US 20200043995A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2020/0043995 A1**

XIE et al. (43) **Pub. Date: Feb. 6, 2020**

(54) **TOP-EMISSION TYPE OLED DISPLAY PANEL AND MANUFACTURING METHOD THEREOF**

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(21) Appl. No.: **16/395,740**

(22) Filed: **Apr. 26, 2019**

(30) **Foreign Application Priority Data**

Aug. 2, 2018 (CN) 201810873612.X

Publication Classification

(51) **Int. Cl.**

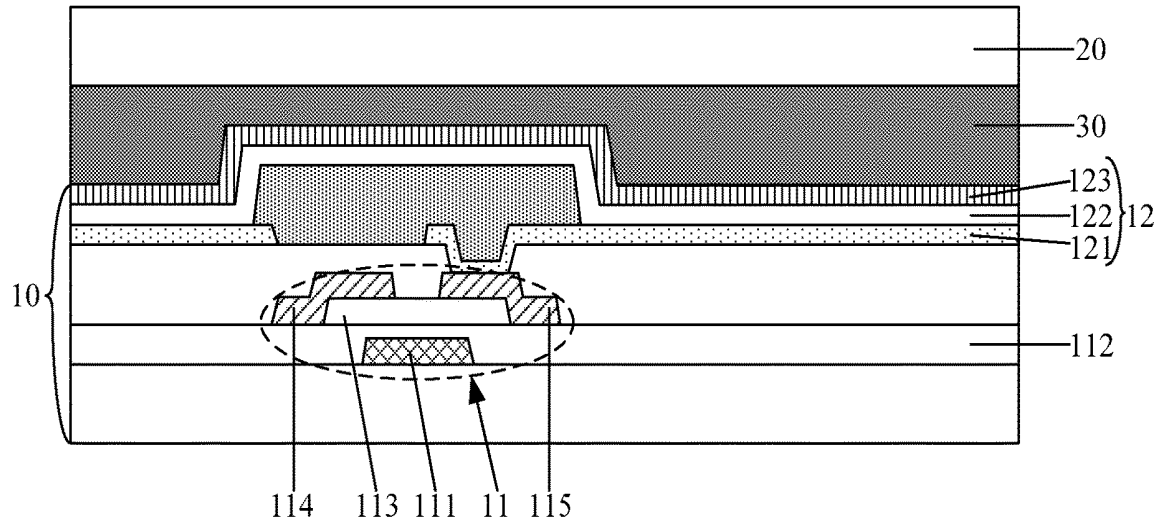
H01L 27/32	(2006.01)
H01L 51/50	(2006.01)
H01L 51/52	(2006.01)

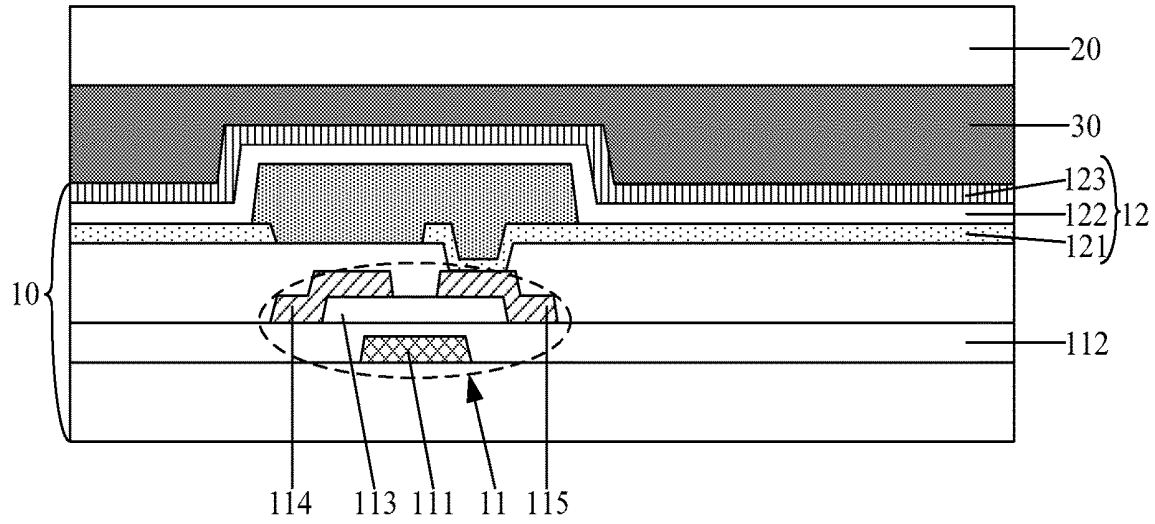
(52) **U.S. Cl.**

CPC ***H01L 27/3244*** (2013.01); ***H01L 51/5012*** (2013.01); *H01L 2251/5315* (2013.01); *H01L 2227/323* (2013.01); ***H01L 51/5246*** (2013.01)

(57) **ABSTRACT**

Embodiments of the present disclosure provide a top-emission type OLED display panel and a manufacturing method thereof. The top-emission type OLED display panel comprises an array substrate and an encapsulating cover plate, wherein the array substrate includes OLED light emitting devices which comprise a light emitting function layer, a first electrode layer disposed on a side of the light emitting function layer proximate to the encapsulating cover plate, and a second electrode disposed on a side of the light emitting function layer distal to the first electrode layer. The top-emission type OLED display panel further comprises a transparent conductive adhesive filled between the array substrate and the encapsulating cover plate, for adhering the array substrate and the encapsulating cover plate; and the transparent conductive adhesive is in direct contact with the first electrode layer.




20
30
123
122
121
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111
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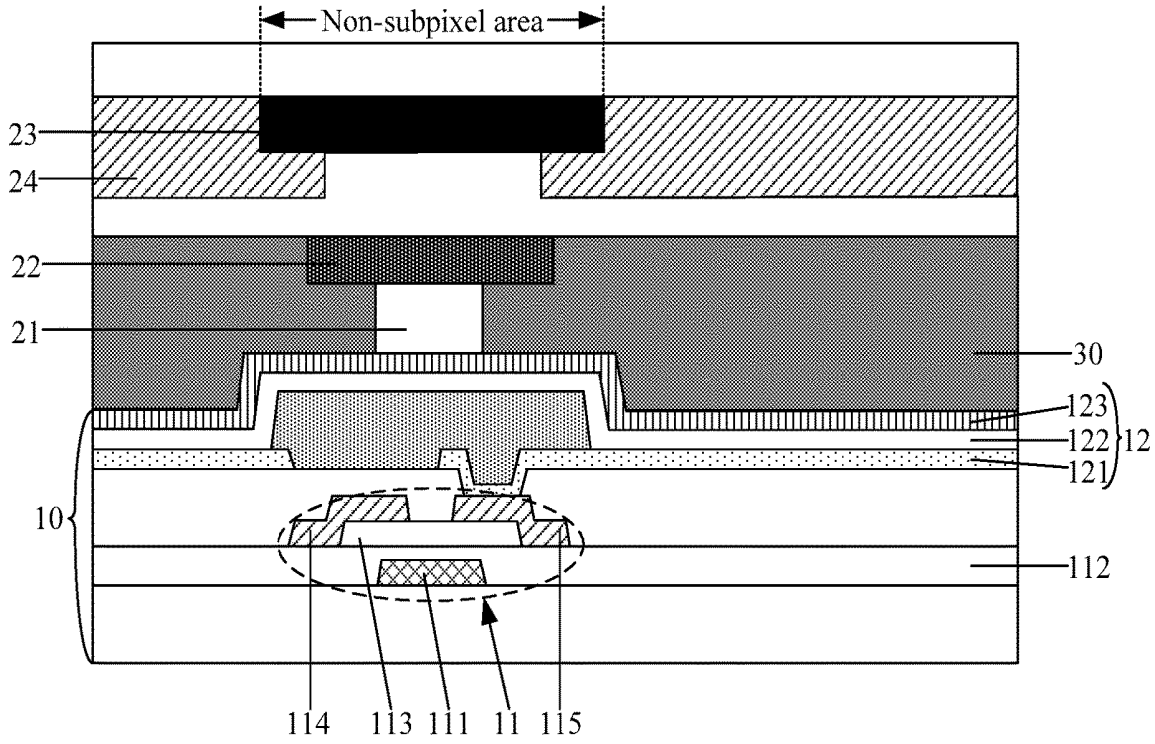
115

FIG. 1


Non-subpixel area
23
24
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115

FIG. 2

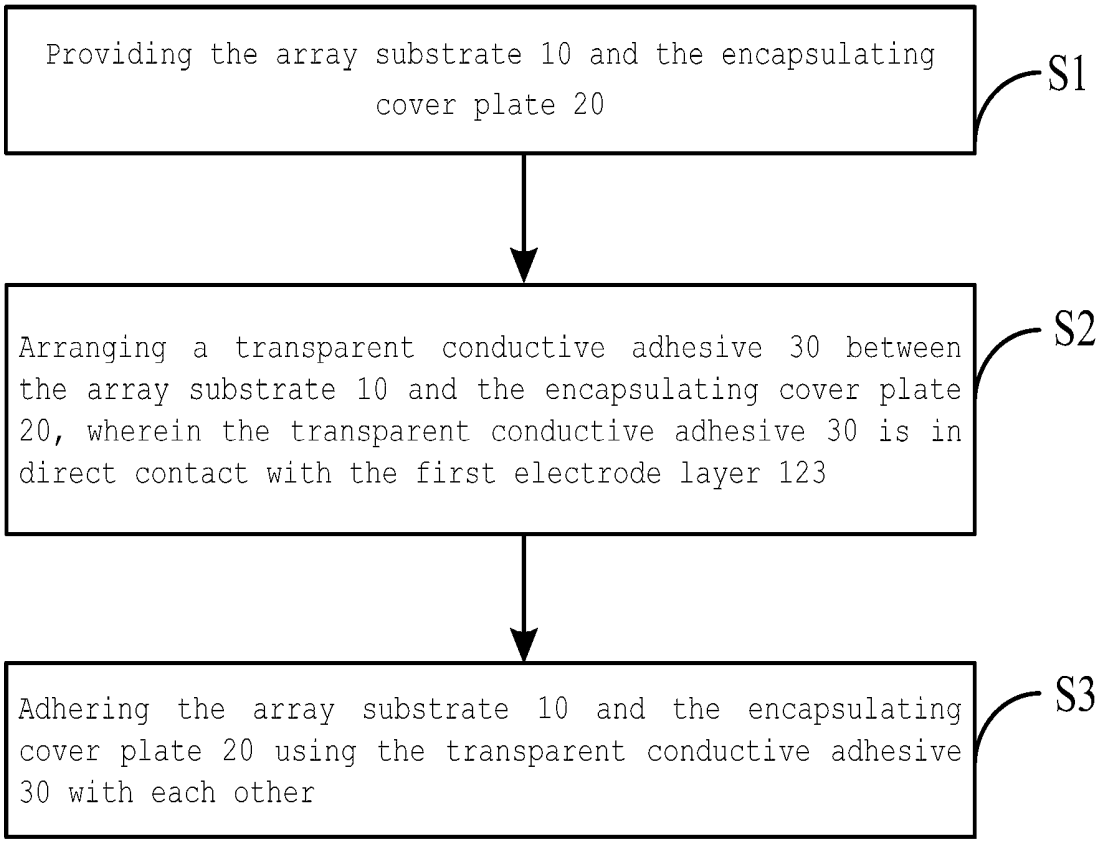

FIG. 3

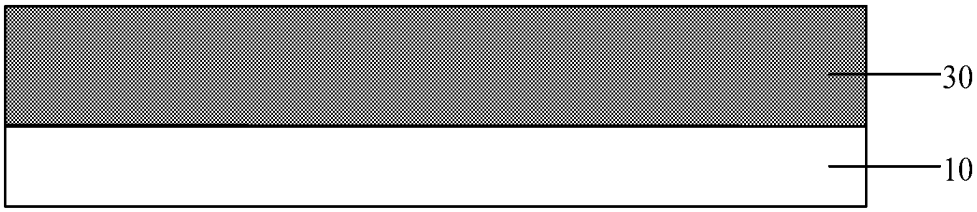

FIG. 4

FIG. 5

TOP-EMISSION TYPE OLED DISPLAY PANEL AND MANUFACTURING METHOD THEREOF

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present application claims priority to Chinese Patent Application No. 201810873612.X filed on Aug. 2, 2018, the entirety of which is hereby incorporated by reference as a part of this application.

TECHNICAL FIELD

[0002] The present disclosure relates to a top-emission type OLED display panel and a manufacturing method thereof.

BACKGROUND

[0003] Organic Light Emitting Display (OLED) is one of the dominant research subjects in the current display field. As compared with a liquid crystal display, the OLED display has advantages such as low power consumption, self-emission, low production cost, wide viewing angle and fast response speed. At present, for products such as mobile phones, personal digital assistants (PDA), tablets and digital cameras, the OLED display has gradually replaced the conventional liquid crystal display.

SUMMARY

[0004] Embodiments of the present disclosure provide a top-emission type OLED display panel comprising an array substrate and an encapsulating cover plate, wherein the array substrate includes OLED light emitting devices which comprise a light emitting function layer, a first electrode layer disposed on a side of the light emitting function layer proximate to the encapsulating cover plate, and a second electrode disposed on a side of the light emitting function layer distal to the first electrode layer. The top-emission type OLED display panel further comprises a transparent conductive adhesive filled between the array substrate and the encapsulating cover plate, for adhering the array substrate and the encapsulating cover plate; and the transparent conductive adhesive is in direct contact with the first electrode layer.

[0005] In one or more embodiments of the present disclosure, the encapsulating cover plate includes a plurality of subpixel areas, and non-subpixel areas between the adjacent subpixel areas, and the non-subpixel areas of the encapsulating cover plate are provided with spacers and conductive layers; wherein the conductive layer is in direct contact with the transparent conductive adhesive.

[0006] In one or more embodiments of the present disclosure, the conductive layer is disposed on a side of the spacer proximate to the array substrate; or the conductive layer is disposed on a side of the spacer distal to the array substrate.

[0007] In one or more embodiments of the present disclosure, the material of the conductive layer includes metal.

[0008] In one or more embodiments of the present disclosure, the transparent conductive adhesive includes resin, and conductive particles doped in the resin; or, the transparent conductive adhesive is a conductive polymer having adhesivity.

[0009] In one or more embodiments of the present disclosure, the conductive particles include at least one of graphene, carbon nanotubes, C60, metal nanoparticles, or metal nanowires.

[0010] In one or more embodiments of the present disclosure, the conductive polymer includes polythiophene.

[0011] On the other hand, the present disclosure provides a manufacturing method of a top-emission type OLED display panel, comprising an array substrate and an encapsulating cover plate, wherein the array substrate includes OLED light emitting devices which comprise a light emitting function layer, a first electrode layer disposed on a side of the light emitting function layer proximate to the encapsulating cover plate, and a second electrode disposed on a side of the light emitting function layer distal to the first electrode layer, wherein the manufacturing method comprises: providing the array substrate and the encapsulating cover plate; arranging a transparent conductive adhesive between the array substrate and the encapsulating cover plate, wherein the transparent conductive adhesive is in direct contact with the first electrode layer; adhering the array substrate and the encapsulating cover plate with each other using the transparent conductive adhesive.

[0012] In one or more embodiments of the present disclosure, the transparent conductive adhesive is formed on the encapsulating cover plate.

[0013] In one or more embodiments of the present disclosure, the encapsulating cover plate includes a plurality of subpixel areas, and non-subpixel areas between the adjacent subpixel areas, and the method further comprises: forming spacers and conductive layers in the non-subpixel area of the encapsulating cover plate; wherein the conductive layer is in direct contact with the transparent conductive adhesive.

[0014] Further, in one or more embodiments of the present disclosure, the step of forming spacers and conductive layers in the non-subpixel area of the encapsulating cover plate includes: sequentially forming the spacer and the conductive layer in the non-subpixel area of the encapsulating cover plate; or, sequentially forming the conductive layer and the spacer in the non-subpixel area of the encapsulating cover plate.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] In order to more clearly explain the embodiments of the present disclosure or the technical solutions in the relevant art, a brief introduction will be given below for the drawings required to be used in the description of the embodiments or the relevant art. It is obvious that, the drawings illustrated as follows are merely some of the embodiments of the present disclosure. For those skilled in the art, they may also acquire other drawings according to such drawings on the premise that no inventive effort is involved.

[0016] FIG. **1** is a schematic structural view of a top-emission type OLED display panel according to an embodiment of the present disclosure;

[0017] FIG. **2** is a schematic structural view of a top-emission type OLED display panel according to an embodiment of the present disclosure;

[0018] FIG. **3** is a flow chart of a manufacturing method of a top-emission type OLED display panel according to an embodiment of the present disclosure;

[0019] FIG. **4** is a schematic view of a method of forming a transparent conductive adhesive according to an embodiment of the present disclosure;

[0020] FIG. **5** is a schematic view of a method of forming a transparent conductive adhesive according to an embodiment of the present disclosure.

DETAILED DESCRIPTION

[0021] Next, the technical solution in the embodiments of the present disclosure will be explicitly and completely described in combination with the drawings in the embodiments of the present disclosure. Apparently, the described embodiments are merely part of the embodiments of the present disclosure, rather than all the embodiments. On the basis of the embodiments of the present disclosure, all the other embodiments acquired by a person skilled in the art on the premise that no inventive effort is involved fall into the scope protected by the present disclosure.

[0022] One of the light emission modes of the OLED display is top-emission. The light exiting direction of the top-emission is a direction in which the array substrate is directed to the encapsulating cover plate. It is required that the transparency of the cathode material be as high as possible, otherwise, the display brightness of the display panel can be affected. Therefore, in order to improve the light transmittance of the cathode, the thickness of the cathode has to be made very thin. However, the thinner the thickness of the cathode is, the greater the resistance thereof will be. When there is an excessive resistance of the cathode, on one hand, the charging rate of the pixels in the OLED display can be slowed down, which affects the refreshing rate of the display screen of the OLED display, thereby affecting the viewing experience of the user On the other hand, in the case where the current is the same, there is an excessive voltage drop (IR drop) of the cathode, thereby affecting the display performance of the display panel.

[0023] Embodiments of the present disclosure provide a top-emission type OLED display panel comprising an array substrate **10** and an encapsulating cover plate **20** as shown in FIG. **2**, wherein the array substrate **10** includes an OLED light emitting device **12** which comprises a light emitting function layer **122**, a first electrode layer **123** disposed on one side of the light emitting function layer **122** proximate to the encapsulating cover plate **20**, and a second electrode **121** disposed on one side of the light emitting function layer **122** distal to the first electrode layer **123**. The top-emission type OLED display panel further comprises a transparent conductive adhesive **30** filled between the array substrate **10** and the encapsulating cover plate **20**, for adhering the array substrate **10** and the encapsulating cover plate **20**; wherein the transparent conductive adhesive **30** is in direct contact with the first electrode layer **123**.

[0024] The transparent conductive adhesive **30** according to an embodiment of the present disclosure can not only cell-align the array substrate **10** with the encapsulating cover plate **20**, but also has certain conductivity.

[0025] On such basis, the array substrate **10** further includes a substrate, and a thin film transistor **11** disposed on the substrate. The thin film transistor **11** includes a gate **111**, a gate insulating layer **112**, an active layer **113**, a source **114**, and a drain **115**. The second electrode layer **121** of the OLED light emitting device **12** can be comprised of a plurality of block-shaped electrodes, and each of the block-shaped electrodes is electrically connected to the drain **115** of the thin film transistor **11** corresponding thereto. The first electrode layer **123** can be a cathode of the OLED light emitting device **12**, and the second electrode layer **121** is an anode of the OLED light emitting device **12**.

[0026] The top-emission type OLED display panel can further comprise a color filter layer and a black matrix. As shown in FIG. **3**, the color filter layer **24** and the black matrix **23** are disposed on the encapsulating cover plate **20**.

[0027] It should be noted that the material of the transparent conductive adhesive **30** is not limited as long as it has a certain light transmittance, adhesivity, and conductivity.

[0028] By way of example, the transparent conductive adhesive **30** includes resin and conductive particles doped in the resin. In order to make the conductive property of the transparent conductive adhesive **30** to be the same at each position, the conductive particles are uniformly doped in the resin. The conductive particles can be at least one of graphene, carbon nanotubes, C60, metal nanoparticles, and metal nanowires.

[0029] The transparent conductive adhesive **30** can also be an adhesive conductive polymer. For example, the transparent conductive adhesive **30** can be polythiophene. Before polymerization, the thiophene monomer has a certain fluidity, so that the thiophene monomer solution is coated on the encapsulating cover plate **20**. After that, the thiophene monomer is subjected to ultraviolet irradiation and thermal treatment to prompt a polymerization reaction between the thiophene monomers to generate a polythiophene solid. Then, the array substrate **10** and the encapsulating cover plate **20** are attached with each other. After the polythiophene solid is cooled and cured, the cell-alignment of the array substrate **10** with the encapsulating cover plate **20** is completed.

[0030] Of course, in order to make the parallel resistance of the first electrode layer **123** and the transparent conductive adhesive **30** as small as possible, a material having a small resistivity is selected as the material of the transparent conductive adhesive **30** without changing the shape and size of the transparent conductive adhesive **30**.

[0031] The material of the first electrode layer **123** is not limited, and the material of the first electrode layer **123** can be metal such as silver (Ag), aluminum (Al), calcium (Ca), indium (In), lithium (Li), magnesium (Mg). The material of the first electrode layer **123** can be a transparent conductive material such as ITO or Indium Zinc Oxide (IZO).

[0032] Embodiments of the present disclosure provide a top-emission type OLED display panel. By making the transparent conductive adhesive **30** in direct contact with the first electrode layer **123** in the OLED light emitting device **12**, on the one hand, since the parallel resistance of the transparent conductive adhesive **30** and the first electrode layer **123** is smaller than the resistance of the first electrode layer **123**, in the case where the first electrode layer **123** is thin, it is possible to avoid the problems that the refreshing rate of the display screen is slowed down and there is an excessive IR drop of the first electrode layer **123** resulting from an excessive resistance of the first electrode layer **123** and to improve the user's experience. On the other hand, since the transparent conductive adhesive **30** of the present application is used to adhere the array substrate **10** and the encapsulating cover plate **20**, the transparent conductive adhesive **30** should be in direct contact with the first electrode layer **123**, and thus it is unnecessary to electrically connect the transparent conductive adhesive **30** to the first

electrode layer **123** using a manner of laser drilling or a bridging process, thereby avoiding the problem of a reduced yield of the top-emission type OLED display panel resulting from excessive difficulties in the laser drilling process or the bridging process. On the other hand, embodiments of the present disclosure do not need to add an additional structure in the top-emission type OLED panel so that it is electrically connected with the first electrode layer **123**. Therefore, it is possible to simplify the steps of a process of manufacturing the top-emission type OLED display panel, and it is also possible to avoid fracture of ITO4 connecting the cathode **1** and the auxiliary electrode **2**, and affect the display effect.

[0033] In one or more embodiments of the present disclosure, as shown in FIG. **3**, the encapsulating cover plate **20** includes a plurality of subpixel areas, and non-subpixel areas between adjacent said subpixel areas. The non-subpixel areas of the encapsulating cover plate **20** are provided with a spacer **21** and a conductive layer **22**. The conductive layer **22** is in direct contact with the transparent conductive adhesive **30**.

[0034] It should be noted that, as shown in FIG. **3**, the encapsulating cover plate **20** further includes a black matrix **23** and a color filter layer **24**. In a display area of the top-emission type OLED display panel, the area in which the black matrix **23** is located is a non-subpixel area of the encapsulating cover plate **20**, and the area other than the non-subpixel area is a subpixel area.

[0035] The projections of the spacer **21** and the conductive layer **22** on the black matrix **23** can be the same or different, as long as the projections of the spacer **21** and the conductive layer **22** on the black matrix **23** are both located within the range of the black matrix **23**, and the conductive layer **22** is in direct contact with the transparent conductive adhesive **30**.

[0036] The conductive layer **22** can be disposed on one side of the spacer **21** proximate to the array substrate **10** or the conductive layer **22** can also be disposed on one side of the spacer **21** distal to the array substrate **10**.

[0037] When the conductive layer **22** is disposed on one side of the spacer **21** distal to the array substrate, the spacer **21** does not completely cover the conductive layer **22**, so that the conductive layer **22** is in direct contact with the transparent conductive adhesive **30**.

[0038] The shape of the conductive layer **22** is not limited, and the conductive layer **22** can be comprised of a plurality of block-shaped conductive blocks or a plurality of conductive strips.

[0039] The material of the conductive layer **22** is not limited, and the material of the conductive layer **22** can be a transparent conductive material such as IZO or ITO, or can be metal.

[0040] Since the conductive layer **22** is disposed in the non-subpixel area of the encapsulating cover plate **20**, even if the material of the conductive layer **22** is metal, the normal display of the top-emission type OLED display panel cannot be affected.

[0041] Here, since metal has a toughness greater than that of the transparent conductive material, and metal typically has a resistivity smaller than that of the transparent conductive material, in one or more embodiments of the present disclosure, the material of the conductive layer **22** is metal.

[0042] In embodiments of the present disclosure, by providing the conductive layer **22** in the non-subpixel area of the encapsulating cover plate **20**, and making the conductive layer **22** in direct contact with the transparent conductive adhesive **30**, in this way, with respect to the parallel resistance of the first electrode layer **123** and the transparent conductive adhesive **30**, the parallel resistance of the first electrode layer **123**, the transparent conductive adhesive **30**, and the conductive layer **22** can be further reduced, thereby further reducing the IR drop of the first electrode layer **123**, and improving the refreshing rate of the display screen, so as to improve the user's experience.

[0043] Embodiments of the present disclosure provide a manufacturing method of a top-emission type OLED display panel. As shown in FIG. **1**, the top-emission type OLED display panel comprises a light emitting function layer **122**, a first electrode layer **123** disposed on one side of the light emitting function layer **122** proximate to the encapsulating cover plate **20**, and a second electrode **121** disposed on one side of the light emitting function layer **122** distal to the first electrode layer **123**. Moreover, as shown in the flow chart of FIG. **3**, the manufacturing method comprises the following steps: S**1** providing the array substrate **10** and the encapsulating cover plate **20**; S**2** arranging a transparent conductive adhesive **30** between the array substrate **10** and the encapsulating cover plate **20**, wherein the transparent conductive adhesive **30** is in direct contact with the first electrode layer **123**; S**3** adhering the array substrate **10** and the encapsulating cover plate **20** with each other using the transparent conductive adhesive **30**.

[0044] It should be noted that the material of the transparent conductive adhesive **30** is not limited as long as it has a certain light transmittance, adhesivity, and conductivity.

[0045] By way of example, the transparent conductive adhesive **30** includes resin and conductive particles doped in the resin. In order to make the conductive property of the transparent conductive adhesive **30** to be the same at each position, the conductive particles are uniformly doped in the resin. The conductive particles can be at least one of graphene, carbon nanotubes, C60, metal nanoparticles, and metal nanowires.

[0046] The transparent conductive adhesive **30** can also be an adhesive conductive polymer. For example, the transparent conductive adhesive **30** can be polythiophene. Before polymerization, the thiophene monomer has a certain fluidity, so that the thiophene monomer solution is coated on the encapsulating cover plate **20**. After that, the thiophene monomer is subjected to ultraviolet irradiation and thermal treatment to prompt a polymerization reaction between the thiophene monomers to generate a polythiophene solid. Then, the array substrate **10** and the encapsulating cover plate **20** are attached with each other. After the polythiophene solid is cooled and cured, the cell-alignment of the array substrate **10** with the encapsulating cover plate **20** is completed.

[0047] In order to make the parallel resistance of the first electrode layer **123** and the transparent conductive adhesive **30** as small as possible, a material having a small resistivity can be selected as the material of the transparent conductive adhesive **30** without changing the shape and size of the transparent conductive adhesive **30**.

[0048] The material of the first electrode layer **123** is not limited, and the material of the first electrode layer **123** can be metal such as silver (Ag), aluminum (Al), calcium (Ca), indium (In), lithium (Li), magnesium (Mg). The material of the first electrode layer **123** can be a transparent conductive material such as ITO or Indium Zinc Oxide (IZO).

[0049] When the top-emission type OLED display panel is manufactured, as shown in FIG. **4**, the transparent conductive adhesive **30** can be formed on the array substrate **10**. As shown in FIG. **5**, the transparent conductive adhesive **30** can also be formed on the encapsulating cover plate **20**.

[0050] Considering that a light-emitting function layer **122** is provided on the array substrate, the light-emitting function layer **122** is susceptible to an external environment such as high temperature so that its light-emitting property is affected. Therefore, in one or more embodiments of the present disclosure, the transparent conductive adhesive **30** is formed on the encapsulating cover plate **20**.

[0051] Embodiments of the present disclosure provide a manufacturing method of a top-emission type OLED display panel. By making the transparent conductive adhesive **30** in direct contact with the first electrode layer **123** in the OLED light emitting device **12**, on the one hand, since the parallel resistance of the transparent conductive adhesive **30** and the first electrode layer **123** is smaller than the resistance of the first electrode layer **123**, in the case where the first electrode layer **123** is thin, it is possible to avoid the problems that the refreshing rate of the display screen is slowed down and there is an excessive IR drop of the first electrode layer **123** resulting from an excessive resistance of the first electrode layer **123** and to improve the user's experience. On the other hand, since the transparent conductive adhesive **30** of the present application is used to adhere the array substrate **10** and the encapsulating cover plate **20**, the transparent conductive adhesive **30** should be in direct contact with the first electrode layer **123**. Accordingly, it is unnecessary to electrically connect the transparent conductive adhesive **30** to the first electrode layer **123** using a manner of laser drilling or a bridging process, thereby avoiding the problem of a reduced yield of the top-emission type OLED display panel resulting from excessive difficulties in the laser drilling process or the bridging process. On the other hand, embodiments of the present disclosure do not need to add an additional structure in the top-emission type OLED panel so that it is electrically connected with the first electrode layer **123**. Therefore, it is possible to simplify the steps of a process of manufacturing the top-emission type OLED display panel, and it is also possible to avoid fracture of ITO4 connecting the cathode **1** and the auxiliary electrode **2**, and affect the display effect.

[0052] In one or more embodiments of the present disclosure, as shown in FIG. **3**, the encapsulating cover plate **20** includes a plurality of subpixel areas, and non-subpixel areas between adjacent said subpixel areas. The method further comprises: forming a spacer **21** and a conductive layer **22** in the non-subpixel areas of the encapsulating cover plate **20**, wherein the conductive layer **22** is in direct contact with the transparent conductive adhesive **30**.

[0053] It should be noted that, as shown in FIG. **3**, the encapsulating cover plate **20** further includes a black matrix **23** and a color filter layer **24**. In a display area of the top-emission type OLED display panel, the area in which the black matrix **23** is located is a non-subpixel area of the encapsulating cover plate **20**, and the area other than the non-subpixel area is a subpixel area.

[0054] The projections of the spacer **21** and the conductive layer **22** on the black matrix **23** can be the same or different, as long as the projections of the spacer **21** and the conductive layer **22** on the black matrix **23** are both located within the range of the black matrix **23**, and the conductive layer **22** is in direct contact with the transparent conductive adhesive **30**.

[0055] The step of forming a spacer **21** and a conductive layer **22** in the non-subpixel areas of the encapsulating cover plate **20** includes: sequentially forming a spacer **21** and a conductive layer **22** in the non-subpixel areas of the encapsulating cover plate **20**; or, sequentially forming a conductive layer **22** and a spacer **21** in the non-subpixel areas of the encapsulating cover plate **20**. Here, the spacer **21** and the conductive layer **22** are both formed on one side of the encapsulating cover plate **20** proximate to the array substrate **10**.

[0056] When the conductive layer **22** and the spacer **21** are sequentially formed in a non-subpixel area of the encapsulating cover plate **20**, the spacer **21** does not completely cover the conductive layer **22**, so that the conductive layer **22** is in direct contact with the transparent conductive adhesive **30**.

[0057] The shape of the conductive layer **22** is not limited, and the conductive layer **22** can be comprised of a plurality of block-shaped conductive blocks or a plurality of conductive strips.

[0058] The material of the conductive layer **22** is not limited, and the material of the conductive layer **22** can be a transparent conductive material such as IZO or ITO, or can be metal.

[0059] Since the conductive layer **22** is disposed in the non-subpixel area of the encapsulating cover plate **20**, even if the material of the conductive layer **22** is metal, the normal display of the top-emission type OLED display panel cannot be affected.

[0060] Here, since metal has a toughness greater than that of the transparent conductive material, and metal typically has a resistivity smaller than that of the transparent conductive material, in one or more embodiments of the present disclosure, the material of the conductive layer **22** is metal.

[0061] In embodiments of the present disclosure, by providing the conductive layer **22** in the non-subpixel area of the encapsulating cover plate **20**, and making the conductive layer **22** in direct contact with the transparent conductive adhesive **30**, in this way, with respect to the parallel resistance of the first electrode layer **123** and the transparent conductive adhesive **30**, the parallel resistance of the first electrode layer **123**, the transparent conductive adhesive **30**, and the conductive layer **22** can be further reduced, thereby further reducing the IR drop of the first electrode layer **123**, and improving the refreshing rate of the display screen, so as to improve the user's experience.

[0062] The foregoing descriptions are merely the embodiments of the present disclosure, but the protection scope of the present disclosure is not limited thereto. Anyone skilled in the art may easily anticipate a variation or a replacement within the technical scope disclosed by the present disclosure, which should all within the protection scope of the present disclosure. Thus, the protection scope of the present disclosure should be determined by the protection scope of the claims.

What is claimed is:

1. A top-emission type OLED display panel, comprising an array substrate and an encapsulating cover plate, wherein the array substrate includes OLED light emitting devices which comprise a light emitting function layer, a first electrode layer disposed on a side of the light emitting

function layer proximate to the encapsulating cover plate, and a second electrode disposed on a side of the light emitting function layer distal to the first electrode layer,

the top-emission type OLED display panel further comprises a transparent conductive adhesive filled between the array substrate and the encapsulating cover plate, for adhering the array substrate and the encapsulating cover plate; and

the transparent conductive adhesive is in direct contact with the first electrode layer.

2. The top-emission type OLED display panel according to claim **1**, wherein the encapsulating cover plate includes a plurality of subpixel areas, and non-subpixel areas between adjacent subpixel areas, and the non-subpixel areas of the encapsulating cover plate are provided with spacers and conductive layers;

wherein the conductive layers are in direct contact with the transparent conductive adhesive.

3. The top-emission type OLED display panel according to claim **2**, wherein the conductive layers are disposed on a side of the spacers proximate to the array substrate; or the conductive layers are disposed on a side of the spacers distal to the array substrate.

4. The top-emission type OLED display panel according to claim **2**, wherein a material of the conductive layers includes metal.

5. The top-emission type OLED display panel according to claim **1**, wherein the transparent conductive adhesive includes resin, and conductive particles doped in the resin;

or, the transparent conductive adhesive is a conductive polymer having adhesivity.

6. The top-emission type OLED display panel according to claim **5**, wherein the conductive particles include at least one of graphene, carbon nanotubes, C60, metal nanoparticles, or metal nanowires.

7. The top-emission type OLED display panel according to claim **5**, wherein the conductive polymer includes polythiophene.

8. A manufacturing method of a top-emission type OLED display panel, comprising an array substrate and an encapsulating cover plate, wherein the array substrate includes OLED light emitting devices which comprise a light emitting function layer, a first electrode layer disposed on a side of the light emitting function layer proximate to the encapsulating cover plate, and a second electrode disposed on a side of the light emitting function layer distal to the first electrode layer, wherein the manufacturing method comprises:

providing the array substrate and the encapsulating cover plate;

arranging a transparent conductive adhesive between the array substrate and the encapsulating cover plate, wherein the transparent conductive adhesive is in direct contact with the first electrode layer;

adhering the array substrate and the encapsulating cover plate with each other using the transparent conductive adhesive.

9. The manufacturing method of a top-emission type OLED display panel according to claim **8**, wherein arranging a transparent conductive adhesive between the array substrate and the encapsulating cover plate includes arranging the transparent conductive adhesive on the encapsulating cover plate or arranging the transparent conductive adhesive on the array substrate.

10. The manufacturing method of a top-emission type OLED display panel according to claim **8**, wherein the encapsulating cover plate includes a plurality of subpixel areas, and non-subpixel areas between adjacent subpixel areas, the method further comprising:

forming spacers and conductive layers in the non-subpixel areas of the encapsulating cover plate;

wherein the conductive layers are in direct contact with the transparent conductive adhesive.

11. The manufacturing method of a top-emission type OLED display panel according to claim **10**, wherein the step of forming spacers and conductive layers in the non-subpixel area of the encapsulating cover plate includes:

sequentially forming the spacers and the conductive layers in the non-subpixel areas of the encapsulating cover plate;

or, sequentially forming the conductive layers and the spacers in the non-subpixel areas of the encapsulating cover plate.

* * * * *

专利名称(译)	顶发光型OLED显示面板及其制造方法		
公开(公告)号	US20200043995A1	公开(公告)日	2020-02-06
申请号	US16/395740	申请日	2019-04-26
[标]申请(专利权)人(译)	京东方科技集团股份有限公司		
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IPC分类号	H01L27/32 H01L51/50 H01L51/52		
CPC分类号	H01L2251/5315 H01L2251/5369 H01L51/5246 H01L27/3244 H01L51/5012 H01L2227/323 H01L27/3246 H01L27/3279 H01L51/5228 H01L51/5234 H01L51/5253		
优先权	201810873612.X 2018-08-02 CN		
外部链接	Espacenet USPTO		

摘要(译)

本公开的实施例提供了一种顶部发光型OLED显示面板及其制造方法。顶部发光型OLED显示面板包括阵列基板和封装盖板，其中，阵列基板包括OLED发光器件，该OLED发光器件包括发光功能层，设置在发光功能层一侧的第一电极层。 第二电极设置在封装盖板上，第二电极设置在发光功能层的远离第一电极层的一侧。 顶部发光型OLED显示面板还包括透明导电胶，其填充在阵列基板和封装盖板之间，用于粘合阵列基板和封装盖板。 透明导电胶与第一电极层直接接触。