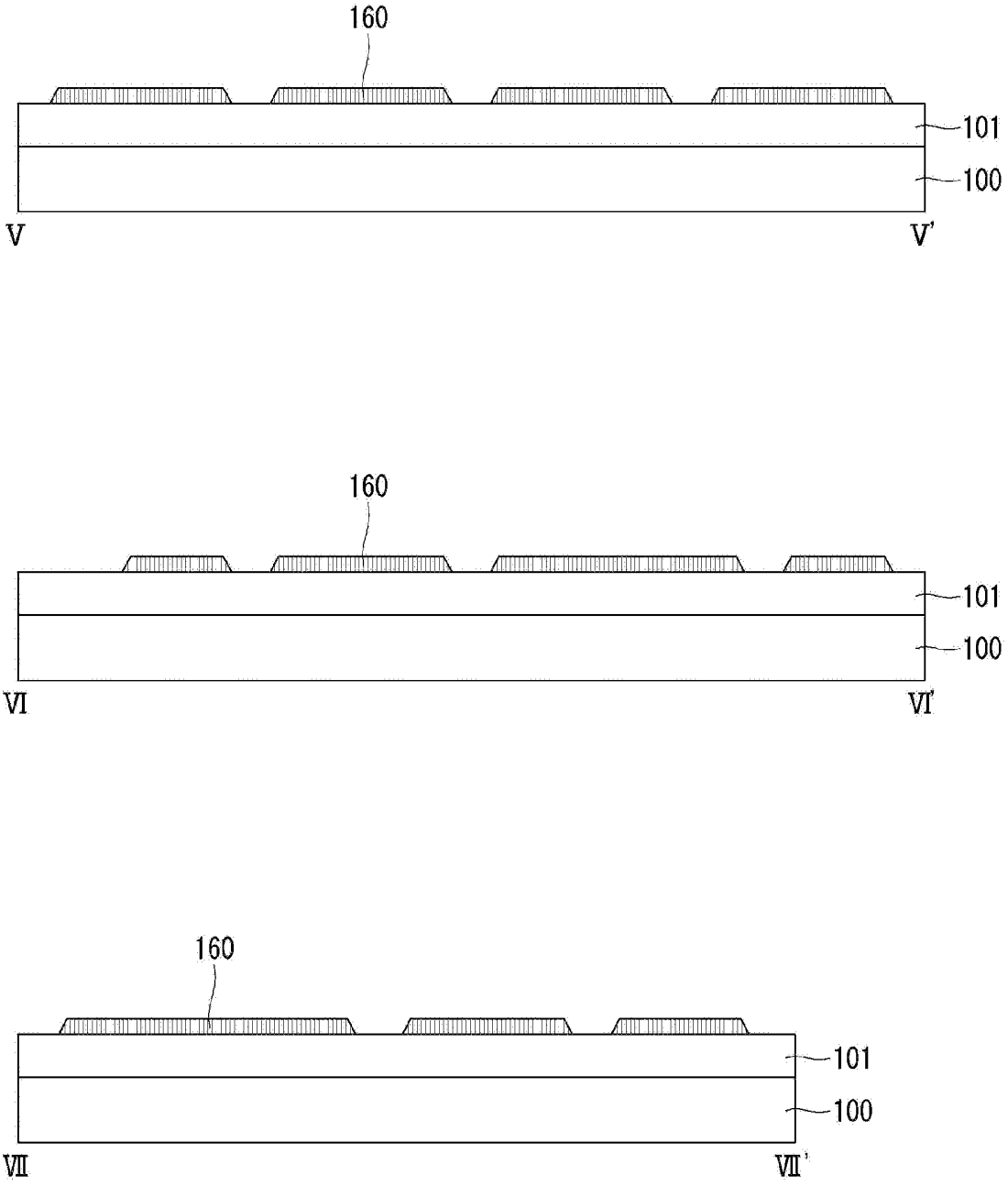


FIG. 11A

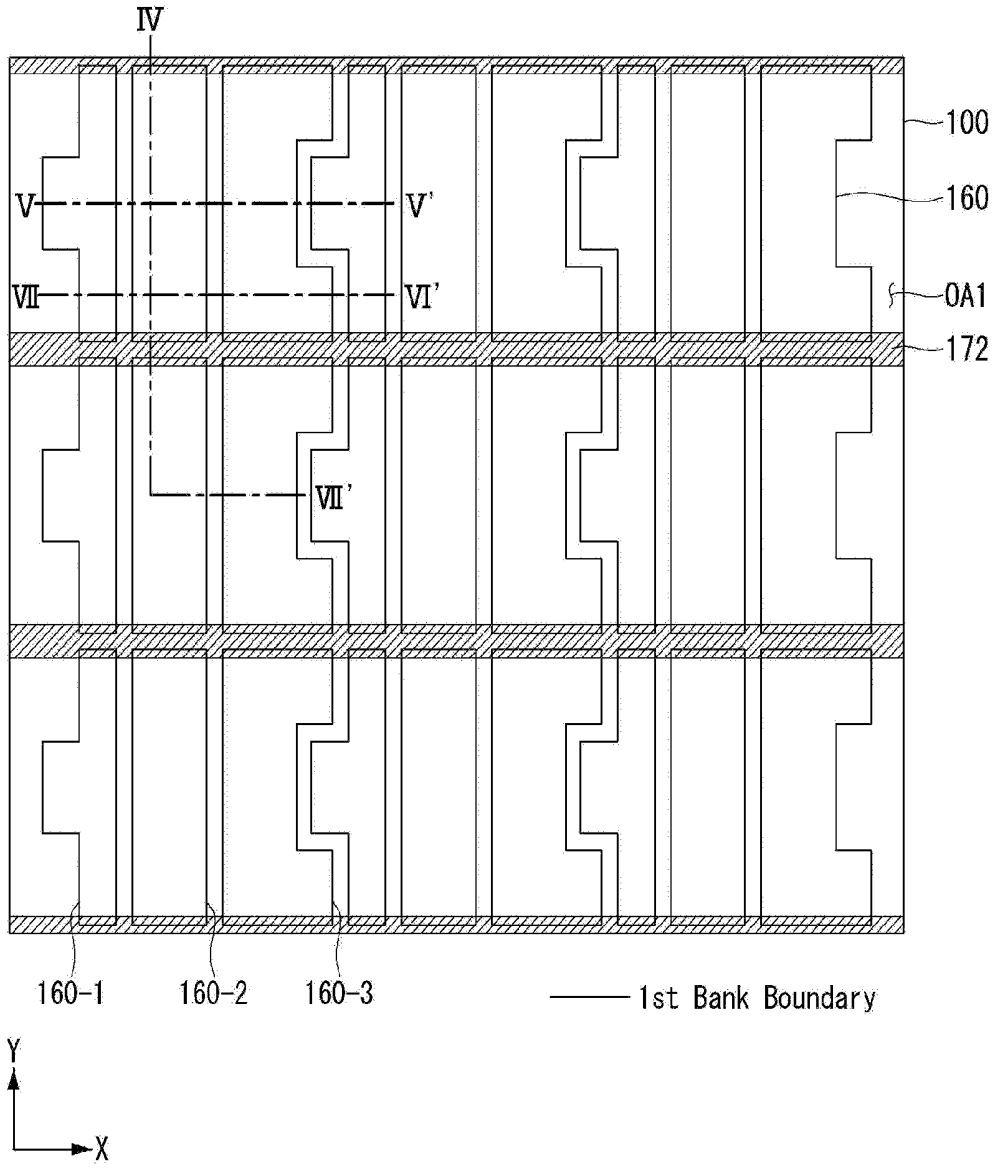

IV
V
V'
VII
VI'
VII'
100
160
OA1
172
160-1
160-2
160-3
1st Bank Boundary
Y
X

FIG. 11B

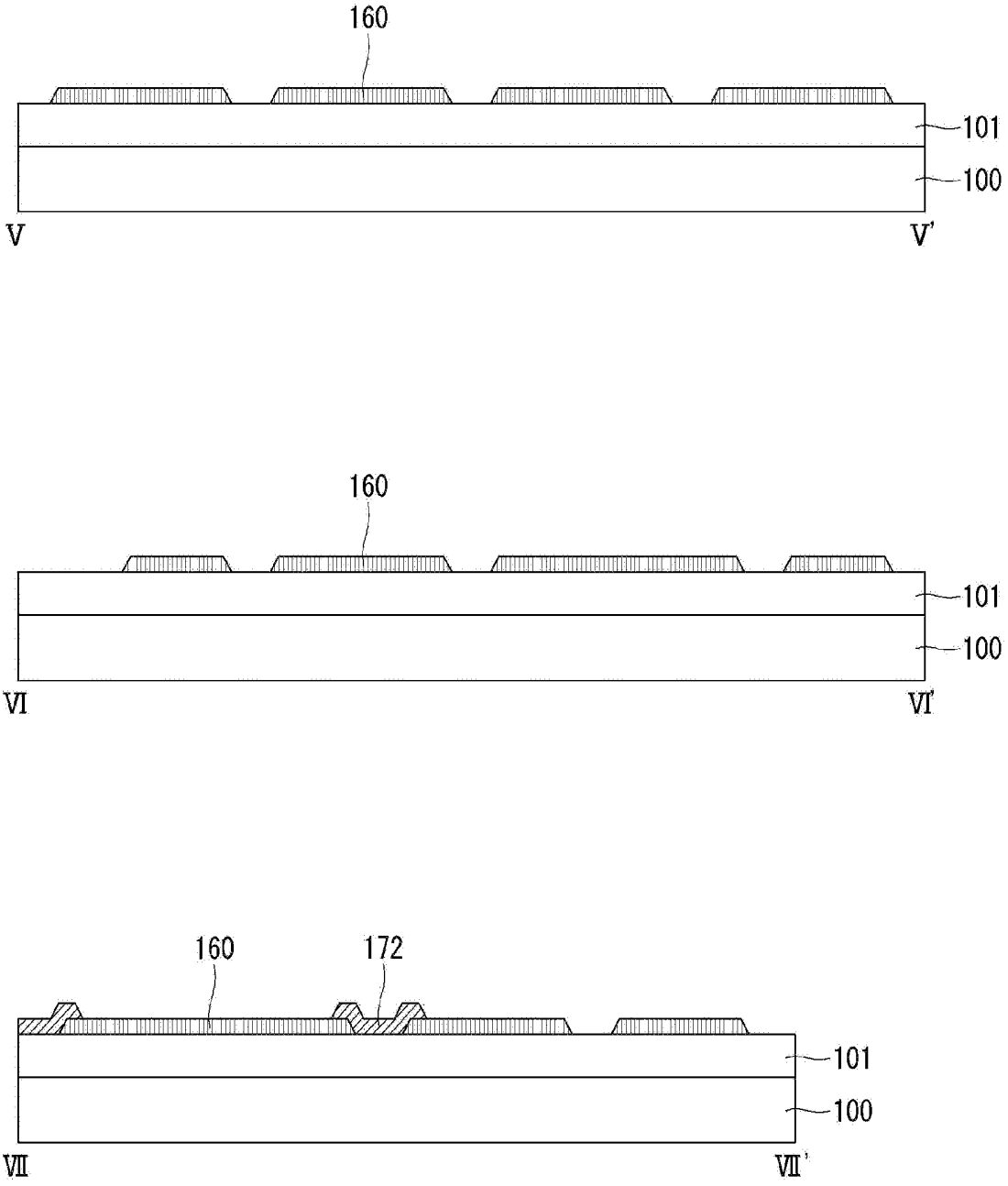


FIG. 12A

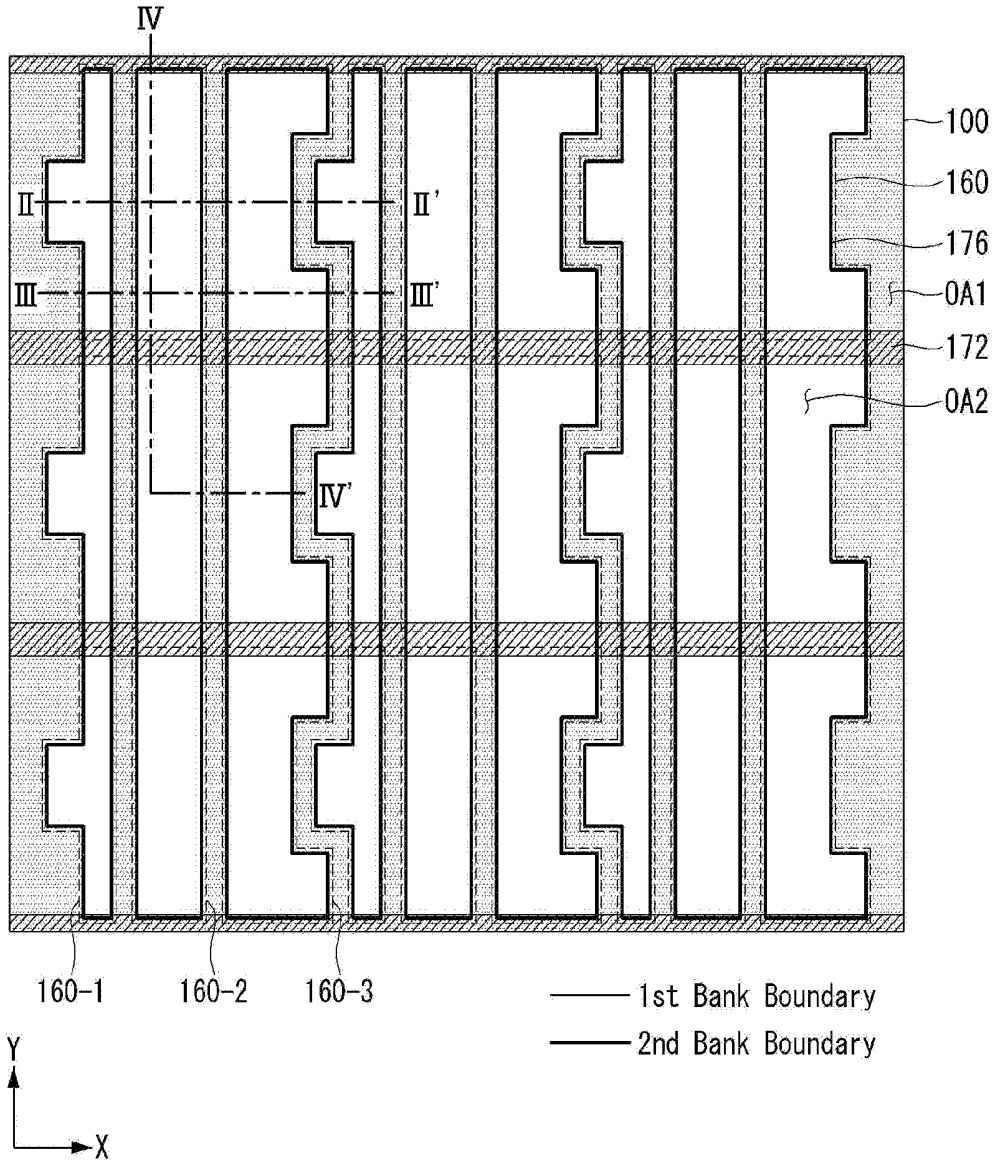
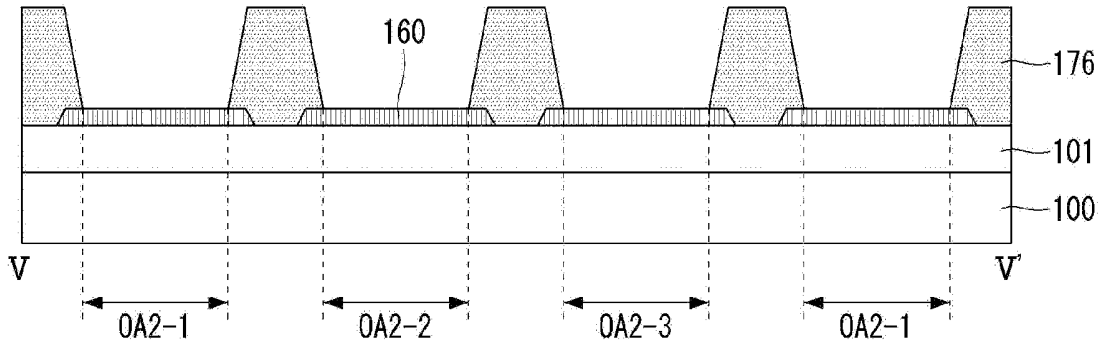
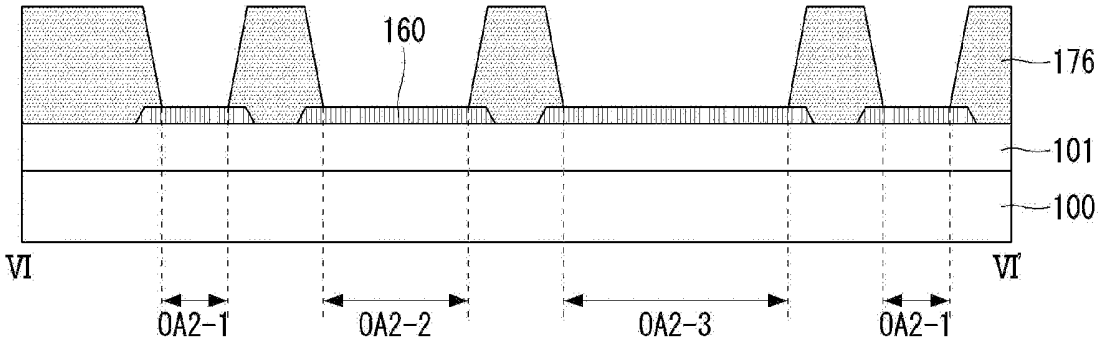

Ⅳ
Ⅱ
Ⅱ'
Ⅲ
Ⅲ'
Ⅳ'
100
160
176
OA1
172
OA2
160-1
160-2
160-3
1st Bank Boundary
2nd Bank Boundary
Y
X

FIG. 12B


160
176
101
100
V
V'
OA2-1
OA2-2
OA2-3
OA2-1


160
176
101
100
VI
VI'
OA2-1
OA2-2
OA2-3
OA2-1

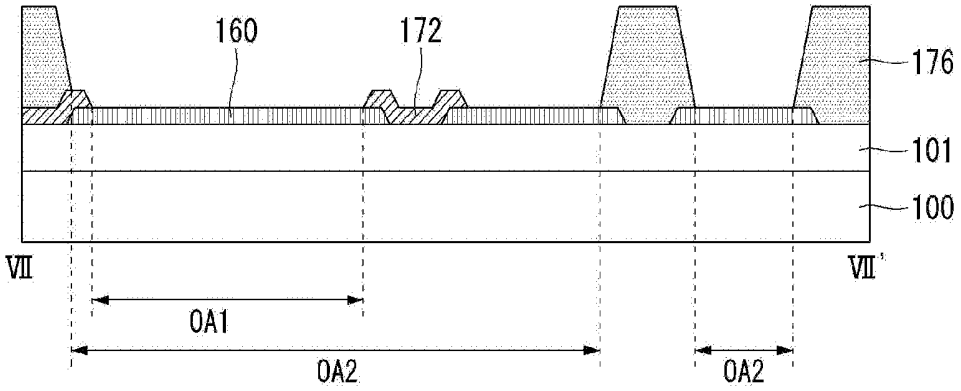

160
172
176
101
100
VII
VII'
OA1
OA2
OA2

FIG. 13A

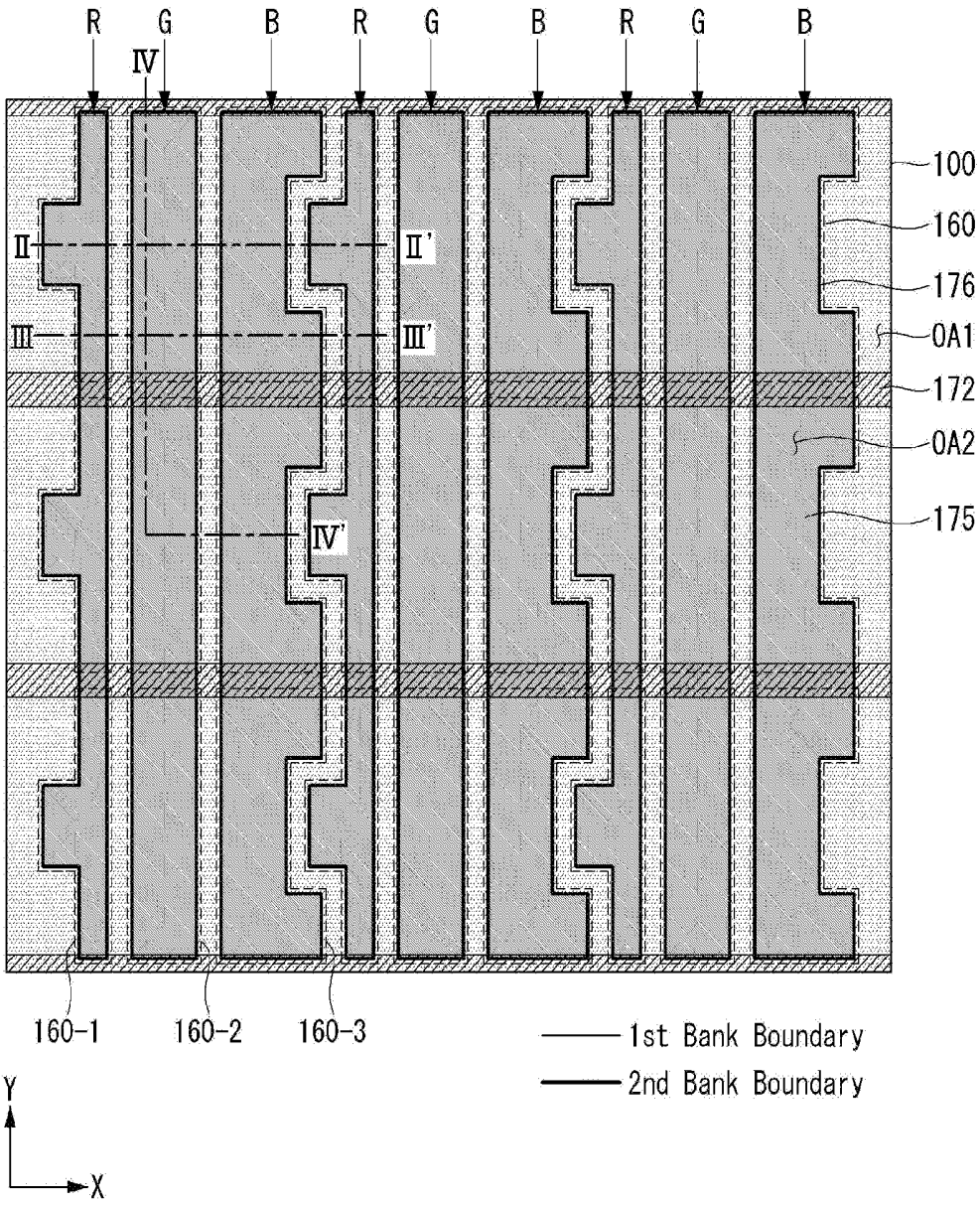
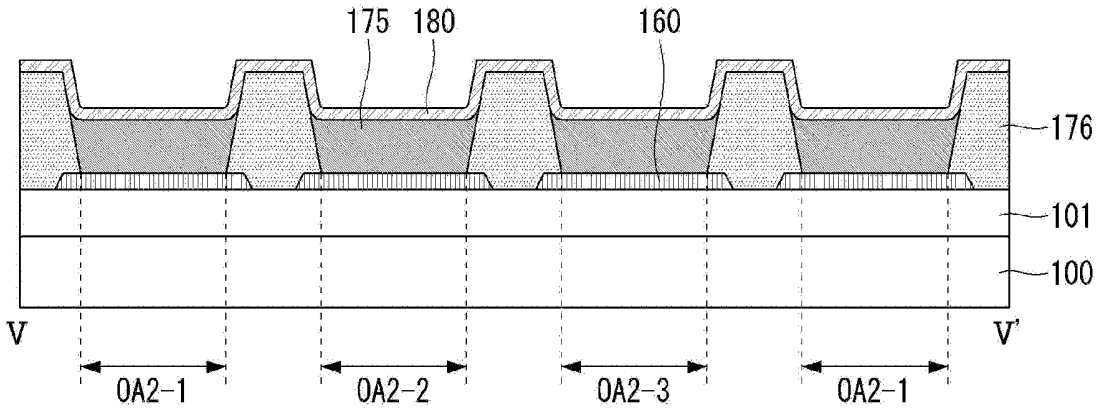
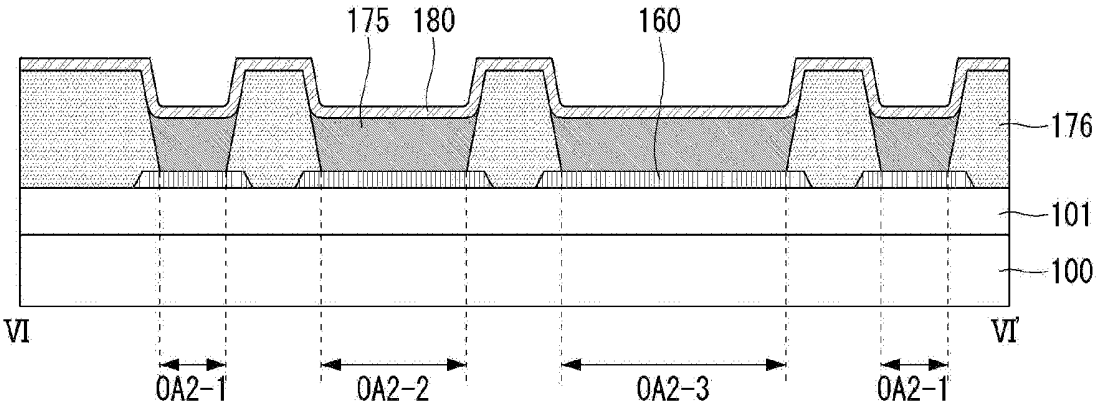

R
G
B
R
G
B
R
G
B
Ⅳ
Ⅱ
Ⅱ'
Ⅲ
Ⅲ'
Ⅳ'
100
160
176
OA1
172
OA2
175
160-1
160-2
160-3
1st Bank Boundary
2nd Bank Boundary
Y
X

FIG. 13B


175
180
160
176
101
100
V
V'
OA2-1
OA2-2
OA2-3
OA2-1


175
180
160
176
101
100
VI
VI'
OA2-1
OA2-2
OA2-3
OA2-1

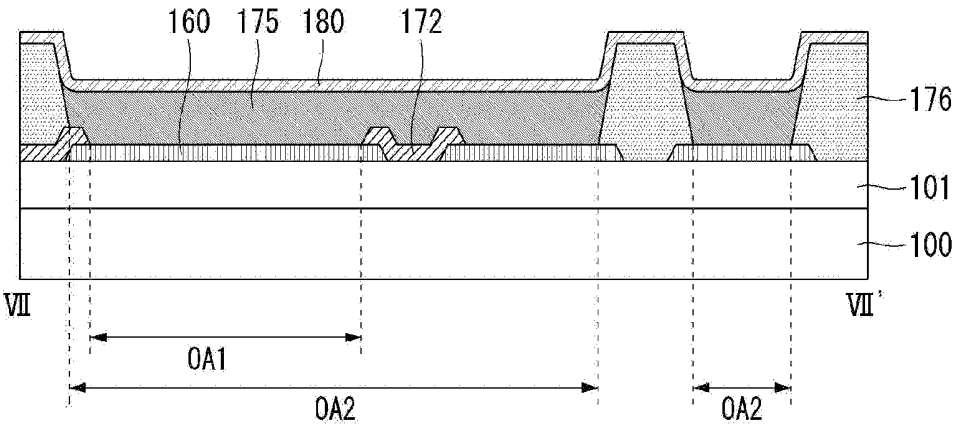

160
175
180
172
176
101
100
VII
VII'
OA1
OA2
OA2

FIG. 14

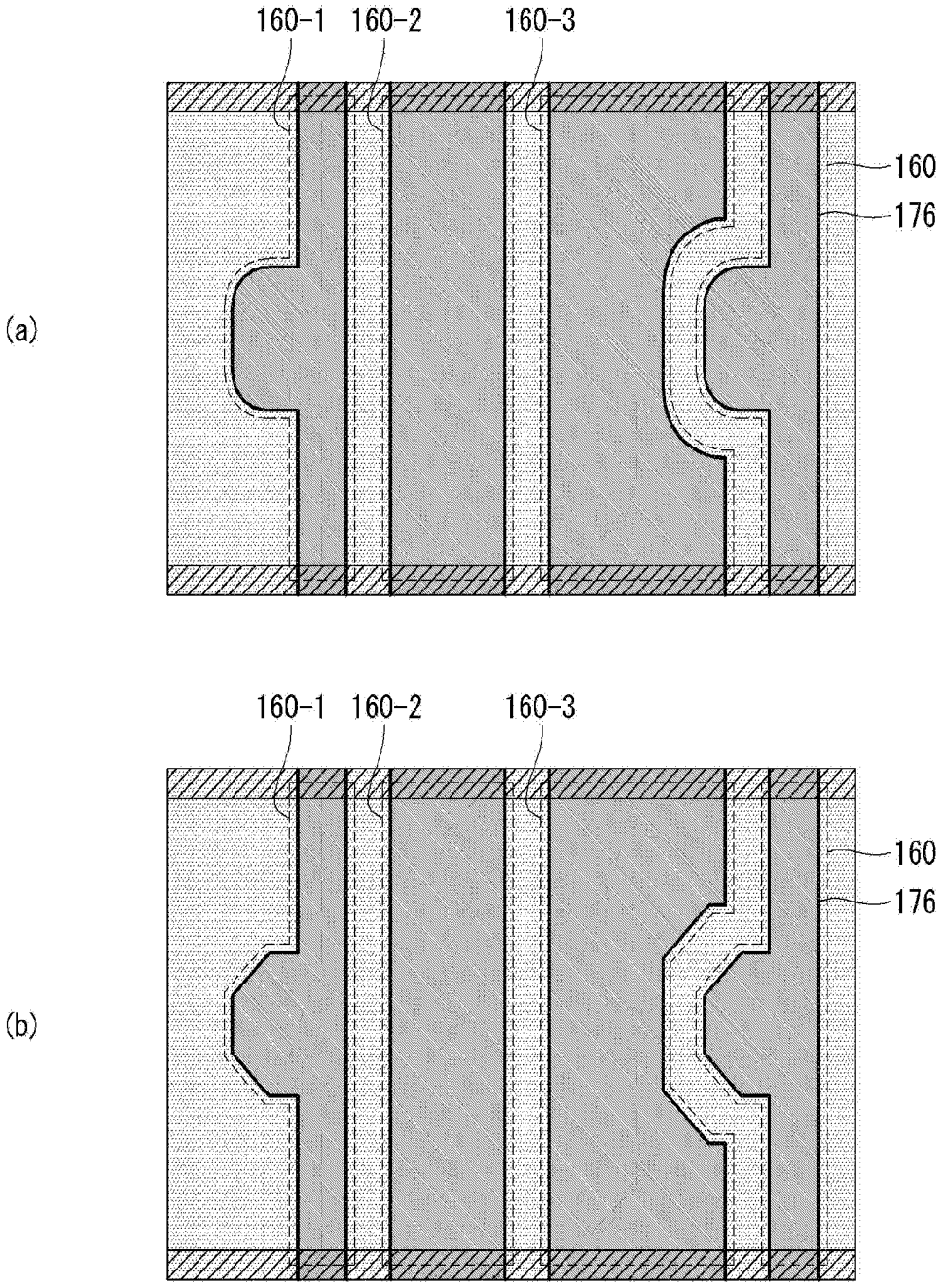


FIG. 15

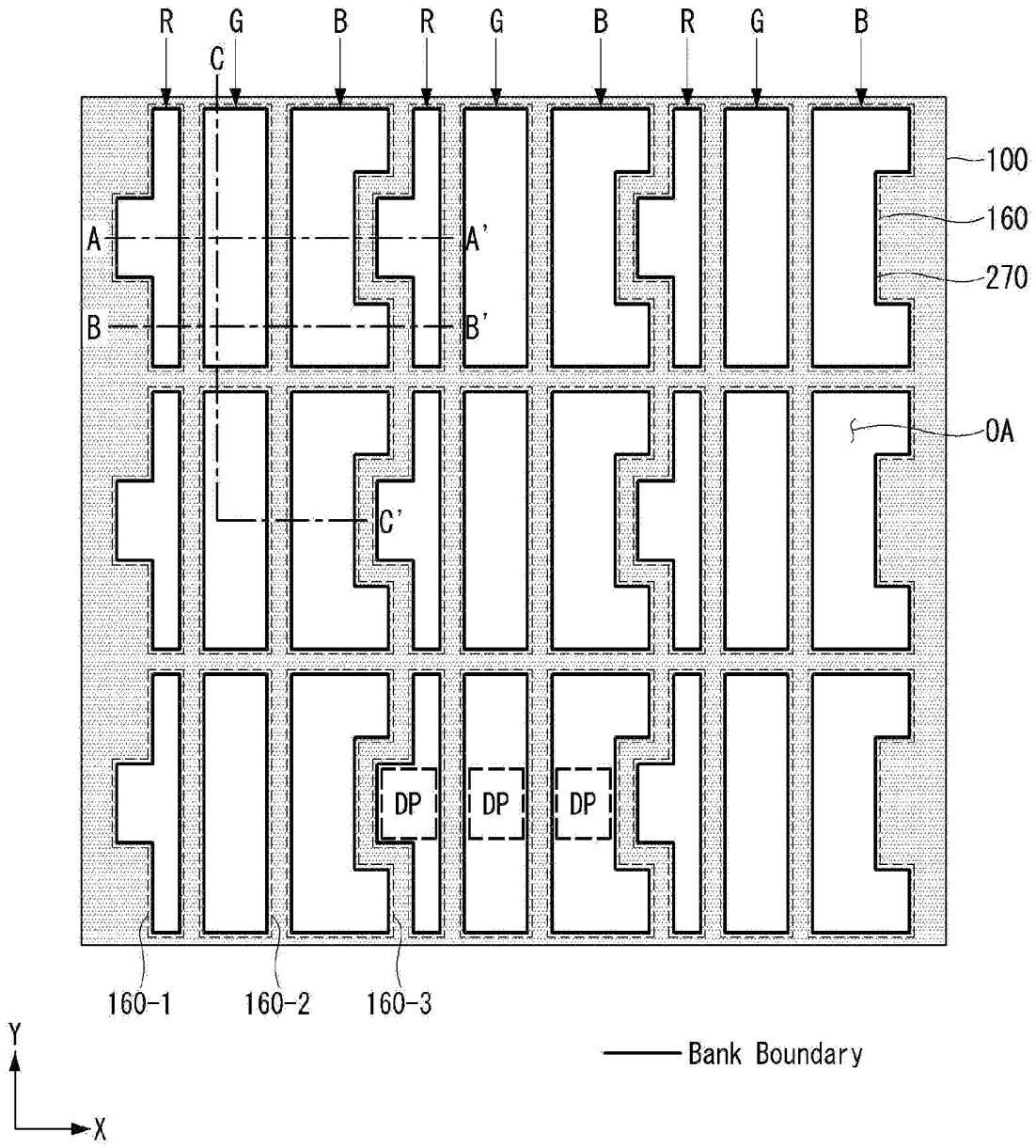

R
G
B
R
G
B
R
G
B
C
100
160
270
A
A'
B
B'
OA
C'
DP
DP
DP
160-1
160-2
160-3
Bank Boundary
Y
X

FIG. 16

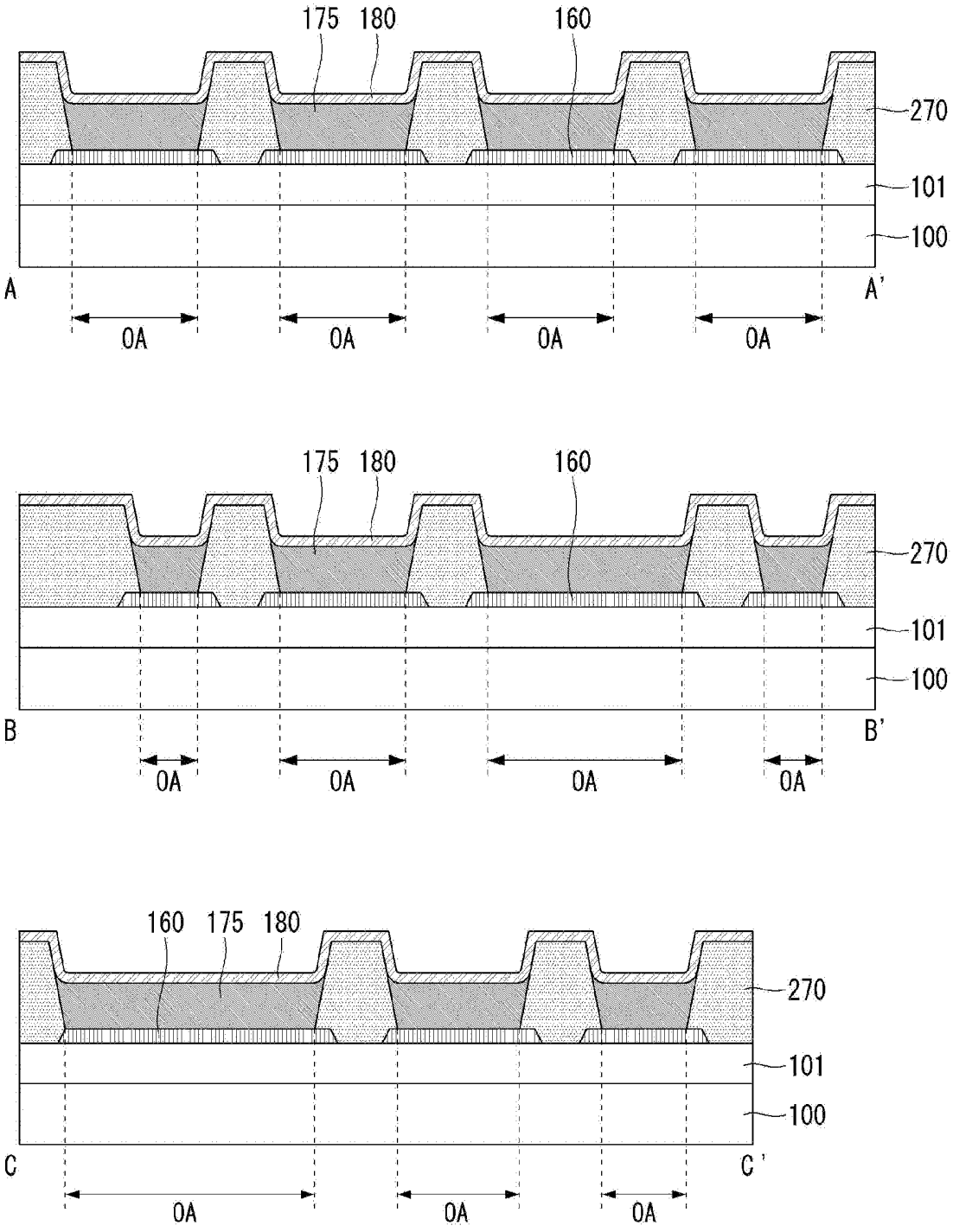

175
180
160
270
101
100
A
A'
OA
OA
OA
OA
175
180
160
270
101
100
B
B'
OA
OA
OA
OA
160
175
180
270
101
100
C
C'
OA
OA
OA

FIG. 17

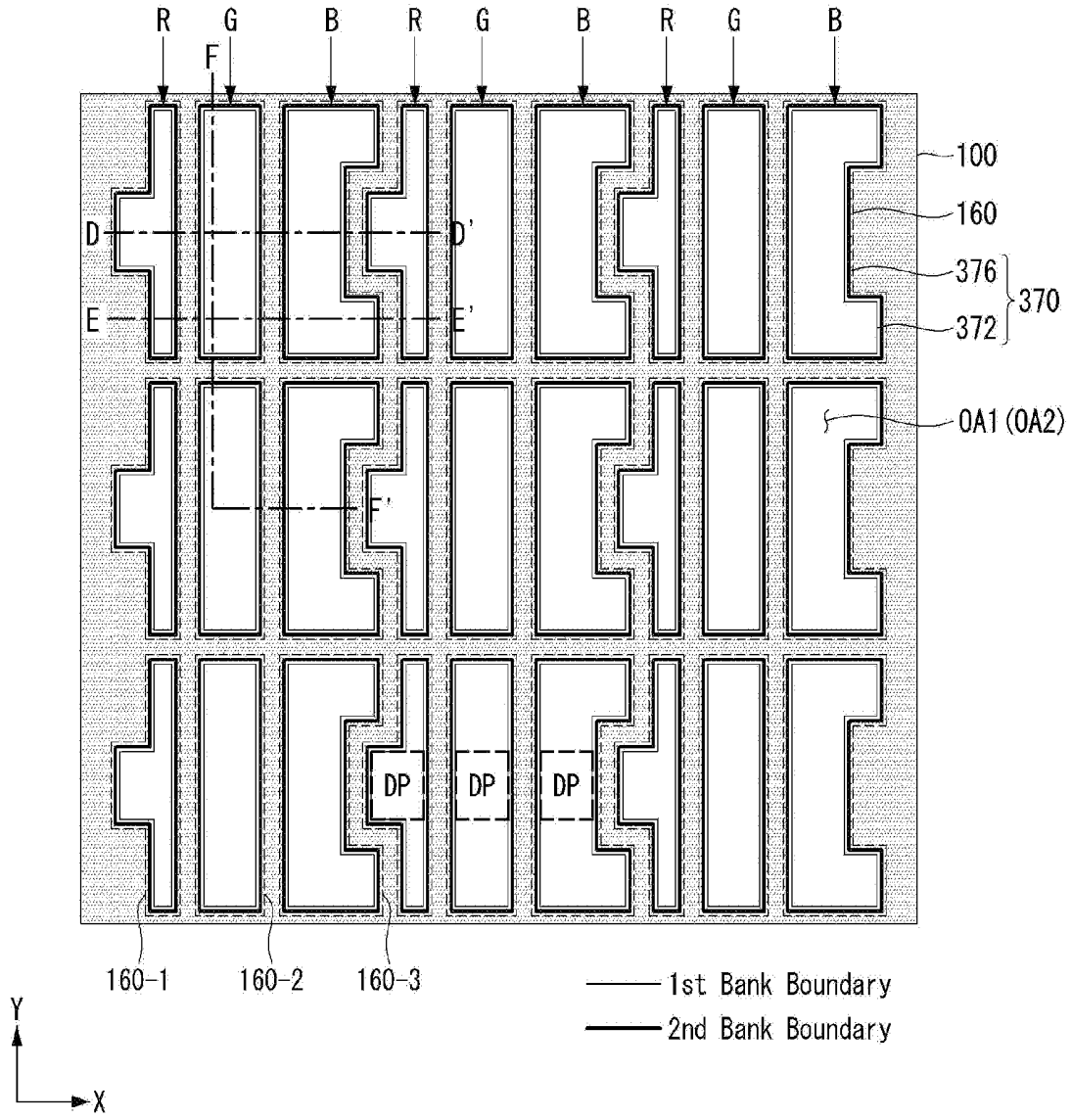
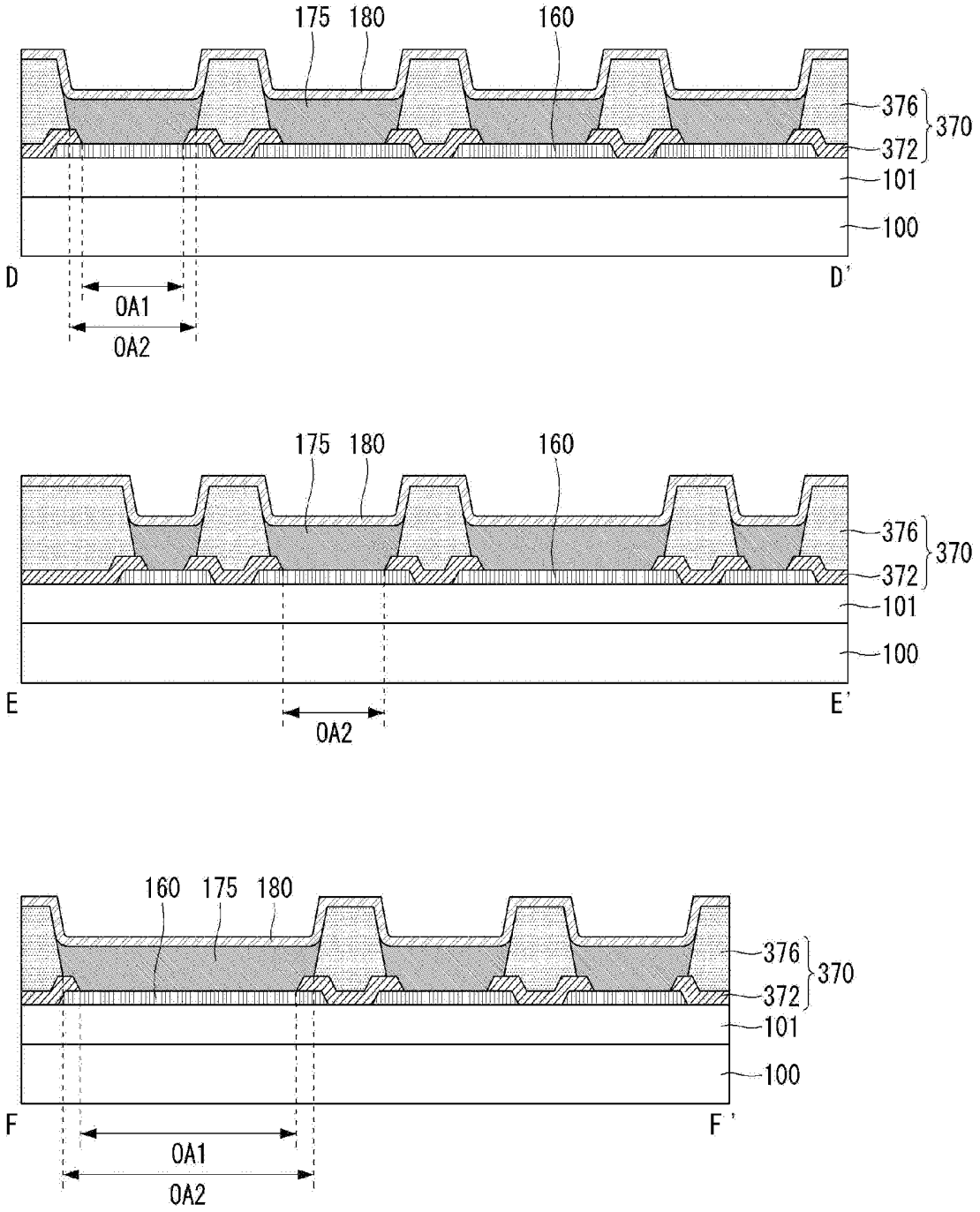

R
G
B
R
G
B
R
G
B
F
100
160
376
370
372
D
D'
E
E'
F'
OA1 (OA2)
DP
DP
DP
160-1
160-2
160-3
1st Bank Boundary
2nd Bank Boundary
Y
X

FIG. 18


175
180
160
376
370
372
101
100
D
D'
OA1
OA2
175
180
160
376
370
372
101
100
E
E'
OA2
160
175
180
376
370
372
101
100
F
F'
OA1
OA2

ORGANIC LIGHT EMITTING DISPLAY DEVICE

CROSS REFERENCE TO RELATED APPLICATION

[0001] This application claims priority from Korean Patent Application No. 10-2018-0168725, filed on Dec. 24, 2018, which is hereby incorporated by reference in its entirety.

BACKGROUND

Field of the Disclosure

[0002] The present disclosure relates to a display device, and more particularly, to an organic light-emitting display. Although the present disclosure is suitable for a wide scope of applications, it is particularly suitable for securing a dropping region of an organic light-emitting material while maintaining a preset area ratio between subpixels of the organic light-emitting display.

Description of the Background

[0003] Various display devices capable of reducing weight and volume, which is disadvantages of the cathode ray tube, are developed. Such display devices can be implemented as a liquid crystal display (LCD), a plasma display panel (PDP), a field emission display (FED), an organic light-emitting diode (OLED) display, etc.

[0004] An organic light-emitting display is a self-emission device without an additional light source, and has advantages in fast response time and high emission efficiency, high brightness and wide viewing angle. Furthermore, the organic light-emitting display can be implemented as a flexible display device because elements can be formed on a flexible substrate, such as plastic.

[0005] As large-area and high-resolution organic light-emitting displays are recently required, multiple subpixels are included in a single panel. In general, a mask is used for patterning red (R), green (G), and blue (B) subpixels. Accordingly, in order to implement a large-area display device, a corresponding large-area fine metal mask (FMM) is necessary. However, as the display device has a larger area, an organic light-emitting material to form an emission layer may not be deposited in place, which may be caused by the FMM drooping.

[0006] In order to solve such a problem in the above-described deposition method using the mask, a solution process (or soluble process) that is simple and advantageous for a large area attracts attention. The solution process enables large area patterning without a mask through inkjet printing or nozzle printing, and has a very high material use ratio of about 50 to 80% compared to the vacuum deposition having a material use ratio of 10% or less. Furthermore, the solution process provides excellent thermal stability and morphology characteristics because it has a higher glass transition temperature compared to a thin vacuum deposition film.

[0007] When an organic emission layer is formed with the solution process, a color mixture failure in which organic light-emitting materials of different colors are mixed may occur because the organic light-emitting materials may not be dropped in place. In order to prevent the color mixture failure, it is necessary to secure a sufficient dropping region of an organic light-emitting material is dropped by taking a process margin into consideration. In a high-resolution display device having a high pixel per inch (PPI), however, it is difficult to secure a dropping region because the size per pixel is very small.

SUMMARY

[0008] Accordingly, the present disclosure is directed to an organic light-emitting display that substantially obviates one or more of problems due to limitations and disadvantages of the prior art.

[0009] Additional features and advantages of the disclosure will be set forth in the description which follows and in part will be apparent from the description, or may be learned by practice of the invention. Other advantages of the present disclosure will be realized and attained by the structure particularly pointed out in the written description and claims hereof as well as the appended drawings.

[0010] The present disclosure provides an organic light-emitting display capable of securing the dropping region of an organic light-emitting material while maintaining a preset area ratio between subpixels.

[0011] In an aspect, an organic light-emitting display includes a substrate, first electrodes, and a bank. The substrate has a plurality of subpixels arranged in a row direction and a column direction crossing the row direction. The first electrodes are allocated to the subpixels, respectively, and include (1-1) electrodes arranged in a (3n−2) (n is a natural number of 1 or more) column, (1-2) electrodes arranged in a (3n−1) column, and a (1-3) electrode arranged in a 3n column. The bank has an opening exposing the first electrodes. The (1-1) electrode includes a convex part protruded toward the (1-3) electrode. The (1-3) electrode comprises a concave part opposing the convex part.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The accompanying drawings, which are included to provide a further understanding of the disclosure and are incorporated in and constitute a part of the disclosure, illustrate aspects of the disclosure and together with the description serve to explain the principles of the disclosure.

[0013] In the drawings:

[0014] FIG. **1** is a schematic diagram of an organic light-emitting display device;

[0015] FIG. **2** is a schematic circuit diagram of a subpixel of the organic light-emitting display device;

[0016] FIG. **3** is a detailed circuit diagram of the subpixel of the organic light-emitting display device;

[0017] FIG. **4** a plan view schematically showing a layout of subpixels according to an aspect of the present disclosure;

[0018] FIG. **5** is a cross-sectional view taken along dotted line I-I' of FIG. **4**;

[0019] FIG. **6** is a plan view schematically showing a display device according to the present disclosure;

[0020] FIG. **7** shows cross-sectional views taken along lines II-II', III-III', and IV-IV' of FIG. **6**;

[0021] FIG. **8** is a schematic diagram for illustrating the shape and position relation of first electrodes;

[0022] FIG. **9** is a schematic diagram for illustrating an effect of the present disclosure;

[0023] FIGS. **10**A to **10**B, **11**A to **11**B, **12**A to **12**B and **13**A to **13**B are diagrams for illustrating a process of forming first electrodes, a bank, and an organic emission layer in a time series;

[0024] FIG. **14** is a schematic diagram for illustrating another example of the shape of a first electrode and a second bank;

[0025] FIG. **15** is a plan view schematically showing a display device according to an aspect of the present disclosure;

[0026] FIG. **16** shows cross-sectional views taken along lines VIII-VIII', IX-IX' and X-X' of FIG. **15**;

[0027] FIG. **17** is a plan view schematically showing a display device according to another aspect of the present disclosure; and

[0028] FIG. **18** shows cross-sectional views taken along lines A-A', B-B' and C-C' of FIG. **17**.

DETAILED DESCRIPTION

[0029] Hereinafter, aspects of the present disclosure are described with reference to the accompanying drawings. Throughout the specification, the same reference numeral substantially denotes the same element. In the following description, a detailed description of known technology or element related to the present disclosure will be omitted if it is deemed to make the gist of the present disclosure unnecessarily vague. In describing several aspects, the same element is representatively described at the introductory part of this specification, and may be omitted in other aspects.

[0030] Terms including ordinal numbers, such as the first and the second, may be used to describe various elements, but the elements are not limited by the terms. The terms are used to only distinguish one element from the other element.

[0031] FIG. **1** is a schematic diagram of an organic light-emitting display device. FIG. **2** is a schematic circuit diagram of a subpixel of the organic light-emitting display device. FIG. **3** is a detailed circuit diagram of the subpixel of the organic light-emitting display device.

[0032] As shown in FIG. **1**, the organic light-emitting display device **10** includes an image processor **11**, a timing controller **12**, a data driver **13**, a scan driver **14** and a display panel **20**.

[0033] The image processor **11** outputs a data enable signal DE along with an externally supplied data signal DATA. The image processor **11** may output one or more of a vertical sync signal, a horizontal sync signal and a clock signal in addition to the data enable signal DE, but the signals are omitted, for convenience of description.

[0034] The timing controller **12** is supplied with the data signal DATA along with the data enable signal DE or driving signals, including the vertical sync signal, the horizontal sync signal and the clock signal, from the image processor **11**. The timing controller **12** outputs a gate timing control signal GDC for controlling operating timing of the scan driver **14** and a data timing control signal DDC for controlling operating timing of the data driver **13** based on the driving signal.

[0035] The data driver **13** converts a data signal DATA, supplied by the timing controller **12**, into a gamma reference voltage by sampling and latching the data signal DATA in response to a data timing control signal DDC supplied by the timing controller **12**, and outputs the gamma reference voltage. The data driver **13** outputs the data signal DATA through data lines DL**1**~DLn. The data driver **13** may be formed in an integrated circuit (IC) form.

[0036] The scan driver **14** outputs a scan signal in response to a gate timing control signal GDC supplied by the timing controller **12**. The scan driver **14** outputs the scan signal through gate lines GL**1**~GLm. The scan driver **14** is formed in an IC form or formed in the display panel **20** in a gate in panel (GIP) manner.

[0037] The display panel **20** displays an image in accordance with a data signal DATA and scan signal supplied by the data driver **13** and the scan driver **14**. The display panel **20** includes subpixels **50** operating to display an image.

[0038] The subpixels **50** include a red subpixel, a green subpixel and a blue subpixel or include a white subpixel, a red subpixel, a green subpixel and a blue subpixel. The subpixels **50** may have one or more different emission regions depending on their emission characteristics.

[0039] As shown in FIG. **2**, one subpixel includes a switching transistor **30**, a driving transistor **35**, a capacitor **40**, a compensation circuit **45** and an organic light-emitting diode (OLED) **60**.

[0040] The switching transistor **30** performs a switching operation in response to a scan signal supplied through a first gate line **32** so that a data signal supplied through a first data line **36** is stored in the capacitor **45** as a data voltage. The driving transistor **35** operates in response to a data voltage stored in the capacitor **45** so that a driving current flows between a power source line **42** (high potential voltage) and a cathode power source line **44** (low potential voltage). The OLED **60** operates to emit light in response to a driving current formed by the driving transistor **35**.

[0041] The compensation circuit **45** is a circuit added within the subpixel in order to compensate for a threshold voltage of the driving transistor **35**. The compensation circuit **45** is configured with one or more transistors. The configuration of the compensation circuit **45** is very various depending on an external compensation method, and an example thereof is described below.

[0042] As shown in FIG. **3**, the compensation circuit **45** includes a sensing transistor **65** and a sensing line **70** (or reference line). The sensing transistor **65** is connected between the source electrode of the driving transistor **35** and the anode electrode (hereinafter referred to as "sensing node") of the OLED **60**. The sensing transistor **65** operates to supply the sensing node of the driving transistor **35** with an initialization voltage (or sensing voltage) transferred through the sensing line **70** or to sense a voltage or current of the sensing node of the driving transistor **35** or the sensing line **70**.

[0043] The switching transistor **30** has a first electrode connected to the first data line **36** and has a second electrode connected to the gate electrode of the driving transistor **35**. The driving transistor **35** has a first electrode connected to the power source line **42** and has a second electrode connected to the anode electrode of the OLED **60**. The capacitor **40** has a first electrode connected to the gate electrode of the driving transistor **35**, and has a second electrode connected to the anode electrode of the OLED **60**. The OLED **60** has the anode electrode connected to the second electrode of the driving transistor **35**, and has a cathode electrode connected to the second power source line **44**. The sensing transistor **65** has a first electrode connected to the sensing line **70**, and has

a second electrode connected to the anode electrode of the OLED **60**, that is, a sensing node, and the second electrode of the driving transistor **35**.

[0044] The operating time of the sensing transistor **65** may be similar/identical with or different from that of the switching transistor **30** depending on an external compensation algorithm (or the configuration of a compensation circuit). For example, the switching transistor **30** may have a gate electrode connected to a first gate line **32**, and the sensing transistor **65** may have a gate electrode connected to a second gate line **34**. In this case, a scan signal Scan is transferred to the first gate line **32**, and a sensing signal Sense is transferred to the second gate line **34**. For another example, the first gate line **32** connected to the gate electrode of the switching transistor **30** and the second gate line **34** connected to the gate electrode of the sensing transistor **65** may be connected to be shared.

[0045] The sensing line **70** may be connected to a data driver. In this case, the data driver may sense the sensing node of a subpixel during the non-display period or N frame (N is an integer of 1 or more) period of a real-time image, and may generate a result of the sensing. The switching transistor **30** and the sensing transistor **65** may be turned on at the same time. In this case, a sensing operation through the sensing line **70** based on a time-division method of the data driver and a data output operation of outputting a data signal are separated.

[0046] In addition, a compensation target according to a result of the sensing may be a data signal of a digital form, a data signal of an analog form or gamma. Furthermore, the compensation circuit generating a compensation signal (or compensation voltage) based on a result of the sensing may be implemented within the data driver, within the timing controller or as a separate circuit.

[0047] A light blocking layer **80** may be positioned only under the channel region of the driving transistor **35** or may be positioned under the channel region of the switching transistor **30** and the sensing transistor **65** in addition to the driving transistor **35**. The light blocking layer **80** may be used to simply block external light or may be used as an electrode that connects the light blocking layer **80** and a different electrode or line or configures a capacitor. Accordingly, the light blocking layer **80** is selected as the metal layer of plural layers (e.g., plural layers of heterogeneous metals) to have a light-shielding characteristic.

[0048] In addition, FIG. **3** has been illustrated as being a subpixel having a 3transistor (T) 1capacitor (C) (3T1C) structure, including the switching transistor **30**, the driving transistor **35**, the capacitor **40**, the OLED **60**, and the sensing transistor **65**. If the compensation circuit **45** is added, a subpixel may have a structure of 3T2C, 4T2C, 5T1C or 6T2C.

[0049] FIG. **4** schematically shows a plan layout of subpixels according to the present disclosure. FIG. **5** is a cross-sectional view taken along dotted line I-I' of FIG. **4**.

[0050] Referring to FIG. **4**, a first subpixel SP**1**, a second subpixel SP**2** and a third subpixel SP**3** are formed on the display region of a substrate. An OLED (light-emitting device) and a circuit, including the switching transistor **30**, the sensing transistor **65** and the driving transistor **35** driving the OLED, are formed in each of the first subpixel SP**1**, the second subpixel SP**2** and the third subpixel SP**3**. The OLEDs of the first subpixel SP**1**, second subpixel SP**2** and third subpixel SP**3** emit light in accordance with operations of the switching transistor **30**, sensing transistor **65** and driving transistor **35**, respectively. A power source line **42**, a sensing line **70**, and first to third data lines **36**, **38**, and **52** are disposed between the first subpixel SP**1**, the second subpixel SP**2** and the third subpixel SP**3**. First and second gate lines **32** and **34** are disposed to traverse the first subpixel SP**1**, the second subpixel SP**2** and the third subpixel SP**3**.

[0051] Wires, such as the power source line **42**, the sensing line **70**, the first to the third data lines **36**, **38**, and **52**, and electrodes configuring a thin film transistor (TFT) are disposed in different layers, but are electrically connected due to a contact through a contact hole (or via hole). The sensing line **70** is connected to the sensing transistor **65** of each of the first subpixel SP**1**, second subpixel SP**2** and third subpixel SP**3** through a sensing connection line **72**. The power source line **42** is connected to the driving transistor **35** of each of the first subpixel SP**1**, second subpixel SP**2** and third subpixel SP**3** through a power source connection line **74**. The first and the second gate lines **32** and **34** are connected to the sensing and switching transistors **65** and **30** of each of the first subpixel SP**1**, second subpixel SP**2** and third subpixel SP**3**.

[0052] The first subpixel SP**1** may be a red subpixel, the second subpixel SP**2** may be a green subpixel, and the third subpixel SP**3** may be a blue subpixel. However, the positions of the subpixels may be changed.

[0053] A cross-sectional structure of the first subpixel of the first to the third subpixels is described below as an example with reference to FIG. **5**.

[0054] Referring to FIG. **5**, a light blocking layer **80** is positioned on a substrate **100**. The light blocking layer **80** functions to prevent a photocurrent from occurring in a transistor by blocking the incidence of external light. A buffer layer **105** is positioned on the light blocking layer **80**. The buffer layer **105** functions to protect a transistor, formed in a subsequent process, against impurities such as alkali ions drained from the light blocking layer **80**. The buffer layer **105** may be a silicon oxide (SiOx) layer, a silicon nitride (SiNx) layer or a multiple layer of them.

[0055] The semiconductor layer **110** of a driving transistor **35** is positioned on the buffer layer **105**. The semiconductor layer **110** may be made of a silicon semiconductor, an oxide semiconductor or an organic matter semiconductor. The silicon semiconductor may be formed using amorphous silicon or using polycrystalline silicon crystallized from amorphous silicon. The oxide semiconductor may be made of any one of zinc oxide (ZnO), indium zinc oxide (InZnO), indium gallium zinc oxide (InGaZnO) or zinc tin oxide (ZnSnO). The organic matter semiconductor may be made of a small molecule or polymetric molecule organic matter, such as merocyanine, phthalocyanine, pentacene and thiophenpolymer. The semiconductor layer **110** includes a drain region and source region including p or n type impurities, and includes a channel between the drain region and the source region.

[0056] A gate insulating film **115** is positioned on the semiconductor layer **110**. The gate insulating film **115** may be a silicon oxide (SiOx) layer, a silicon nitride (SiNx) layer or a multiple layer of them. A gate electrode **120** is positioned on the gate insulating film **115** in a given region of the semiconductor layer **110**, that is, a position corresponding to a channel if impurities have been implanted. The gate electrode **120** may be formed of one of molybdenum (Mo), aluminum (Al), chrome (Cr), gold (Au), titanium (Ti), nickel

(Ni), neodymium (Nd) and copper (Cu) or an alloy of them. Furthermore, the gate electrode **120** may be a multiple layer of one of molybdenum (Mo), aluminum (Al), chrome (Cr), gold (Au), titanium (Ti), nickel (Ni), neodymium (Nd) and copper (Cu) or an alloy of them. For example, the gate electrode **120** may be a dual layer of made of molybdenum/aluminum-neodymium or molybdenum/aluminum.

[0057] An interlayer dielectric film **125** for insulating the gate electrode **120** is positioned on the gate electrode **120**. The interlayer dielectric film **125** may be a silicon oxide (SiOx) film, a silicon nitride (SiNx) film or a multiple layer of them. A source electrode **130** and a drain electrode **135** are disposed on the interlayer dielectric film **125**. The source electrode **130** and the drain electrode **135** are connected to the semiconductor layer **110** through contact holes **137**, respectively, exposing the source and drain regions of the semiconductor layer **110**. The source electrode **130** and the drain electrode **135** may be configured with a single layer or a multiple layer. If the source electrode **130** and the drain electrode **135** are configured with a single layer, they may be one of molybdenum (Mo), aluminum (Al), chrome (Cr), gold (Au), titanium (Ti), nickel (Ni), neodymium (Nd) and copper (Cu) or an alloy of them. Furthermore, if the source electrode **130** and the drain electrode **135** are configured with a multiple layer, they may be a dual layer of molybdenum/aluminum-neodymium or a triple layer of titanium/aluminum/titanium, molybdenum/aluminum/molybdenum or molybdenum/aluminum-neodymium/molybdenum. A first data line **36** is positioned in the region separated from the driving transistor **35**, and a cathode power source line **44** is positioned in a different region.

[0058] Accordingly, the driving transistor **35**, including the semiconductor layer **110**, the gate electrode **120**, the source electrode **130** and the drain electrode **135**, is configured.

[0059] A passivation film **140** is positioned on the substrate **100** including the driving transistor **35**. The passivation film **140** is an insulating film protecting an underlying element, and may be a silicon oxide (SiOx) film, a silicon nitride (SiNx) film or a multiple layer of them. A first via hole **142** exposing the drain electrode **135** of the underlying driving transistor **35** is positioned in some region of the passivation film **140**. A second via hole **143** exposing the cathode power source line **44** is positioned in some region of the passivation film **140**.

[0060] An overcoat layer **150** is positioned on the passivation film **140**. The overcoat layer **150** may be a planarization film for reducing the step of a lower structure, and is made of an organic matter, such as polyimide, benzocyclobutene series resin or acrylate. A third via hole **152** exposing the drain electrode **135** by exposing the first via hole **142** of the passivation film **140** is positioned in some region of the overcoat layer **150**. A fourth via hole **154** exposing the cathode power source line **44** by exposing the second via hole **143** of the passivation film **140** is positioned in some region of the overcoat layer **150**.

[0061] An OLED **60** is formed on the overcoat layer **150**. The OLED **60** includes a first electrode **160** connected to the driving transistor **35**, a second electrode **180** opposite the first electrode **160**, and an organic emission layer **175** interposed between the first electrode **160** and the second electrode **180**. The first electrode **160** may be an anode electrode, and the second electrode **180** may be a cathode electrode.

[0062] The first electrode **160** is positioned on the overcoat layer **150**, and may be connected to the drain electrode **135** of the driving transistor **35** through the third via hole **152** of the overcoat layer **150** and the first via hole **142** of the passivation film **140**. One first electrode **160** may be allocated to each subpixel, but the present disclosure is not limited thereto. The first electrode **160** may be made of a transparent conductive material, such as indium tin oxide (ITO), indium zinc oxide (ZTO) or zinc oxide (ZnO), to function as a transmission electrode or may include a reflection layer to function as a reflection electrode, in accordance with an adopted emission method. The reflection layer may be made of aluminum (Al), copper (Cu), silver (Ag), nickel (Ni) or an alloy of them and may be made of a silver/palladium/copper (APC) alloy.

[0063] A connection pattern **165** connected to the cathode power source line **44** through the fourth via hole **154** of the overcoat layer **150** and the second via hole **143** of the passivation film **140** is positioned on the overcoat layer **150** separated from the first electrode **160**. The connection pattern **165** has the same structure as the first electrode **160**.

[0064] A bank **170** is positioned on the substrate **100** in which the first electrode **160** has been formed. The bank **170** includes a first bank **172** having a first opening OA**1** exposing the first electrode **160**. The bank **170** includes the second bank **176** having a second opening OA**2**. The second opening OA**2** has a larger area than the first opening OA**1**, and may expose a part of the first bank **172**.

[0065] Furthermore, a first bank **172** includes a third opening OA**3** exposing the connection pattern **165**. A second bank **176** includes a fourth opening OA**4** exposing the part of the first bank **172** and the connection pattern **165**. The fourth opening OA**4** has a larger area than the third opening OA**3**, and may expose the part of the first bank **172**.

[0066] An organic emission layer **175** is positioned on the substrate **100** in which the bank **170** has been formed. The organic emission layer **175** includes an emission layer (EL), and may further include any one or more of a hole injection layer (HIL), a hole transport layer (HTL), an electron transport layer (ETL) and an electron injection layer (EIL). The organic emission layer **175** is coated and dried by a solution process (or, soluble process), such as inkjet printing or nozzle coating, thus the top of the organic emission layer **175** with which the organic emission layer **175** and the bank **170** come into contact may have a round shape.

[0067] The second electrode **180** is positioned on the organic emission layer **175**. The second electrode **180** may be widely formed on the entire surface of the substrate **100**. The second electrode **180** may function as a transmission electrode or a reflection electrode in accordance with an adopted emission method. If the second electrode **180** is a transmission electrode, it may be made of a transparent conductive material, such as indium tin oxide (ITO) or indium zinc oxide (ZTO) or may be made of magnesium (Mg), calcium (Ca), aluminum (Al), silver (Ag) or an alloy of them having a thin thickness through which light can transmit. The second electrode **180** is connected to the connection pattern **165** through the third opening OA**3** of the first bank **172** and the fourth opening OA**4** of the second bank **176**, thus being connected to the cathode power source line **44**.

[0068] An opposite substrate **190** opposite the substrate **100** in which the driving transistor **35** and the OLED **60** have been formed is positioned. The opposite substrate **190** seals

the substrate **100**, and includes a color filter **195** at the bottom thereof. The color filter **195** may be a red color filter, and functions to make thick red color coordinates. For example, if a first subpixel is a red subpixel, the opposite substrate **190** may have a red color filter in the region corresponding to the first subpixel. Furthermore, any color filter may not be provided in a region that belongs to the opposite substrate **190** and that corresponds to a second subpixel, that is, a green subpixel, and a third subpixel, which is, a blue subpixel. However, such examples are merely examples, and a color filter of a corresponding color may be provided in each subpixel. The structure of FIG. **5** may be identically applied to other subpixels in addition to the above-described subpixel.

[0069] Hereinafter, there is proposed a new structure capable of securing the area of a dropping region while securing a preset area ratio between subpixels.

[0070] FIG. **6** is a plan view schematically showing a display device according to an aspect of the present disclosure. FIG. **7** shows cross-sectional views taken along lines II-II', III-III', and IV-IV' of FIG. **6**. FIG. **8** is a diagram for illustrating the shape and position relation of first electrodes.

[0071] Referring to FIGS. **6** and **7**, the display device according to the present disclosure includes a substrate **100** in which subpixels SP have been arranged. A circuit element layer **101** and an OLED **60** driven by the elements of the circuit element layer **101** are disposed on the substrate **100**.

[0072] A signal line for applying a driving signal to the OLED **60** and electrodes may be arranged in the circuit element layer **101**. The signal line and electrodes may be separated with at least one insulating layer interposed therebetween if necessary. If the organic light-emitting display is implemented by an active matrix (AM) method, the circuit element layer **101** may further include a transistor allocated to each subpixel SP. In this case, the subpixel SP may have a structure, such as that shown in FIG. **5**, but is not limited thereto.

[0073] The OLED **60** includes a first electrode **160**, a second electrode **180**, and an organic emission layer **175** interposed between the first electrode **160** and the second electrode **180**. The first electrode **160** may be an anode, and the second electrode **180** may be a cathode.

[0074] More specifically, the subpixels SP are arranged in a row direction (e.g., X-axis direction) and a column direction (e.g., Y-axis direction) which cross each other. Subpixels SP adjacently arranged in the row direction may emit light of different colors, and subpixels SP adjacently arranged in the column direction may emit light of the same color.

[0075] The subpixels include a first subpixel in a (3n−2) (n is a natural number of 1 or more) column, a second subpixel arranged in a (3n−1) column, and a third subpixel arranged in a 3n column. That is, the first subpixel, second subpixel and third subpixel are sequentially arranged alternately in the row direction. The first subpixel may emit light of a first color. The second subpixel may emit light of a second color. The third subpixel may emit light of a third color. The first color may be red, the second color may be green, and the third color may be blue, but are not limited thereto.

[0076] The first electrode **160** of the OLED **60** is positioned in the subpixel SP. One first electrode **160** may be allocated to one subpixel SP. Adjacent first electrodes **160** are spaced apart at predetermined intervals.

[0077] The first electrodes **160** include a (1-1) electrode **160-1**, a (1-2) electrode **160-2**, and a (1-3) electrode **160-3**. The (1-1) electrode **160-1**, (1-2) electrode **160-2**, and (1-3) electrode **160-3** have different plane shapes. The (1-1) electrode **160-1** may be allocated to the first subpixel, the (1-2) electrode **160-2** may be allocated to the second subpixel, and the (1-3) electrode **160-3** may be allocated to the third subpixel.

[0078] The (1-1) electrodes **160-1** are disposed in the (3n−2) column. The (1-1) electrodes **160-1** are sequentially disposed in the column direction. The (1-2) electrodes **160-2** are disposed in the (3n−1) column. The (1-2) electrodes **160-2** are sequentially disposed in the column direction. The (1-3) electrodes **160-3** are disposed in the 3n column. The (1-3) electrodes **160-3** are sequentially disposed in the column direction. Accordingly, the (1-1) electrode **160-1**, (1-2) electrode **160-2**, and (1-3) electrode **160-3** are sequentially disposed alternately in the row direction.

[0079] Referring further to FIG. **8**, the (1-1) electrode **160-1** has a convex part **161** on its one side. The convex part **161** may be disposed on one side of the (1-1) electrode **160-1** not adjacent to the (1-2) electrode **160-2**. The convex part **161** may be positioned on one side of the (1-1) electrode **160-1** adjacent to the (1-3) electrode **160-3**. The area of the region in which the convex part **161** of the (1-1) electrode **160-1** has been formed has a wide area compared to other regions. The convex part **161** may be protruded toward the (1-3) electrode **160-3** in a region adjacent to the (1-3) electrode **160-3**.

[0080] The (1-2) electrode **160-2** may have a square or an oblong.

[0081] The (1-3) electrode **160-3** has a concave part **163** on its one side. The concave part **163** may be positioned on one side of the (1-3) electrode **160-3** not adjacent to the (1-2) electrode **160-2**. The concave part **163** may be positioned on one side of the (1-1) electrode **160-1** adjacent to the (1-1) electrode **160-1**. In the region in which the (1-1) electrode **160-1** and the (1-3) electrode **160-3** are adjacently disposed, the convex part **161** of the (1-1) electrode **160-1** is opposite the concave part **163** of the (1-3) electrode **160-3**. In the region in which the (1-1) electrode **160-1** and the (1-3) electrode **160-3** are adjacently disposed, the convex part **161** of the (1-1) electrode **160-1** may be inserted in the concave part **163** of the (1-3) electrode **160-3**.

[0082] A bank **170** is positioned on the substrate **100** in which the first electrode **160** has been formed. The bank **170** includes a first bank **172** and a second bank **176**.

[0083] The first bank **172** includes a first opening OA**1** exposing at least one part of the first electrode **160**. The first bank **172** may be positioned to cover one side of the first electrodes **160** between first electrodes **160** adjacent in the column direction.

[0084] A plurality of the first openings OA**1** is arranged in parallel in the column direction. Each of the first openings OA**1** is extended in the row direction, thus exposing the (1-1) electrode **160-1**, (1-2) electrode **160-2**, and (1-3) electrodes **160-3** disposed in the row direction together. In other words, the first bank **172** may be positioned between first electrodes **160** adjacent in the column direction, and may partition subpixels SP adjacent in the column direction. That is, the first bank **172** may be positioned between (1-1) electrodes **160-1**, between (1-2) electrodes **160-2**, and between (1-3) electrodes **160-3** adjacent in the column direction.

[0085] The first bank **172** may be formed in a relatively thin thickness so that it is covered by the organic emission layer **175** to be formed subsequently. The first bank **172** may have a hydrophilic property. For example, the first bank **172** may be made of a hydrophilic inorganic insulating material, such as silicon oxide (SiO2) or silicon nitride (SiNx). The first bank **172** is a thin film of a hydrophilic component provided to prevent a wettability failure attributable to the hydrophobic property of the first electrode **160**, and functions to well spread an organic light-emitting material having the hydrophilic property.

[0086] The second bank **176** is positioned on the substrate **100** in which the first bank **172** has been formed. The second bank **176** includes a second opening OA**2** exposing at least one part of the first electrode **160**. A plurality of the second openings OA**2** is disposed in parallel in the row direction and extended in the column direction. The second opening OA**2** is extended in the column direction, thus exposing the plurality of first electrodes **160** disposed in the column direction. The width of the second bank **176** may be selected as a minimum width, which is configured so that organic light-emitting materials of different colors dropped to adjacent second openings OA**2** are not mixed and which is possible in process.

[0087] More specifically, the second bank **176** is positioned between (1-1) electrodes **160-1** arranged in the (3n−2) column and (1-2) electrodes **160-2** which are arranged in the (3n−1) column and are adjacent to the (1-1) electrodes **160-1**. That is, subpixels arranged in the (3n−2) column and subpixels arranged in the (3n−1) column may be partitioned by the second bank **176**. In this case, the second bank **176** may be extended in the column direction in a straight-line form between the (1-1) electrodes **160-1** arranged in the (3n−2) column and the (1-2) electrodes **160-2** arranged in the (3n−1) column.

[0088] The second bank **176** is positioned between (1-2) electrodes **160-2** arranged in the (3n−1) column and (1-3) electrodes **160-3** which are arranged in the 3n column and are adjacent to the (1-2) electrodes **160-2**. That is, subpixels arranged in the (3n−1) column and subpixels arranged in the 3n column may be partitioned by the second bank **176**. In this case, the second bank **176** may be extended in the column direction in a straight-line form between the (1-2) electrodes **160-2** arranged in the (3n−1) column and the (1-3) electrodes **160-3** arranged in the 3n column.

[0089] The second bank **176** is positioned between (1-3) electrodes **160-3** arranged in the 3n column and (1-1) electrodes **160-1** which are arranged in the (3n−2) column and are adjacent to the (1-3) electrodes **160-3** in the row direction. That is, subpixels arranged in the 3n column and subpixels arranged in the (3n−2) column may be partitioned by the second bank **176**. In this case, the second bank **176** may be extended in the column direction in zigzag form between the (1-3) electrodes **160-3** arranged in the 3n column and the (1-1) electrodes **160-1** arranged in the (3n−2) column.

[0090] A (2-1) opening OA**2-1** exposing the (1-1) electrodes **160-1** arranged in the (3n−2) column, a (2-2) opening OA**2-2** exposing the (1-2) electrodes **160-2** arranged in the (3n−1) column, and (2-3) openings OA**2-3** exposing the (1-3) electrodes **160-3** arranged in the 3n column have different areas and shapes.

[0091] A part that belongs to the (2-1) opening OA**2-1** and that exposes the convex parts **161** of the (1-1) electrodes **160-1** may be configured to have a relatively wide width compared to a part exposing other parts of the (1-1) electrodes **160-1**. Accordingly, a part of the (2-1) opening OA**2-1** exposing the convex part **161** can satisfy a minimum width which may be set by taking into consideration the amount of dropping of an organic light-emitting material and a process margin. In this case, a part of the (2-1) opening OA**2-1** exposing the (1-1) electrode **160-1** may be assigned as a dropping region DP to which an organic light-emitting material is dropped upon performing a solution process.

[0092] In this case, the (2-3) opening OA**2-3** may be configured to have a relatively narrow width in the region, corresponding to the concave part **163**, compared to other regions. However, the (2-3) opening OA**2-3** basically has been configured to have a greater width than the (2-1) opening OA**2-1**. Accordingly, in the region in which the concave part **163** has been formed, the second opening OA**2** exposing the (1-3) electrode **160-3** can satisfy a minimum width which may be set by taking into consideration the amount of dropping of an organic light-emitting material and a process margin. In this case, a part of the (2-3) opening OA**2-3** corresponding to the concave part **163** may be assigned as a region DP to which an organic light-emitting material upon performing a solution process. Furthermore, the (2-3) opening OA**2-3** has a sufficient width in the region in which the concave part **163** has not been formed. Accordingly, the region in which the concave part **163** has not been formed may also be allocated as the region to which an organic light-emitting material is dropped.

[0093] A part of the first electrode **160** exposed by a combination structure of the first bank **172** and the second bank **176** may be defined as an emission region. The plane shape of the emission region may correspond to that of the first electrode **160**. An emission region allocated to each of the first subpixels arranged in the (3n−2) column, an emission region allocated to each of the second subpixels arranged in the (3n−1) column, and an emission region allocated to each of the third subpixels arranged in the (3n−2) column have different areas and shapes.

[0094] The second bank **176** may have a hydrophobic property. Alternatively, the top of the second bank **176** may have a hydrophobic property, and the lateral part thereof may have a hydrophilic property. For example, the second bank **176** may have a form in which a material of a hydrophobic property has been coated on an insulating material, and may be formed using the insulating material containing a hydrophobic material. The second bank may be made of an organic material. The hydrophobic property of the second bank **176** may function to push an organic light-emitting material configuring the organic emission layer **175** so that the organic light-emitting material gathers at the central part of the emission region. Furthermore, the second bank **176** may function as a barrier to confine an organic light-emitting material, dropped to a corresponding region, in order to prevent organic light-emitting materials of different colors from being mixed. That is, the second bank **176** functions to prevent organic light-emitting materials of different colors dropped to the second openings OA**2** adjacent in the row direction, respectively, from being mixed.

[0095] The organic emission layer **175** is positioned on the substrate **100** in which the second bank **176** has been formed. The organic emission layer **175** may be formed in the direction in which a corresponding second opening OA**2**

has been extended within the second opening OA**2**. That is, an organic light-emitting material dropped to one second opening OA**2** covers the first electrodes **160** and the first banks **172** exposed by the second opening OA**2**. After a curing process, the organic emission layer **175** formed within the second opening OA**2** is not physically separated by the first bank **172** ad maintains continuity on the first bank **172**.

[0096] Organic light-emitting materials having the same color are dropped to a plurality of first electrodes **160** exposed by one second opening OA**2**. This means that light of the same color is emitted from a plurality of subpixels SP allocated to positions corresponding to the one second opening OA**2**. The plane shape of the organic emission layer **175** may correspond to that of the second opening OA**2**.

[0097] Organic light-emitting materials having different colors may be sequentially dropped to respective second openings OA**2** alternately. The organic light-emitting materials of different colors may include organic light-emitting materials emitting light of red (R), green (G), and blue (B). The organic emission layers **175** emitting light of different colors are physically separated by the second bank **176**.

[0098] According to an aspect of the present disclosure, a thickness irregularity phenomenon attributable to a pile-up phenomenon after curing can be improved because an organic light-emitting material can be spread in a uniform thickness in a wide region on the second opening OA**2** extended in the column direction. Accordingly, the organic light-emitting display according to an aspect of the present disclosure can prevent a reduction in the uniformity of the organic emission layer **175** because it can reduce display quality degradation attributable to a thickness deviation within a subpixel SP. Furthermore, the organic light-emitting display can prevent a failure, such as a reduction in the lifespan of a device or the occurrence of a dark point, because the uniformity of the organic emission layer **175** is secured.

[0099] Furthermore, as described above, the organic light-emitting display according to an aspect of the present disclosure has an advantage in that it can significantly improve display quality degradation attributable to a color mixture failure because the dropping region of an organic light-emitting material can be sufficiently secured.

[0100] FIG. **9** is a diagram for illustrating an effect of the present disclosure.

[0101] FIG. **9**(*a*) shows a subpixel structure according to a comparison example, and FIG. **9**(*b*) shows a subpixel structure according to an aspect of the present disclosure. Numerical values shown in the drawings have been illustrated to help easy understanding of a change in the width, but the present disclosure is not limited thereto.

[0102] If the organic emission layer is formed using a solution process, a color mixture failure in which organic light-emitting materials **175-1** of different colors are mixed because the organic light-emitting materials **175-1** are not dropped in place may occur. In order to prevent the color mixture failure, it is necessary to secure a sufficient dropping region of the organic light-emitting material **175-1** by taking a process margin into consideration. That is, the width of the second opening OA**2** to which the organic light-emitting material **175-1** is dropped in the row direction needs to satisfy a preset width. Furthermore, an area ratio between subpixels needs to be previously set by taking into consideration a light-emitting device characteristic and white balance.

[0103] In a high-resolution display device having a high pixel per inch (PPI), however, it is difficult to secure a sufficient dropping region because the size per pixel is significantly small. Particularly, in the case of a subpixel having a narrow area, the area of an opening allocated to the subpixel is narrow. In this case, it is difficult for the width of the opening in the row direction to satisfy a minimum width (hereinafter referred to as a "preset width") which may be configured by taking into consideration the amount of dropping of the organic light-emitting material **175-1** and a process margin.

[0104] Referring to FIG. **9**(*a*), in the case of a first subpixel that belongs to subpixels according to a comparison example and that has a small area, it may be difficult for the width of a (2-1) opening OA**2-1** in the row direction, allocated to the corresponding subpixel, to satisfy a preset width. In this case, a color mixture failure may occur between adjacent subpixels.

[0105] In contrast, referring to FIG. **9**(*b*), according to an aspect of the present disclosure, a (2-1) opening OA**2-1** allocated to a first subpixel having a narrow area may include a part having a wide width in accordance with the area of the convex part **161** of a (1-1) electrode **160-1**. Accordingly, the (2-1) opening OA**2-1** can satisfy a preset width in the region in which the convex part **161** has been formed. In this case, in order to satisfy a preset area ratio, a total width of the (2-1) opening OA**2-1** allocated to the first subpixel is reduced to the extent corresponding to the area of the convex part **161**.

[0106] A (2-3) opening OA**2-3** allocated to a third subpixel having a relatively wide area may include a part having a narrow width in accordance with the area of the concave part **163** of a (1-3) electrode **160-3**. In order to satisfy a preset area ratio, however, a total width of the (2-3) opening OA**2-3** allocated to the third subpixel is increased to the extent corresponding to the area of the concave part **163**. Accordingly, the (2-3) opening OA**2-3** can satisfy a preset width in the region in which the concave part **163** has been formed and/or other regions.

[0107] As described above, an aspect of the present disclosure can sufficiently secure the area of a dropping region to which the organic light-emitting material **175-1** is dropped while maintaining a preset area ratio between subpixels. Accordingly, an aspect of the present disclosure has advantages in that it can prevent a color mixture failure while maintaining a light-emitting device characteristic and white balance.

[0108] FIGS. **10**A to **13**B are diagrams for illustrating a process of forming first electrodes, a bank, and an organic emission layer in a time series. FIGS. **10**A, **11**B, **12**A, and **13**A are plan views, and FIGS. **10**B, **11**B, **12**B, and **13**B are cross-sectional views taken along lines V-V', VI-VI' and VII-VII' of FIGS. **10**A, **11**B, **12**A, and **13**A, respectively.

[0109] Referring to FIGS. **10**A and **10**B, the first electrode **160** is formed on the substrate **100**. One first electrode **160** may be allocated to one subpixel. The (1-1) electrodes **160-1** may be positioned in the (3n−2) column, the (1-2) electrodes **160-2** may be positioned in the (3n−1) column, and the (1-3) electrodes **160-3** may be positioned in the 3n column. The first electrodes **160** include the (1-1) electrode **160-1**, the (1-2) electrode **160-2**, and the (1-3) electrode **160-3**. The

(1-1) electrode **160-1**, the (1-2) electrode **160-2**, and the (1-3) electrode **160-3** have different plane shapes.

[0110] Referring to FIGS. **11**A and **11**B, the first bank **172** is formed on the substrate **100** in which the first electrode **160** has been formed. The first bank **172** include the first opening OA**1**. The first opening OA**1** exposes a plurality of first electrodes **160** corresponding to one pixel. For example, one first opening OA**1** may expose the (1-1) electrodes **160-1**, the (1-2) electrodes **160-2**, the (1-3) electrodes **160-3**, arranged in one row, together.

[0111] Referring to FIGS. **12**A and **12**B, the second bank **176** is formed on the substrate **100** in which the first bank **172** has been formed. The second bank **176** includes the second opening OA**2**. The second opening OA**2** exposes a plurality of first electrodes **160** arranged in the column direction, together.

[0112] For example, (1-1) electrodes **160-1** arranged in the (3n−2) column may be exposed at the same time through one second opening OA**2**. (1-2) electrodes **160-2** arranged in the (3n−2) column may be exposed at the same time through one second opening OA**2**. (1-3) electrodes **160-3** arranged in the (3n−2) column may be exposed at the same time through one second opening OA**2**. An emission region may be defined by a combination structure of the first bank and the second bank **176**.

[0113] Referring to FIGS. **13**A and **13**B, the organic emission layer **175** and the second electrode **180** are sequentially formed on the substrate **100** in which the second bank **176** has been formed. The organic emission layer **175** may include the first organic emission layer **175-1** emitting light of the first color, the second organic emission layer **175-2** emitting light of the second color, and the third organic emission layer **175-3** emitting light of the third color.

[0114] For example, the first organic emission layer **175-1** may be formed on the second opening OA**2** exposing the (1-1) electrodes **160-1** arranged in the (3n−2) column. The second organic emission layer **175-2** may be formed on the second opening OA**2** exposing the (1-2) electrodes **160-2** arranged in the (3n−1) column. The third organic emission layer **175-3** may be formed on the second opening OA**2** exposing the (1-3) electrodes **160-3** arranged in the (3n−2) column.

[0115] FIG. **14** is a diagram for illustrating another example of the shape of a first electrode and a second bank.

[0116] Referring to FIG. **14**A, the convex part **161** of the (1-1) electrode **160-1** may have a shape having a rounded corner. The concave part **163** of the (1-3) electrode **160-3** may have a shape having a rounded corner in accordance with the rounded corner of the convex part **161**. The second bank **176** positioned between the (1-1) electrode **160-1** and the (1-3) electrode **160-3** adjacent each other may be extended in the column direction a round form along the shapes of the convex part **161** and the concave part **163**, in the region in which the convex part **161** and the concave part **163** are disposed.

[0117] As described above, the top of the second bank **176** may have a hydrophobic property, and the lateral part thereof may have a hydrophilic property. In this case, if the second bank **176** has a round shape, a contact area between the lateral part of the second bank **176** and an organic light-emitting material increases. Accordingly, a dropped organic light-emitting material can be effectively spread because it comes into contact with the lateral part of the second bank **176** having a hydrophilic property. Accordingly, the thickness uniformity of the organic emission layer formed after curing may be improved significantly.

[0118] Referring to FIG. **14**B, the convex part **161** of the (1-1) electrode **160-1** may have a polygon shape, such as a triangle or a quadrangle. Accordingly, the concave part **163** of the (1-3) electrode **160-3** may also have a polygon shape, such as a triangle or a quadrangle, in accordance with the polygon shape of the convex part **161**. The second bank **176** positioned between the (1-1) electrode **160-1** and the (1-3) electrode **160-3** adjacent each other may be extended in the column direction along the shape of the convex part **161** and the concave part **163**, in the region in which the convex part **161** and the concave part **163** are disposed. As described above, an aspect of the present disclosure has an advantage in that it can have a degree of freedom of design because the shape of the convex part **161** and the concave part **163** are freely changed. For example, the shape of the convex part **161** and the concave part **163** may be selected by taking into consideration the viscosity of an organic light-emitting material and content of solids.

[0119] FIG. **15** is a plan view schematically showing a display device according to an aspect of the present disclosure. FIG. **16** shows cross-sectional views taken along lines VIII-VIII', IX-IX', and X-X' of FIG. **15**.

[0120] Referring to FIGS. **15** and **16**, the display device according to the aspect of the present disclosure includes a substrate **100** in which subpixels SP have been arranged. A circuit element layer **101** and an OLED **60** driven by the elements of the circuit element layer **101** are disposed on the substrate **100**.

[0121] A signal line for applying a driving signal to the OLED **60** and electrodes may be arranged in the circuit element layer **101**. The signal line and the electrodes may be disposed with at least one insulating layer interposed therebetween, if necessary. If the organic light-emitting display is implemented using an active matrix (AM) method, the circuit element layer **101** may further include a transistor allocated to each subpixel SP. In this case, the subpixel SP may have a structure, such as that shown in FIG. **5**, but is not limited thereto.

[0122] The OLED **60** includes a first electrode **160**, a second electrode **180**, and an organic emission layer **175** interposed between the first electrode **160** and the second electrode **180**. The first electrode **160** may be an anode, and the second electrode **180** may be a cathode.

[0123] More specifically, the subpixels SP may be arranged in a row direction (e.g., X-axis direction) and a column direction (e.g., Y-axis direction) which cross each other. Subpixels SP adjacently arranged in the row direction may emit light of different colors, and subpixels SP adjacently arranged in the column direction may emit light of the same color.

[0124] The subpixels include a first subpixel in a (3n−2) (n is a natural number of 1 or more) column, a second subpixel arranged in a (3n−1) column, and a third subpixel arranged in a 3n column. That is, the first subpixel, second subpixel and third subpixel are sequentially arranged alternately in the row direction. The first subpixel may emit light of a first color. The second subpixel may emit light of a second color. The third subpixel may emit light of a third color. The first color may be red, the second color may be green, and the third color may be blue, but are not limited thereto.

[0125] The first electrode **160** of the OLED **60** is positioned in the subpixel SP. One first electrode **160** may be

allocated to one subpixel SP. Adjacent first electrodes **160** are spaced apart at predetermined intervals.

[0126] The first electrodes **160** include a (1-1) electrode **160-1**, a (1-2) electrode **160-2**, and a (1-3) electrode **160-3**. The (1-1) electrode **160-1**, (1-2) electrode **160-2**, and (1-3) electrode **160-3** have different plane shapes. The (1-1) electrode **160-1** may be allocated to the first subpixel, the (1-2) electrode **160-2** may be allocated to the second subpixel, and the (1-3) electrode **160-3** may be allocated to the third subpixel.

[0127] The (1-1) electrodes **160-1** are disposed in the (3n−2) column. The (1-1) electrodes **160-1** are sequentially disposed in the column direction. The (1-2) electrodes **160-2** are disposed in the (3n−1) column. The (1-2) electrodes **160-2** are sequentially disposed in the column direction. The (1-3) electrodes **160-3** are disposed in the 3n column. The (1-3) electrodes **160-3** are sequentially disposed in the column direction. Accordingly, the (1-1) electrode **160-1**, (1-2) electrode **160-2**, and (1-3) electrode **160-3** are sequentially disposed alternately in the row direction.

[0128] The (1-1) electrode **160-1** has a convex part **161** on its one side. The convex part **161** may be disposed on one side of the (1-1) electrode **160-1** not adjacent to the (1-2) electrode **160-2**. The convex part **161** may be positioned on one side of the (1-1) electrode **160-1** adjacent to the (1-3) electrode **160-3**. The area of the region in which the convex part **161** of the (1-1) electrode **160-1** has been formed has a wide area compared to other regions. The convex part **161** may be protruded toward the (1-3) electrode **160-3** in a region adjacent to the (1-3) electrode **160-3**.

[0129] The (1-2) electrode **160-2** may have a square or an oblong.

[0130] The (1-3) electrode **160-3** has a concave part **163** on its one side. The concave part **163** may be positioned on one side of the (1-3) electrode **160-3** not adjacent to the (1-2) electrode **160-2**. The concave part **163** may be positioned on one side of the (1-1) electrode **160-1** adjacent to the (1-1) electrode **160-1**. In the region in which the (1-1) electrode **160-1** and the (1-3) electrode **160-3** are adjacently disposed, the convex part **161** of the (1-1) electrode **160-1** is opposite the concave part **163** of the (1-3) electrode **160-3**. In the region in which the (1-1) electrode **160-1** and the (1-3) electrode **160-3** are adjacently disposed, the convex part **161** of the (1-1) electrode **160-1** may be inserted in the concave part **163** of the (1-3) electrode **160-3**.

[0131] A bank **270** is positioned on the substrate **100** in which the first electrode **160** has been formed. The bank **270** may partition subpixels adjacent in the column direction and the row direction.

[0132] The bank **270** includes an opening OA exposing at least one part of the first electrode **160**. One opening OA may be allocated to one first electrode **160**. A part of the first electrode **160** exposed by the opening OA may be defined as an emission region. The plane shape of the emission region may correspond to that of the first electrode **160**.

[0133] An opening OA exposing each of the (1-1) electrodes **160-1** arranged in the (3n−2) column, an opening OA exposing each of the (1-2) electrodes **160-2** arranged in the (3n−1) column, and an opening OA exposing each of the (1-3) electrodes **160-3** arranged in the 3n column have different areas and shapes.

[0134] A part that belongs to the opening OA and that exposes the convex parts **161** of the (1-1) electrodes **160-1** may be configured to have a relatively wide width compared to a part exposing other parts of the (1-1) electrodes **160-1**. Accordingly, a part of the opening OA exposing the convex part **161** can satisfy a minimum width which may be set by taking into consideration the amount of dropping of an organic light-emitting material and a process margin. In this case, the part of the opening OA exposing the convex part **161** may be assigned as a dropping region DP to which an organic light-emitting material is dropped upon performing a solution process.

[0135] In this case, an opening OA that belongs to the opening OA and that exposes the (1-3) electrode **160-3** may be configured to have a relatively narrow width in a region, corresponding to the concave part **163**, compared to other regions. However, an opening OA exposing the (1-3) electrode **160-3** has been configured to have a large width compared to the opening OA exposing the (1-1) electrode **160-1**. Accordingly, in other regions in addition to the region in which the concave part **163** has been formed, the opening OA exposing the (1-3) electrode **160-3** can satisfy a minimum width which may be set by taking into consideration the amount of dropping of an organic light-emitting material and a process margin. In this case, the opening OA exposing the (1-3) electrode **160-3** may be assigned as a region DP to which an organic light-emitting material is dropped upon performing a solution process.

[0136] As described above, the organic light-emitting display according to the first modification example of the present disclosure has an advantage in that it can significantly improve display quality degradation attributable to a color mixture failure because the dropping area of an organic light-emitting material can be sufficiently secured.

[0137] An organic emission layer **175** is positioned on the substrate **100** in which the bank **270** has been formed. The organic emission layer **175** may be formed within a corresponding opening OA. The organic emission layers **175** formed within openings OA adjacent in the column direction and the row direction may be physically separated by the bank **270**.

[0138] FIG. **17** is a plan view schematically showing a display device according to another aspect of the present disclosure. FIG. **18** shows cross-sectional views taken along lines A-A', B-B' and C-C' of FIG. **17**.

[0139] Referring to FIGS. **17** and **18**, the display device according to the second modification example of the present disclosure includes a substrate **100** in which subpixels SP have been arranged. A circuit element layer **101** and an OLED **60** driven by the elements of the circuit element layer **101** are disposed on the substrate **100**.

[0140] A signal line for applying a driving signal to the OLED **60** and electrodes may be arranged in the circuit element layer **101**. The signal line and the electrodes may be disposed with at least one insulating layer interposed therebetween, if necessary. If the organic light-emitting display is implemented using an active matrix (AM) method, the circuit element layer **101** may further include a transistor allocated to each subpixel SP. In this case, the subpixel SP may have a structure, such as that shown in FIG. **5**, but is not limited thereto.

[0141] The OLED **60** includes a first electrode **160**, a second electrode **180**, and an organic emission layer **175** interposed between the first electrode **160** and the second electrode **180**. The first electrode **160** may be an anode, and the second electrode **180** may be a cathode.

[0142] More specifically, the subpixels SP may be arranged in a row direction (e.g., X-axis direction) and a column direction (e.g., Y-axis direction) which cross each other. Subpixels SP adjacently arranged in the row direction may emit light of different colors, and subpixels SP adjacently arranged in the column direction may emit light of the same color.

[0143] The subpixels include a first subpixel in a (3n−2) (n is a natural number of 1 or more) column, a second subpixel arranged in a (3n−1) column, and a third subpixel arranged in a 3n column. That is, the first subpixel, second subpixel and third subpixel are sequentially arranged alternately in the row direction. The first subpixel may emit light of a first color. The second subpixel may emit light of a second color. The third subpixel may emit light of a third color. The first color may be red, the second color may be green, and the third color may be blue, but are not limited thereto.

[0144] The first electrode **160** of the OLED **60** is positioned in the subpixel SP. One first electrode **160** may be allocated to one subpixel SP. Adjacent first electrodes **160** are spaced apart at predetermined intervals.

[0145] The first electrodes **160** include a (1-1) electrode **160-1**, a (1-2) electrode **160-2**, and a (1-3) electrode **160-3**. The (1-1) electrode **160-1**, (1-2) electrode **160-2**, and (1-3) electrode **160-3** have different plane shapes. The (1-1) electrode **160-1** may be allocated to the first subpixel, the (1-2) electrode **160-2** may be allocated to the second subpixel, and the (1-3) electrode **160-3** may be allocated to the third subpixel.

[0146] The (1-1) electrodes **160-1** are disposed in the (3n−2) column. The (1-1) electrodes **160-1** are sequentially disposed in the column direction. The (1-2) electrodes **160-2** are disposed in the (3n−1) column. The (1-2) electrodes **160-2** are sequentially disposed in the column direction. The (1-3) electrodes **160-3** are disposed in the 3n column. The (1-3) electrodes **160-3** are sequentially disposed in the column direction. Accordingly, the (1-1) electrode **160-1**, (1-2) electrode **160-2**, and (1-3) electrode **160-3** are sequentially disposed alternately in the row direction.

[0147] The (1-1) electrode **160-1** has a convex part **161** on its one side. The convex part **161** may be disposed on one side of the (1-1) electrode **160-1** not adjacent to the (1-2) electrode **160-2**. The convex part **161** may be positioned on one side of the (1-1) electrode **160-1** adjacent to the (1-3) electrode **160-3**. The area of the region in which the convex part **161** of the (1-1) electrode **160-1** has been formed has a wide area compared to other regions. The convex part **161** may be protruded toward the (1-3) electrode **160-3** in a region adjacent to the (1-3) electrode **160-3**.

[0148] The (1-2) electrode **160-2** may have a square or an oblong.

[0149] The (1-3) electrode **160-3** has a concave part **163** on its one side. The concave part **163** may be positioned on one side of the (1-3) electrode **160-3** not adjacent to the (1-2) electrode **160-2**. The concave part **163** may be positioned on one side of the (1-1) electrode **160-1** adjacent to the (1-1) electrode **160-1**. In the region in which the (1-1) electrode **160-1** and the (1-3) electrode **160-3** are adjacently disposed, the convex part **161** of the (1-1) electrode **160-1** is opposite the concave part **163** of the (1-3) electrode **160-3**. In the region in which the (1-1) electrode **160-1** and the (1-3) electrode **160-3** are adjacently disposed, the convex part **161** of the (1-1) electrode **160-1** may be inserted in the concave part **163** of the (1-3) electrode **160-3**.

[0150] A bank **370** is positioned on the substrate **100** in which the first electrode **160** has been formed. The bank **370** includes a first bank **372** and a second bank **376**.

[0151] The first bank **372** includes a first opening OA**1** exposing at least one part of the first electrode **160**. One first opening OA**1** may be allocated to one first electrode **160**. The first bank **372** may be formed to cover the edge of the first electrode **160**, thus exposing most of the central part of the first electrode **160**. In this case, the boundary of the first opening OA**1** may be positioned inside the boundary of the first electrode **160**. The boundary of the first opening OA**1** determines the plane shape of the first opening OA**1**. The boundary of the first electrode **160** determines the plane shape of the first electrode **160**. A part of the first electrode **160** exposed by the first opening OA**1** may be defined as an emission region.

[0152] A first opening OA**1** exposing the (1-1) electrodes **160-1** arranged in the (3n−2) column, a first opening OA**1** exposing the (1-2) electrodes **160-2** arranged in the (3n−1) column, and a first opening OA**1** exposing the (1-3) electrodes **160-3** arranged in the 3n column have different areas and shapes.

[0153] The second bank **376** includes a second opening OA**2** exposing at least one part of the first electrode **160**. One second opening OA**2** may be allocated to one first electrode **160**.

[0154] The second opening OA**2** may be formed to have a wider area than the first opening OA**1**, thus accommodating the first opening OA**1**. That is, the boundary of the second opening OA**2** may be spaced apart toward the outside of the boundary of the first opening OA**1** at a preset interval. The boundary of the second opening **61** determines the plane shape of the second opening **61**.

[0155] A second opening OA**2** exposing each of the (1-1) electrodes **160-1** arranged in the (3n−2) column, a second opening OA**2** exposing each of the (1-2) electrodes **160-2** arranged in the (3n−1) column, and a second opening OA**2** exposing each of the (1-3) electrodes **160-3** arranged in the 3n column have different areas and shapes.

[0156] The plane shapes of the first electrode **160**, first opening OA**1**, and second opening OA**2** allocated to one subpixel may correspond to each other.

[0157] A part that belongs to the second opening OA and that exposes the convex parts **161** of the (1-1) electrodes **160-1** may be configured to have a relatively wide width compared to a part exposing other parts of the (1-1) electrodes **160-1**. Accordingly, a part that belongs to the second opening OA**2** and that exposes the convex part **161** can satisfy a minimum width which may be set by taking into consideration the amount of dropping of an organic light-emitting material and a process margin. In this case, the part of the second opening OA**2** exposing the convex part **161** may be assigned as a dropping region DP to which an organic light-emitting material is dropped upon performing a solution process.

[0158] In this case, a second opening OA**2** that belongs to the second opening OA and that exposes the (1-3) electrode **160-3** may be configured to have a relatively narrow width in a region, corresponding to the concave part **163**, compared to other parts. However, the second opening OA**2** exposing the (1-3) electrode **160-3** has been configured to have a large width compared to the second opening OA**2** exposing the (1-1) electrode **160-1**. Accordingly, in other regions in addition to the region in which the concave part

163 has been formed, the second opening OA**2** exposing the (1-3) electrode **160-3** can satisfy a minimum width which may be set by taking into consideration the amount of dropping of an organic light-emitting material and a process margin. In this case, the second opening OA**2** exposing the (1-3) electrode **160-3** may be assigned as a region DP to which an organic light-emitting material is dropped upon performing a solution process.

[0159] As described above, the organic light-emitting display according to the second modification example of the present disclosure has an advantage in that it can significantly improve display quality degradation attributable to a color mixture failure because the dropping area of an organic light-emitting material can be sufficiently secured.

[0160] An organic emission layer **175** is positioned on the substrate **100** in which the bank **370** has been formed. The organic emission layer **175** may be formed within a corresponding opening OA. The organic emission layers **175** formed within openings OA adjacent in the column direction and the row direction may be physically separated by the bank **370**.

[0161] The first bank **372** is a thin film of a hydrophilic component provided to prevent a wettability failure attributable to the hydrophobic property of the first electrode **160**, and functions to well spread an organic light-emitting material having a hydrophilic property. The second bank **376** is a thick of a hydrophobic component, and functions to push an organic light-emitting material of a hydrophilic property toward a central part. The organic emission layer **175** may be formed to have a uniform thickness on the emission region through a combination structure of the first bank **172** and the second bank **176**.

[0162] Those skilled in the art may change and modify the present disclosure in various ways without departing from the technical spirit of the present disclosure through the above description. Accordingly, the technical range of the present disclosure should not be limited to the detailed contents of the specification, but should be determined by the claims.

[0163] An organic light-emitting display comprises a substrate having a plurality of subpixels arranged in a row direction and a column direction crossing the row direction; first electrodes allocated to the subpixels, respectively, and comprising (1-1) electrodes arranged in a (3n−2) (n is a natural number of 1 or more) column, (1-2) electrodes arranged in a (3n−1) column, and a (1-3) electrode arranged in a 3n column; and a bank having an opening exposing the first electrodes, wherein the (1-1) electrode comprises a convex part protruded toward the (1-3) electrode, and wherein the (1-3) electrode comprises a concave part opposing the convex part.

[0164] The convex part of the (1-1) electrode is inserted in the concave part of the (1-3) electrode.

[0165] The subpixels comprise a first subpixel having the (1-1) electrode, a second subpixel having the (1-2) electrode, and a third subpixel having the (1-3) electrode, and areas and shapes of the openings allocated to the first subpixel, the second subpixel, and the third subpixels, respectively, are different.

[0166] The bank comprises: a first bank having first openings, the first opening exposing one first electrode; and a second bank positioned above the first bank and having second openings, the second opening exposing a plurality of the first electrodes.

[0167] Plane shapes of the first electrode and the second opening allocated to one subpixel correspond to each other.

[0168] The subpixels comprise a first subpixel having the (1-1) electrode, a second subpixel having the (1-2) electrode, and a third subpixel having the (1-3) electrode, and areas and shapes of the second openings allocated to the first subpixel, the second subpixel, and the third subpixel, respectively, are different.

[0169] The bank comprises: a first bank positioned between the first electrodes adjacent in the column direction; and a second bank positioned between the first electrodes adjacent in the row direction.

[0170] At least one part of the first electrode exposed by a combination structure of the first bank and the second bank is defined as an emission region, and a plane shape of the emission region corresponds to a plane shape of the first electrode.

[0171] The subpixels comprise a first subpixel having the (1-1) electrode, a second subpixel having the (1-2) electrode, and a third subpixel having the (1-3) electrode, and areas and shapes of the emission regions allocated to the first subpixel, the second subpixel, and the third subpixel, respectively, are different.

[0172] The second bank is extended in the column direction in a straight-line form between the (1-1) electrodes arranged in the (3n−2) column and the (1-2) electrodes arranged in the (3n−1) column, the second bank is extended in the column direction in a straight-line form between the (1-2) electrodes arranged in the (3n−1) column and the (1-3) electrodes arranged in the 3n column, and the second bank is extended in the column direction in a zigzag form between the (1-3) electrodes arranged in the 3n column and the (1-2) electrodes arranged in the (3n−2) column.

[0173] The second bank comprises: (2-1) openings exposing the (1-1) electrodes, arranged in the (3n−2) column, together; (2-2) openings exposing the (1-2) electrodes, arranged in the (3n−1) column, together; and (2-3) openings exposing the (1-3) electrodes, arranged in the 3n column, together, and wherein areas and shapes of the (2-1) opening, the (2-2) opening, and the (2-3) opening are different.

[0174] The convex part has a shape having a rounded corner, and the concave part has a shape having a rounded corner in accordance with the shape of the convex part.

[0175] The first bank has a hydrophilic property, and the second bank has a hydrophobic property.

What is claimed is:

1. An organic light-emitting display, comprising:

a substrate having a plurality of subpixels arranged in a row direction and a column direction crossing the row direction;

a plurality of first electrodes respectively allocated to the plurality of subpixels and comprising a first sub-electrode arranged in a (3n−2) column, a second sub-electrode arranged in a (3n−1) column, and a third sub-electrode arranged in a 3n column (where n is a natural number of 1 or more); and

a bank having an opening exposing the plurality of first electrodes,

wherein the first sub-electrode has a convex part protruded toward the third sub-electrode that has a concave part corresponding to the convex part.

2. The organic light-emitting display of claim **1**, wherein the convex part of the first sub-electrode is inserted in the concave part of the third sub-electrode.

3. The organic light-emitting display of claim 1, wherein the plurality of subpixels comprises a first subpixel having the first sub-electrode, a second subpixel having the second sub-electrode, and a third subpixel having the third sub-electrode, and

wherein the first subpixel, the second subpixel and the third subpixels respectively include openings that have different areas and different shapes from one another.

4. The organic light-emitting display of claim 1, wherein the bank comprises:

a first bank having first openings that expose one first electrode; and

a second bank positioned over the first bank and having a plurality of second openings that exposes a plurality of the first electrodes.

5. The organic light-emitting display of claim 4, wherein the first electrode and the second opening have plane shapes are allocated to one subpixel and correspond to each other.

6. The organic light-emitting display of claim 4, wherein the plurality of subpixels comprises a first subpixel having the first sub-electrode, a second subpixel having the second sub-electrode, and a third subpixel having the third sub-electrode, and

wherein the first subpixel, the second subpixel and the third subpixels respectively include openings that have different areas and different shapes.

7. The organic light-emitting display of claim 1, wherein the bank comprises:

a first bank positioned between the plurality of first electrodes adjacent in the column direction; and

a second bank positioned between the plurality of first electrodes adjacent in the row direction.

8. The organic light-emitting display of claim 7, wherein at least one part of the plurality of first electrodes exposed by the first bank and the second bank is defined as an emission region, and a plane shape of the emission region corresponds to a plane shape of the plurality of first electrode.

8. The organic light-emitting display of claim 8, wherein the plurality of subpixels comprises a first subpixel having the first sub-electrode, a second subpixel having the second sub-electrode, and a third subpixel having the third sub-electrode, and

wherein the first subpixel, the second subpixel and the third subpixels respectively include openings that have different areas and different shapes from one another.

9. The organic light-emitting display of claim 7, wherein the second bank is extended in the column direction in a straight-line shape between the first sub-electrode arranged in the (3n−2) column and the second sub-electrode arranged in the (3n−1) column,

wherein the second bank is extended in the column direction in the straight-line shape between the second sub-electrode arranged in the (3n−1) column and the third sub-electrode arranged in the 3n column, and

wherein the second bank is extended in the column direction in a zigzag form between the third sub-electrode arranged in the 3n column and the second sub-electrode arranged in the (3n−2) column.

10. The organic light-emitting display of claim 7, wherein the second bank has second-first opening, second-second opening and second third opening,

wherein the second-first opening exposes the first sub-electrode arranged in the (3n−2) column, the second-second opening exposes the second sub-electrode arranged in the (3n−1) column, and the second-third opening exposes the third sub-electrodes arranged in the 3n column, and

wherein the second-first opening, the second-second opening, and the second-third opening respectively have different areas and different shapes from one another.

11. The organic light-emitting display of claim 1, wherein the convex part has a shape with a rounded corner, and the concave part has a shape with a rounded corner correspond to the shape of the convex part.

12. The organic light-emitting display of claim 4, wherein the first bank has a hydrophilic property, and the second bank has a hydrophobic property.

13. An organic light-emitting display, comprising:

a substrate having a plurality of subpixels arranged in a row direction and a column direction crossing the row direction;

a plurality of first electrodes respectively allocated to the plurality of subpixels and comprising a first sub-electrode arranged in a (3n−2) column, a second sub-electrode arranged in a (3n−1) column, and a third sub-electrode arranged in a 3n column (where n is a natural number of 1 or more);

a first bank positioned between the plurality of first electrodes adjacent in the column direction; and

a second bank positioned between the plurality of first electrodes adjacent in the row direction,

wherein the first sub-electrode has a convex part protruded toward the third sub-electrode that has a concave part corresponding to the convex part.

14. The organic light-emitting display of claim 13, wherein the convex part of the first sub-electrode is inserted in the concave part of the third sub-electrode.

15. The organic light-emitting display of claim 13, wherein the plurality of subpixels comprises first, second and third subpixels, and the first, second and third sub-electrodes are respectively disposed in the first, second and third subpixels.

16. The organic light-emitting display of claim 15, wherein the first subpixel, the second subpixel and the third subpixels respectively include openings that have different areas and different shapes from one another.

17. The organic light-emitting display of claim 13, wherein the first bank has first openings that expose one first electrode; and the second bank is positioned over the first bank and has a plurality of second openings that exposes a plurality of the first electrodes.

18. The organic light-emitting display of claim 13, wherein the second bank has second-first opening, second-second opening and second third opening,

wherein the second-first opening exposes the first sub-electrode arranged in the (3n−2) column, the second-second opening exposes the second sub-electrode arranged in the (3n−1) column, and the second-third opening exposes the third sub-electrodes arranged in the 3n column, and

wherein the second-first opening, the second-second opening, and the second-third opening respectively have different areas and different shapes from one another.

19. The organic light-emitting display of claim 13, wherein the second bank is extended in the column direction

in a straight-line shape between the first sub-electrode arranged in the (3n−2) column and the second sub-electrode arranged in the (3n−1) column,

wherein the second bank is extended in the column direction in the straight-line shape between the second sub-electrode arranged in the (3n−1) column and the third sub-electrode arranged in the 3n column, and

wherein the second bank is extended in the column direction in a zigzag form between the third sub-electrode arranged in the 3n column and the second sub-electrode arranged in the (3n−2) column.

20. The organic light-emitting display of claim **13**, wherein the second bank has second-first opening, second-second opening and second third opening,

wherein the second-first opening exposes the first sub-electrode arranged in the (3n−2) column, the second-second opening exposes the second sub-electrode arranged in the (3n−1) column, and the second-third opening exposes the third sub-electrodes arranged in the 3n column, and

wherein the second-first opening, the second-second opening, and the second-third opening respectively have different areas and different shapes from one another.

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专利名称(译)	有机发光显示装置		
公开(公告)号	US20200203448A1	公开(公告)日	2020-06-25
申请号	US16/714789	申请日	2019-12-15
[标]申请(专利权)人(译)	乐金显示有限公司		
申请(专利权)人(译)	LG DISPLAY CO. , LTD.		
当前申请(专利权)人(译)	LG DISPLAY CO. , LTD.		
[标]发明人	KIM SEONGHYUN RYU HOJIN LEE JAEKI OH YOUNGMU YEO JONGHOON LEE JIHOON GONG CHANGYONG		
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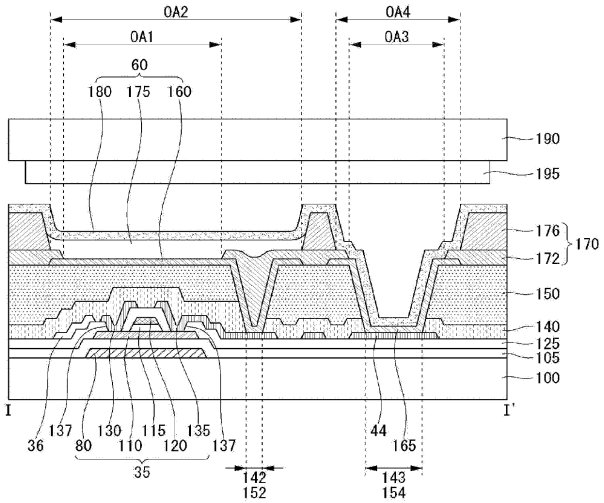
IPC分类号	H01L27/32 H01L51/52 H01L51/56		
CPC分类号	H01L51/5209 G09G2310/08 H01L51/56 G09G3/3275 H01L27/3211 H01L27/3272 H01L2227/323 H01L27/3248 G09G3/3266 H01L27/3246 G09G3/3233 G09G2320/0295		
优先权	1020180168725 2018-12-24 KR		
外部链接	Espacenet USPTO		

摘要(译)

一种有机发光显示器，包括：基板，其具有在行方向和与行方向交叉的列方向上排列的多个子像素；以及在基板上形成的多个子像素。 分别分配给多个子像素的多个第一电极，其包括布置在（3n-2）列中的第一子电极，布置在（3n-1）列中的第二子电极和第三子电极 排列在3n列中（其中n是1或1以上的自然数）； 以及具有具有暴露出多个第一电极的开口的隔堤，其中，第一子电极具有向第三子电极突出的凸部，该凸部具有与凸部相对应的凹部。