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(54) Organic light emitting display device

Organische elektrolumineszente Anzeigevorrichtung

Dispositif d'affichage électroluminescent organique

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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to an organic light-emitting display device. More particularly, the invention relates to an organic light-emitting display device encapsulated with a frit to prevent an infiltration of oxygen and moisture thereinto.

2. Description of the Related Art

[0002] In general, an organic light-emitting display device comprises a first substrate comprising a pixel region and a non-pixel region, and a second substrate opposed and disposed to the first substrate and bonded to the first substrate with sealant such as epoxy for encapsulation.

[0003] In the pixel region of the first substrate, a plurality of organic light-emitting diodes are formed at intersecting portions of scan lines and data lines in the form of a matrix. Each organic light-emitting diode comprises i) an anode electrode, ii) a cathode electrode and iii) an organic thin film layer. The organic thin film layer may comprise a hole transporting layer, the cathode electrode, a light-emitting layer, and an electron transporting layer. The thin film layer may be formed between the anode electrode and the cathode electrode.

[0004] Since the organic light-emitting diode includes organic material, it is vulnerable to degradation in the presence of oxygen. Further, since the cathode electrode is made of a metal material, it may be oxidized by moisture in the air so as to degrade its electrical and light-emitting characteristics. To prevent this, a moisture absorbent material is mounted on a container, e.g., manufactured in the form of a can or cup made of metal material, or on a second substrate of organic, plastic, etc., in the form of powder, or adhered thereto in the form of a film, thereby removing moisture penetrating from the surroundings.

[0005] However, the method of mounting the moisture absorbent material in the form of powder can cause problems such as complicating the process, increasing material and process costs, increasing the thickness of a display device, and being difficult to apply to a front light-emitting display configuration. Also, the method of adhering moisture absorbent material in the form of a film can cause problems in that it is limited in its ability to remove moisture and it is difficult to apply to mass production due to low durability and reliability.

[0006] Therefore, in order to solve such problems, there has been proposed a method of encapsulating a light-emitting element by forming a sidewall with a frit.

[0007] U.S. Patent Serial No. 10/414,794 (April 16, 2003) discloses a glass package encapsulated by adhering a first glass plate and a second glass plate with a frit and method of manufacturing the same.

[0008] US2005184927 discloses a display that includes: a display area adapted to form an image with display devices arranged on a substrate; a sealing portion adapted to seal at least the display area with a sealant arranged along an outer edge portion of the display area; and a driving power supply line adapted to supply a driving voltage to the display area.

[0009] EP1176457 discloses display device in which wiring lines are formed in a portion of a pixel substrate which is covered with a sealing member. Instead of using one wide wiring line, a plurality of wiring lines each having a small width are connected in parallel to one another.

[0010] US2003094615 discloses a light-emitting element formed between a first substrate and a second substrate. The light-emitting device is formed over a first insulating layer made of an organic compound and a second insulating layer made of an inorganic insulating material containing nitrogen formed on the surface of the first insulating layer.

SUMMARY OF CERTAIN INVENTIVE ASPECTS

[0011] The invention sets out to solve the above problems and provides a display device as set out in claim 1 and a method of manufacturing a display device as set out in Claim 8. Preferred features of the invention are set out in claims 2 to 7 and 9 to 12.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] These and/or other aspects and advantages of the invention will become apparent and more readily appreciated from the following description of the preferred embodiments, taken in conjunction with the accompanying drawings of which:

FIG. 1 is a view showing a first substrate of an organic light-emitting display device according to an embodiment of the present invention;

FIG. 2a and FIG. 2b are views showing a second substrate opposed and bonded to the first substrate;

FIG. 3 is a schematic view showing a bonded shape of a second substrate and a first substrate;

FIG 4 is a view showing an intersection region of a frit and an electrode line;

FIG. 5 is a view showing an intersecting region of a frit and an electrode line according to an embodiment of the present invention; and

FIG. 6a and FIG. 6b are views showing various embodiments of openings formed in the electrode line.

DETAILED DESCRIPTION OF CERTAIN INVENTIVE EMBODIMENTS

[0013] Embodiments of the present invention will be described with reference to the accompanying drawings. Herein, when one element is described as being connected to another element, one element may be not only

directly connected to another element but may also be indirectly connected to another element via yet another element. Further, irrelevant elements are omitted for clarity. Also, like reference numerals refer to like elements throughout.

[0014] FIG. 1 shows an organic light-emitting display device according to an embodiment of the present invention.

[0015] Referring to FIG. 1, a first substrate 200 is comprised of a pixel region 210 and a non-pixel region 220 encompassing the pixel region 210. The pixel region 210 comprises formed scan lines 104b and data lines 106c, and pixels 100 electrically connected to the scan lines 104b and the data lines 106c. The non-pixel region 220 is formed with a scan driver 410 connected with the scan lines 104b and a data driver 420 connected with the data lines 106c. The non-pixel region 220 is formed with a power supplying line (not shown) for supplying power to the pixels 100 and the pads 104c and 106d connected with the external driving circuit (not shown).

[0016] Each pixel 100 comprises an organic light-emitting diode (not shown) and at least one thin film transistor for driving the organic light-emitting diode. The organic light-emitting diode is comprised of an anode electrode, a cathode electrode; and an organic thin film layer comprising a hole transporting layer, a light-emitting layer, and an electron transporting layer, which are formed between the anode electrode and the cathode electrode. The thin film transistor comprises a gate electrode, a source electrode and a drain electrode and controls an amount of current supplied to the organic light-emitting diode. One of the pixels 100 is driven when a scan line 104b, connected to the pixel 100, is supplied with scan signals, and data signals are received from the electrically connected data line 106c, so as to generate a predetermined brightness light corresponding to the received data signals.

[0017] The scan driver 410 sequentially supplies the scan signals to the scan lines 104b on the basis of control signals supplied from first pads 104c. As a result, the pixels 100 connected with the scan lines 104b are sequentially selected.

[0018] The data driver 420 receives data and control signals from second pads 106d. The data driver 420 receiving the data and control signals supplies the data signals to the data lines 106c. Here, the data signals supplied to the data lines 106c are supplied to the pixels 100 selected by the scan signals.

[0019] The pads 104c and 106d are electrically connected with the external driving circuit. Here, the first pads 104c are connected with the scan driver 410 to supply the control signal to the scan driver 410, thereby driving the scan driver 410. And, the second pads 106d are electrically connected with the data driver 420 to supply the control signal and data to the data driver 420, thereby driving the data driver 420.

[0020] FIGS. 2a and 2b are a plan view and a sectional view of a second substrate bonded to a first substrate. Here, the second substrate (e.g., a sealing substrate 300) is bonded to the first substrate 200 (shown in FIG.1) so as to prevent moisture from infiltrating into certain internal components of the pixel region 210.

[0021] Referring to FIGS. 2a and 2b, the second substrate 300 is provided with a frit 320 in order to bond to the first substrate 200.

[0022] A process of producing the frit 320 will be briefly described as follows. In general, the frit in the form of glass powder is produced by rapidly falling temperature in the course of heating glass material at high temperature. When oxide powder is included in the frit in powder form and organic matter is then added to it, a paste in a gel state is produced. The paste is applied to the edge of the second substrate 300 and then heated to a predetermined temperature, such that the organic matter burns and dissipates into the air and the paste in the gel state is cured and attached to the second substrate 300 in a solid state frit 320. Here, the temperature at which the frit 320 burns is about 300°C to about 500°C. In one aspect, the frit 320 is formed at the height of about 14 to about 15μm and the width of about 0.6 to about 0.7mm in order to be able to stably bond the second substrate 300 and the first substrate 200.

[0023] After forming the solid state frit 320, the first substrate 200 and the second substrate 300 are bonded together. When bonding the first substrate 200 and the second substrate 300, the pixel region 210 is encapsulated to prevent an infiltration of oxygen and moisture thereinto. To this end, when bonding the second substrate 300 and the first substrate 200, the frit 320 is preferably positioned in the non-pixel region 220. The frit 320 is then irradiated with laser and/or infrared rays from an external source, until it is melted to bond the first substrate 200 and the second substrate 300.

[0024] FIG. 3 is a schematic view of the second substrate300 bonded to the first substrate 200. Although FIG. 3 shows the frit 320 positioned inside the scan driver 410, the present invention is not limited thereto. For example, the frit 320 can be positioned outside the scan driver 410 to surround and/or overlap the scan driver 410.

[0025] Referring to FIG. 3, the frit 320 is positioned in the non-pixel region 220 to bond the first substrate 200 and the second substrate 300. In some embodiments, the frit 320 is positioned in the non-pixel region 220 and is then irradiated with infrared rays so that the frit 320 is melted and bonded to the first substrate 200, thereby bonding the first substrate 200 and the second substrate 300. After the frit 320 is melted, the first substrate 200 and the second substrate 300 are bonded by the frit 320, thereby preventing oxygen and moisture, etc., from infiltrating into the pixel region 210.

[0026] Meanwhile, when bonding the first substrate 200 and the second substrate 300 as in FIG. 3, the frit 320 overlaps with at least one electrode line. For example, the frit 320 may overlap with the scan line 104c, the data line 106c, and the power supply line (not shown). Here, the electrode lines are formed at the time of forming

the thin film transistor and/or the organic light-emitting diode, which is included in the pixel 100. The electrode lines can be formed of at least one of a gate metal, a source/drain metal, an anode metal when forming the thin film transistor. For example, the scan line 104b can be formed of the gate metal, the data line and the power supply line can be formed of the source/drain metal. The electrode lines can be formed of the same substance as a semiconductor layer when forming the thin film transistor.

[0027] Meanwhile, in the intersecting region of the frit 320 and the electrode lines the laser irradiating the frit 320 also irradiates the electrode lines. In this case, the electrode lines positioned at the intersecting region may be heated to a high temperature when irradiated by the laser. The high temperature may result in a deformation of the electrode lines. As shown in FIG. 4, the electrode lines 400 that overlap with the frit 320 in the intersecting region, are cracked by high temperature and their resistance value and electrical characteristics are changed, thereby deteriorating reliability.

[0028] Another problem caused by the high temperature is that the adhesion between the electrode lines 400 and the frit 320 is deteriorated. It is estimated that the problem is caused when the laser is supplied to the electrode lines 400 while irradiating the frit 320. The laser is then reflected from the electrode lines 400 and is resupplied to the frit 320, thereby causing the overheating. In this case, the frit 320 rises to a higher temperature than is desired, thereby deteriorating the adhesion characteristics of the frit 320.

[0029] In order to overcome these problems, an aspect of the present invention comprises forming the intersecting region of the frit 320 and the electrode line 400 as shown in FIG. 5.

[0030] FIG. 5 shows the interesting region of the frit 320 and the electrode line 400.

[0031] Referring to FIG. 5, in the intersecting region of the frit 320 and the electrode line 400, the electrode line 400 is formed with at least one opening 402.

[0032] In the intersecting region, the openings 402 formed in the electrode line 400 allow transmission of the laser supplied to the frit 320, instead of reflecting the laser back onto the frit 320. As a result, the amount of laser, which is directly supplied to the electrode line 400 from the intersecting region, is reduced, thereby preventing the temperature of the electrode line 400 from rapidly rising. In other words, the present invention can prevent the crack of the electrode line 400 in the intersecting region by the openings 402 formed at the electrode line 400.

[0033] Also, since the openings 402 transmit the laser, the amount of laser supplied to the frit 320 is also reduced. If the amount of laser resupplied to the frit 320 from the electrode line 400 reduces, the temperature rise of the frit 320 can also be reduced, thereby improving the adhesion between the frit 320 and the electrode line 400.

[0034] Meanwhile, due to the openings 402 formed in the electrode line 400 at the intersection region of the frit 320, there is a risk that the resistance value of the electrode line 400 could be reduced below a desired value. To prevent this, the width L2 of the electrode line 400 in the intersecting region is formed wider than the width L1 of the electrode line 400 in the non-intersecting regions.

[0035] Although FIG. 5 shows a quadrangular shape of the openings 402, the present invention is not limited thereto. For example, the openings 402 can be formed in the shape of a circle, a triangle, or a inverted triangle, etc., as shown in FIGS 6a and 6b. In fact, in the present invention, the openings 402 can be formed by removing a portion of the electrode line 400, where the shape of the openings 402 can be any shape.

[0036] As described above, the organic light-emitting display device forms at least one opening in the electrode lines in the intersecting region of the frit and the electrode lines. If the opening in the electrode line is formed as described above, the amount of laser irradiated to the electrode line is reduced, thereby preventing cracking, etc., from being generated in the electrode line. Also, if the opening is formed at the electrode line, the amount of laser resupplied to the frit from the electrode line is reduced, thereby improving the adhesion between the frit and the electrode line.

[0037] Although certain embodiments of the present invention have been shown and described, it would be appreciated by those skilled in the art that changes might be made in these embodiments without departing from the principles of the invention, the scope of which is defined in the claims.

Claims

1. An organic light-emitting diode display device comprising:

   a first substrate (200) comprising one or more pixels (100) formed on the first substrate (200);
   a frit (320) positioned around the pixels;
   a second substrate (300) opposed and bonded to the first substrate (200); and
   at least one electrode line (400) formed on the first substrate (200) and intersecting a region of the frit (320), wherein the electrode line (400) comprises at least one opening (402) in the intersecting region; (200)
   wherein the frit (320) bonds the first substrate (200) and the second substrate (300); and
   wherein a width of the electrode line in the intersecting region is different from a width of the electrode line in a region outside of the intersecting region, wherein the width of the electrode line in the intersecting region is wider (L2) than the width of the electrode line in the region outside of the intersecting region (L1).

2. A display device according to claim 1, wherein the

frit (320) comprises an oxide material.

3. A display device according to claim 1 or 2, wherein the first substrate (200) comprises a pixel region wherein the said one or more pixels (100) are formed, and a non-pixel region outside of the pixel region; the second substrate (300) is opposed and bonded to the first substrate (200) in a region encompassing the pixel region; and the said frit (320) is positioned in the non-pixel region between the first substrate (200) and the second substrate (300).

4. A display device as claimed in any preceding claim, wherein the electrode line comprises at least one of a scan line, a data line, and a power supply line.

5. A display device as claimed in any preceding claim, wherein a shape of the opening is at least one of a quadrangle, a triangle, an inverted triangle, and a circle.

6. A display device as claimed in any preceding claim, wherein the pixel comprises at least one thin film transistor and an organic light-emitting diode.

7. A display device as claimed in claim 6, wherein the electrode line is formed of a same substance as the thin film transistor or the organic light-emitting diode, wherein the same substance comprises at least one of a gate metal, a source/drain metal, an anode metal, and a semiconductor layer.

8. A method of making an organic light-emitting diode display device comprising:

forming one or more pixels (100) in a pixel region of a first substrate (200); applying a frit material (320) on the first substrate (200) or on a second substrate (300);
forming one or more electrode lines (400) on the first substrate (200); and
bonding the first substrate (200) to the second substrate (300) with the frit (320);
wherein the one or more electrode lines (400) comprise at least one opening (402) in a region where the one or more electrode lines intersect the frit (320), and
wherein the one or more electrode lines have a different width in the intersecting region than in a region outside of the intersecting region, wherein the width of the electrode lines in the intersecting region is wider (L2) than the width of the electrode lines outside of the intersecting region (L1).

9. A method according to claim 8, wherein the bonding comprises melting the frit (320) by irradiating the frit with laser or infrared radiation.

10. A method according to claim 8 or 9, further comprising forming the opening in the one or more electrode line by removing a portion of the electrode line.

11. A method according to claim 10, wherein a shape of the removed portion of the one or more electrode lines is at least one of a quadrangle, a triangle, and a circle.

12. A method according to one of claims 8 to 11, wherein the frit material comprises an oxide and an organic material, and further wherein the bonding comprises:

heating the frit material (320) to a temperature sufficient to burn the organic material, thereby dissipating substantially all of the organic material.

Patentansprüche

1. Organische Leuchtdioden-Anzeigevorrichtung, umfassend:

ein erstes Substrat (200), umfassend einen oder mehrere Pixel (100), welche auf dem ersten Substrat (200) gebildet sind;
eine Fritte (320), welche um die Pixel herum angeordnet ist;
ein zweites Substrat (300), welches gegenüber dem ersten Substrat (200) angeordnet und daran befestigt ist; und
zumindest eine Elektrodenleitung (400), welche auf dem ersten Substrat (200) gebildet ist und einen Bereich der Fritte (320) schneidet, wobei die Elektrodenleitung (400) zumindest eine Öffnung (402) in dem Schneidbereich umfasst;
wobei die Fritte (320) das erste Substrat (200) mit dem zweiten Substrat (300) verbindet; und
wobei eine Breite der Elektrodenleitung in dem Schneidbereich von einer Breite der Elektrodenleitung in einem Bereich außerhalb des Schneidbereichs unterschiedlich ist, wobei die Breite der Elektrodenleitung im Schneidbereich (L2) breiter ist als die Breite der Elektrodenleitung im Bereich außerhalb des Schneidbereichs (L1).

2. Anzeigevorrichtung nach Anspruch 1, wobei die Fritte (320) ein Oxidmaterial umfasst.

3. Anzeigevorrichtung nach Anspruch 1 oder 2, wobei das erste Substrat (200) einen Pixelbereich, in welchem der eine oder die mehreren Pixel (100) gebildet sind, und einen pixelfreien Bereich außerhalb des Pixelbereichs umfasst;
das zweite Substrat (300) gegenüber dem ersten Substrat (200) in einem den Pixelbereich einschlie-

ßenden Bereich angeordnet und daran befestigt ist; und
die Fritte (320) im pixelfreien Bereich zwischen dem ersten Substrat (200) und dem zweiten Substrat (300) angeordnet ist.

4. Anzeigevorrichtung nach einem der vorhergehenden Ansprüche, wobei die Elektrodenleitung zumindest eine von einer Abtastleitung, einer Datenleitung, und einer Stromversorgungsleitung umfasst.

5. Anzeigevorrichtung nach einem der vorhergehenden Ansprüche, wobei eine Form der Öffnung zumindest die eines Quadrats, Dreiecks, umgekehrten Dreiecks oder eines Kreises ist.

6. Anzeigevorrichtung nach einem der vorhergehenden Ansprüche, wobei die Pixel zumindest einen Dünnfilmtransistor und eine organische Leuchtdiode umfassen.

7. Anzeigevorrichtung nach Anspruch 6, wobei die Elektrodenleitung aus demselben Material des Dünnfilmtransistors oder der organischen Leuchtdiode gebildet ist, wobei dasselbe Material zumindest eines aus einem Gate-Metall, einem Source/Drain-Metall, einem Anodenmetall und einer Halbleiterschicht umfasst.

8. Verfahren zum Herstellen einer organischen Leuchtdioden-Anzeigevorrichtung, umfassend:

Bilden eines oder mehrerer Pixel (100) in einem Pixelbereich eines ersten Substrats (200);
Aufbringen eines Frittenmaterials (320) auf das erste Substrat (200) oder auf ein zweites Substrat (300);
Bilden einer oder mehrerer Elektrodenleitungen (400) auf dem ersten Substrat (200); und
Verbinden des ersten Substrats (200) mit dem zweiten Substrat (300) durch die Fritte (320);
wobei die eine oder die mehreren Elektrodenleitungen (400) zumindest eine Öffnung (402) in einem Bereich umfassen, wo die eine oder die mehreren Elektrodenleitungen die Fritte (320) schneiden, und
wobei die eine oder die mehreren Elektrodenleitungen im Schneidbereich eine unterschiedliche Breite aufweisen, als in einem Bereich außerhalb des Schneidbereichs,
wobei die Breite der Elektrodenleitungen im Schneidbereich (L2) größer ist als die Breite der Elektrodenleitungen außerhalb des Schneidbereichs (L1).

9. Verfahren nach Anspruch 8, wobei das Verbinden das Schmelzen der Fritte (320) durch Bestrahlung der Fritte mit einer Laserstrahlung oder Infrarotstrahlung umfasst.

10. Verfahren nach Anspruch 8 oder 9, ferner umfassend das Bilden der Öffnung in der einen oder mehreren Elektrodenleitungen durch Entfernen eines Abschnitts der Elektrodenleitung.

11. Verfahren nach Anspruch 10, wobei eine Form des entfernten Abschnitts der einen oder mehreren Elektrodenleitungen zumindest eine aus einem Quadrat, Dreieck und einem Kreis ist.

12. Verfahren nach einem der Ansprüche 8 bis 11, wobei das Frittenmaterial ein Oxid und ein organisches Material umfasst, und ferner wobei das Verbinden umfasst:

Heizen des Frittenmaterials (320) auf eine Temperatur, welche ausreicht, um das organische Material zu verbrennen, wodurch im Wesentlichen das gesamte organische Material aufgelöst wird.

Revendications

1. Dispositif d'affichage par diode électroluminescente organique, comprenant :

un premier substrat (200) comprenant un ou plusieurs pixel(s) (100) formé(s) sur le premier substrat (200) ;
un verre de scellement (320) positionné autour des pixels ;
un deuxième substrat (300) faisant face et lié au premier substrat (200) ; et
au moins un conducteur d'électrode (400) formé sur le premier substrat (200) et intersectant une région du verre de scellement (320), dans lequel le conducteur d'électrode (400) comprend au moins une ouverture (402) dans la région d'intersection ;
dans lequel le verre de scellement (320) lie le premier substrat (200) et le deuxième substrat (300) ; et
dans lequel une largeur du conducteur d'électrode situé dans la région d'intersection est différente d'une largeur du conducteur d'électrode situé dans une région extérieure à la région d'intersection, dans lequel la largeur du conducteur d'électrode situé dans la région d'intersection est plus large (L2) que la largeur du conducteur d'électrode situé dans la région extérieure à la région d'intersection (L1).

2. Dispositif d'affichage selon la revendication 1, dans lequel le verre de scellement (320) comprend un matériau à base d'oxyde.

3. Dispositif d'affichage selon la revendication 1 ou 2, dans lequel le premier substrat (200) comprend une région de pixels au sein de laquelle ledit ou lesdits pixel(s) (100) est/sont formé(s), et une région sans pixels extérieure à la région de pixels ;
le deuxième substrat (300) fait face et est lié au premier substrat (200) dans une région englobant la région de pixels ; et
ledit verre de scellement (320) est positionné dans la région sans pixels entre le premier substrat (200) et le deuxième substrat (300).

4. Dispositif d'affichage selon l'une quelconque des revendications précédentes, dans lequel le conducteur d'électrode comprend au moins un parmi un conducteur de balayage, un conducteur de données, et un conducteur d'alimentation en énergie.

5. Dispositif d'affichage selon l'une quelconque des revendications précédentes, dans lequel une forme de l'ouverture est au moins un parmi un quadrilatère, un triangle, un triangle inversé, et un cercle.

6. Dispositif d'affichage selon l'une quelconque des revendications précédentes, dans lequel le pixel comprend au moins un transistor en couches minces et une diode électroluminescente organique.

7. Dispositif d'affichage selon la revendication 6, dans lequel le conducteur d'électrode est formé d'une substance identique à celle du transistor en couches minces ou de la diode électroluminescente organique, dans lequel la substance identique comprend au moins un parmi un métal de grille, un métal de source/drain, un métal d'anode, et une couche semiconductrice.

8. Procédé de réalisation d'un dispositif d'affichage à diode électroluminescente organique, comprenant les étapes consistant à :

former un ou plusieurs pixel(s) (100) dans une région de pixels d'un premier substrat (200) ;
appliquer un matériau de verre de scellement (320) sur le premier substrat (200) ou sur un deuxième substrat (300) ;
former un ou plusieurs conducteur(s) d'électrode (400) sur le premier substrat (200) ; et
lier le premier substrat (200) sur le deuxième substrat (300) avec le verre de scellement (320) ;
dans lequel le ou les conducteur(s) d'électrode (400) comprend ou comprennent au moins une ouverture (402) dans une région où le ou les conducteur(s) d'électrode intersecte(nt) le verre de scellement (320), et
dans lequel le ou les conducteur(s) d'électrode présente(nt) dans la région d'intersection une largeur différente de celle d'une région extérieure à la région d'intersection,
la largeur des conducteurs d'électrode situés dans la région d'intersection étant supérieure (L2) à la largeur des conducteurs d'électrode situés à l'extérieur de la région d'intersection (L1).

9. Procédé selon la revendication 8, dans lequel l'étape de liaison comprend une étape consistant à faire fondre le verre de scellement (320) en irradiant le verre de scellement avec un laser ou rayonnement infrarouge.

10. Procédé selon la revendication 8 ou 9, comprenant en outre une étape de formation de l'ouverture dans le ou les conducteur(s) d'électrode grâce à une étape consistant à retirer une partie du conducteur d'électrode.

11. Procédé selon la revendication 10, dans lequel une forme de la partie retirée du ou des conducteur(s) d'électrode est au moins un parmi un quadrilatère, un triangle, et un cercle.

12. Procédé selon l'une quelconque des revendications 8 à 11, dans lequel le matériau de verre de scellement comprend un oxyde et un matériau organique, et en outre dans lequel l'étape de liaison comprend une étape consistant à :

chauffer le matériau de verre de scellement (320) jusqu'à une température suffisante pour brûler le matériau organique, ce qui fait disparaître essentiellement la totalité du matériau organique.

FIG. 1

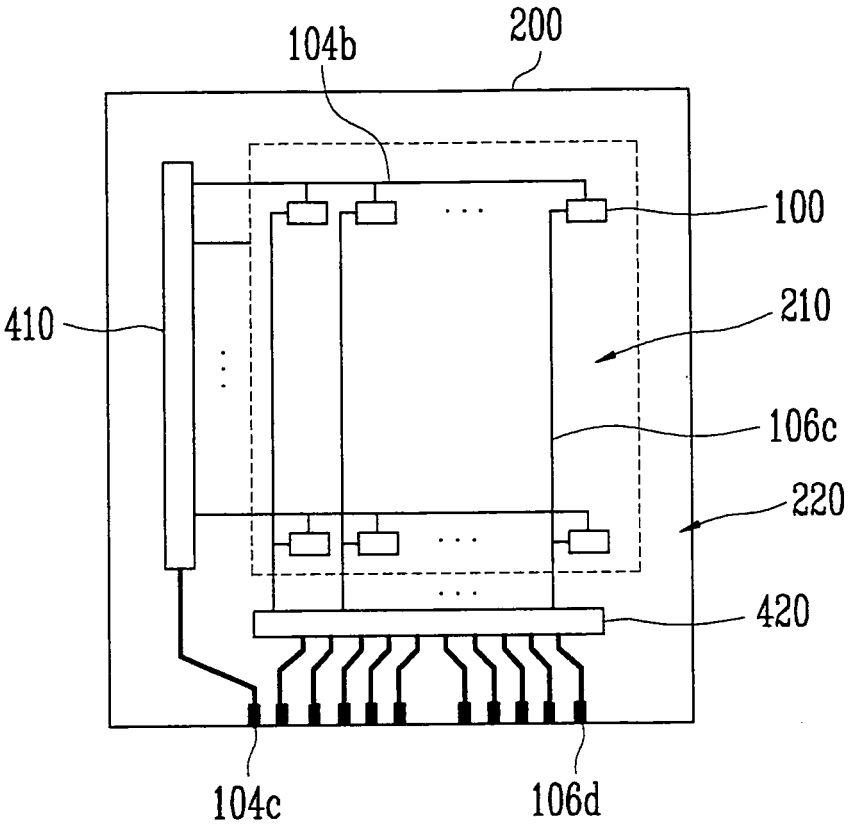


FIG. 2A

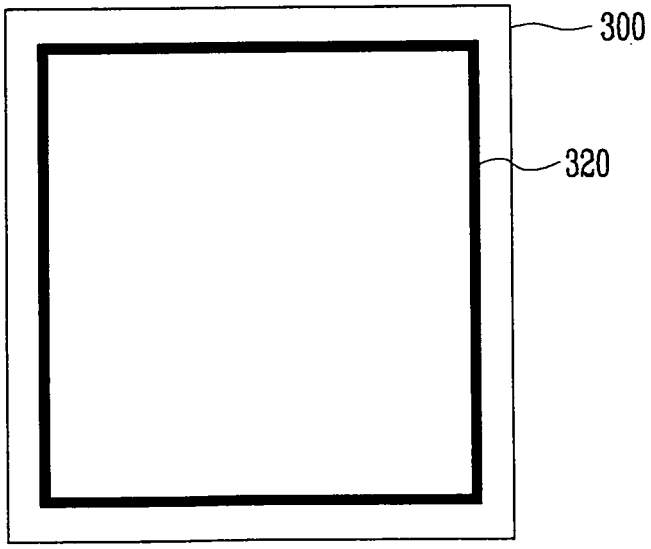


FIG. 2B

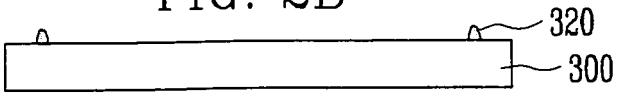


FIG. 3

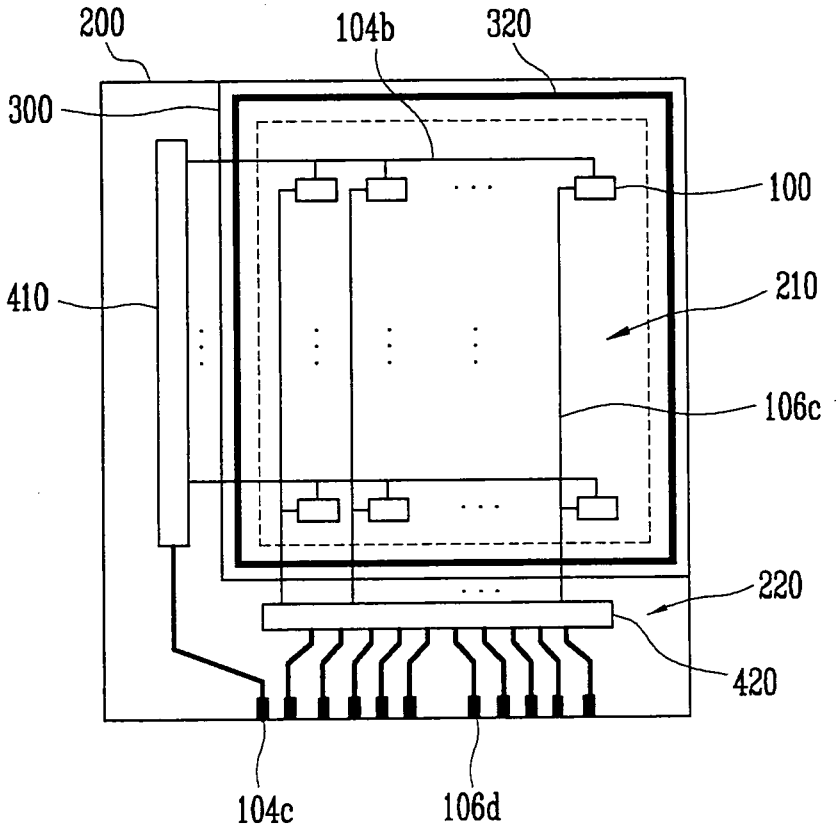


FIG. 4

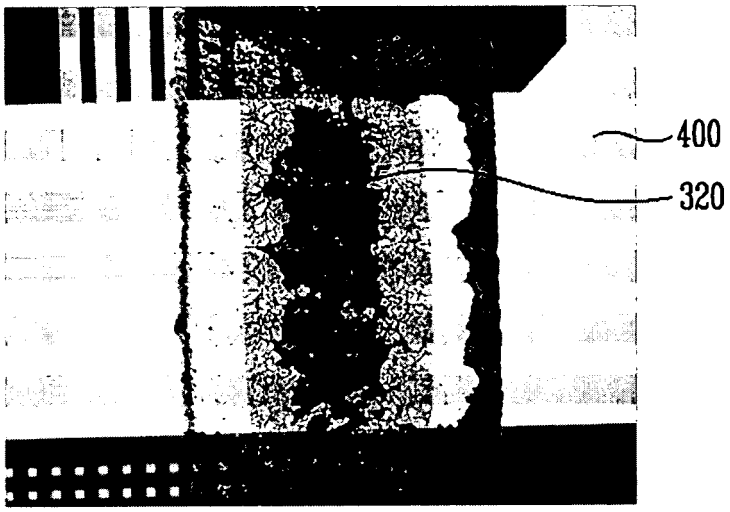


FIG. 5

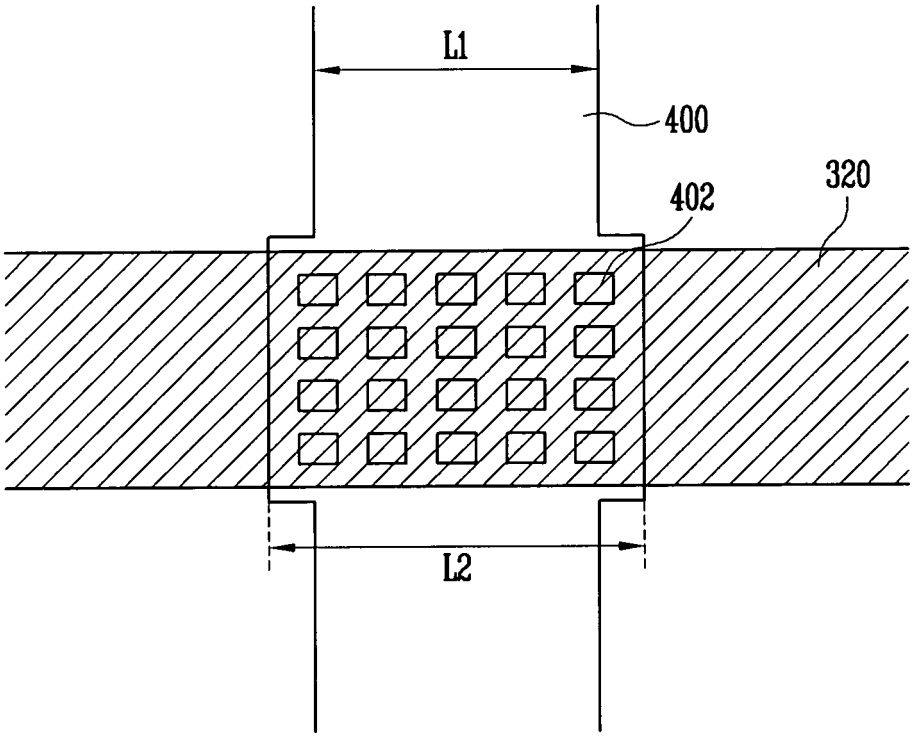


FIG. 6A

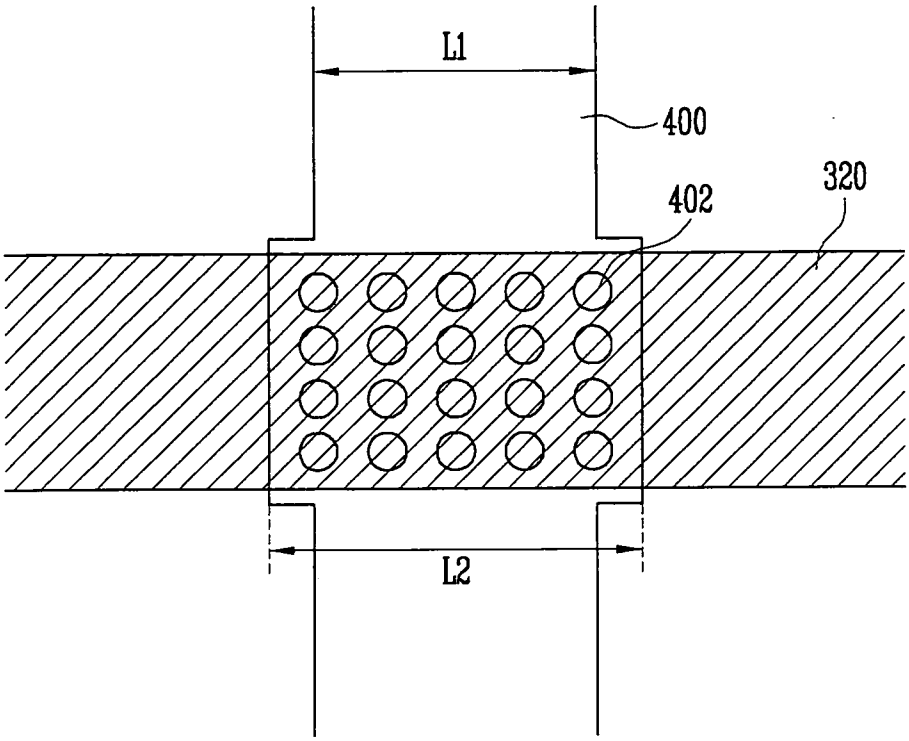
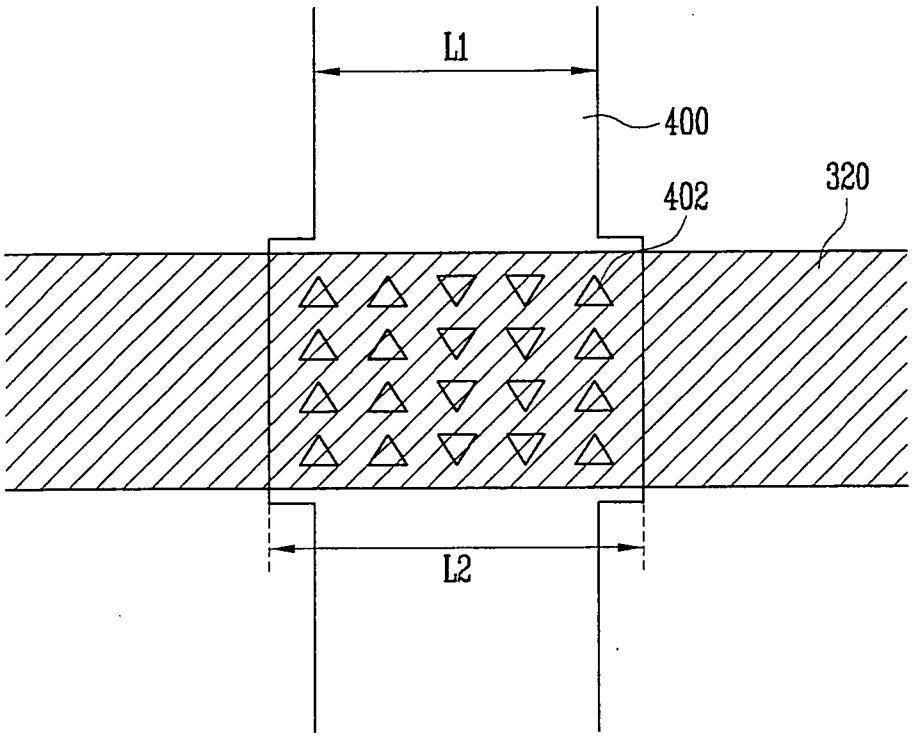


FIG. 6B



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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- US 2005184927 A **[0008]**
- EP 1176457 A **[0009]**
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专利名称(译)	有机发光显示装置		
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[标]申请(专利权)人(译)	三星斯笛爱股份有限公司		
申请(专利权)人(译)	三星SDI CO.，LTD.		
当前申请(专利权)人(译)	三星DISPLAY CO.，LTD.		
发明人	KWAK, WON-KYU C/O SAMSUNG SDI CO., LTD.		
IPC分类号	H01L51/52 H01L27/32		
CPC分类号	H01L27/3276 H01L27/3288 H01L51/5246		
优先权	1020060008460 2006-01-26 KR		
其他公开文献	EP1814181A2 EP1814181A3		
外部链接	Espacenet		

摘要(译)

一种用玻璃料封装的有机发光显示装置，以防止氧气和水分渗入其中。该器件包括：第一基板，包括形成像素的像素区域和像素区域外部的非像素区域;第二基板，在包括像素区域的一个区域中与第一基板相对并接合;位于第一基板和第二基板之间的非像素区域中的玻璃料，用于粘合第一基板和第二基板;至少一个电极线形成在第一基板上并与玻璃料的一部分重叠，其中电极线包括在与玻璃料重叠的交叉区域中的至少一个开口。

FIG. 1

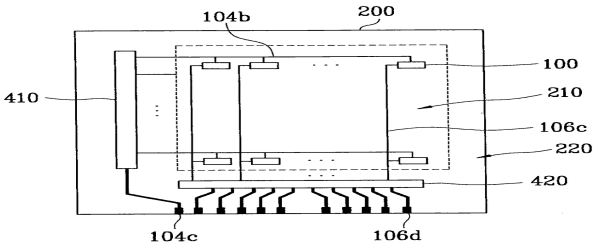

FIG. 2A

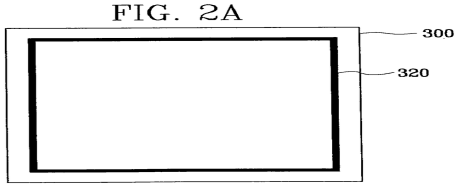

FIG. 2B