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(54) **INK JET PRINTING ORGANIC LIGHT EMITTING DIODE DISPLAY PANEL AND MANUFACTURING METHOD THEREOF**

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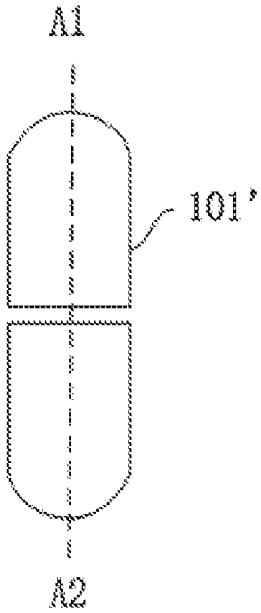
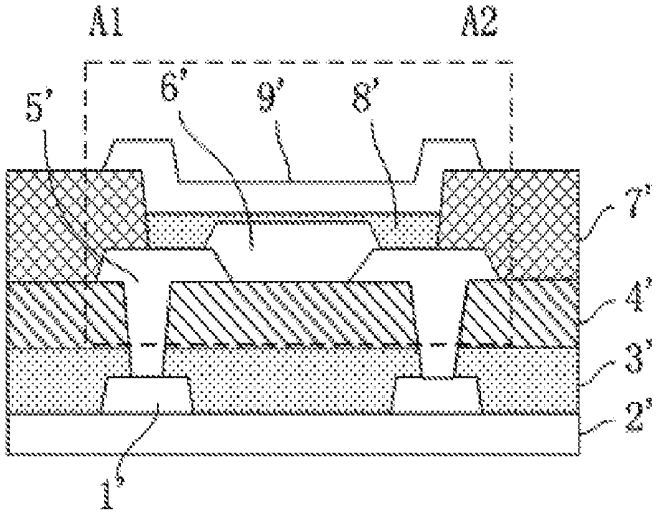
(57) **ABSTRACT**

Provided are an ink jet printing organic light emitting diode display panel and a manufacturing method thereof. The method includes: sequentially forming a passivation layer and a planarization layer on a carrier substrate prepared with one pair of thin film transistors, wherein the passivation layer covers the one pair of thin film transistors; forming one pair of vias in the passivation layer and the planarization layer; forming one pair of anodes on the planarization layer, wherein the one pair of anodes are electrically connected to the one pair of thin film transistors through the one pair of vias in the passivation layer and the planarization layer; preparing an electrode separation layer between the one pair of anodes with Al_2O_3 or an organic photoresist material; forming a light emitting layer over the one pair of anodes by ink jet printing, wherein the light emitting layer covers the electrode separation layer.





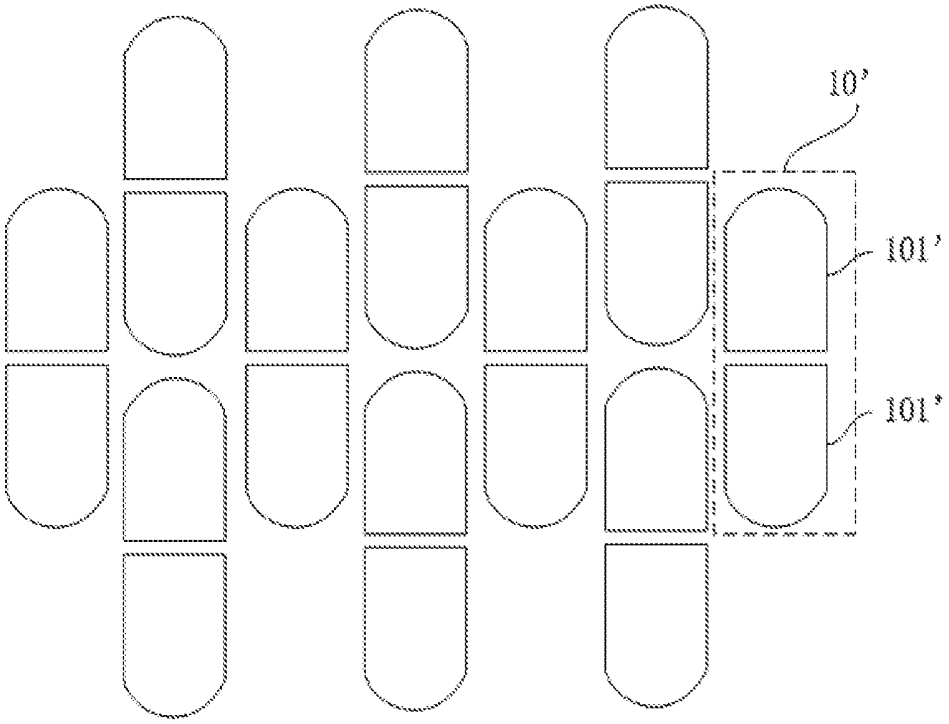


FIG. 1

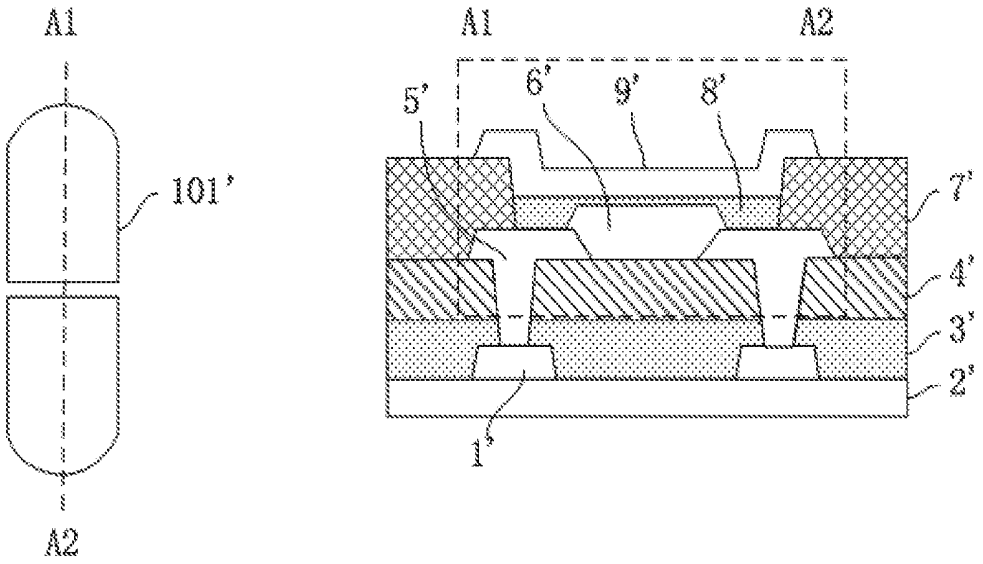


FIG. 2

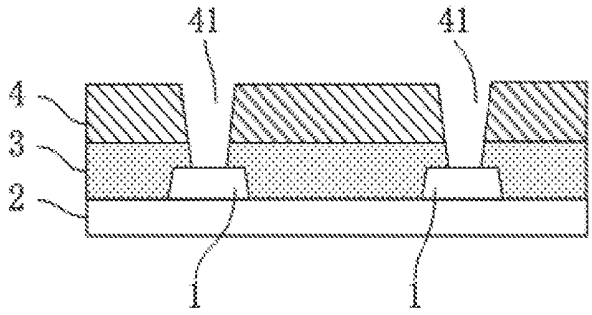


FIG. 3

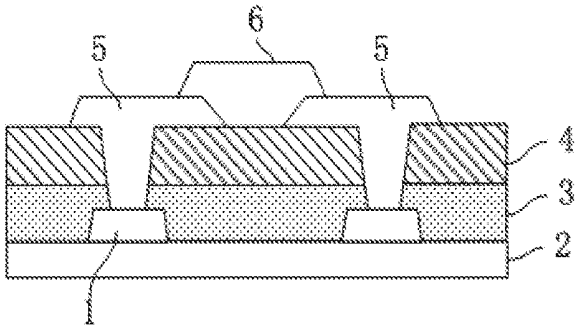


FIG. 4

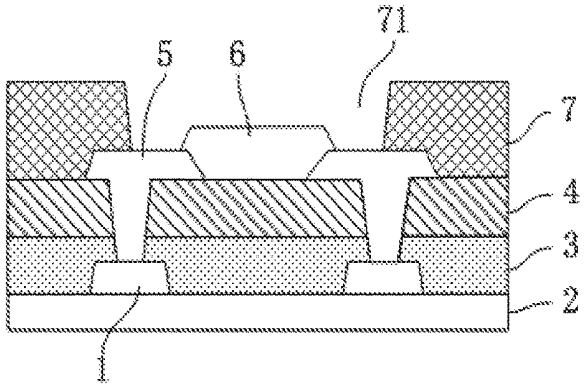


FIG. 5

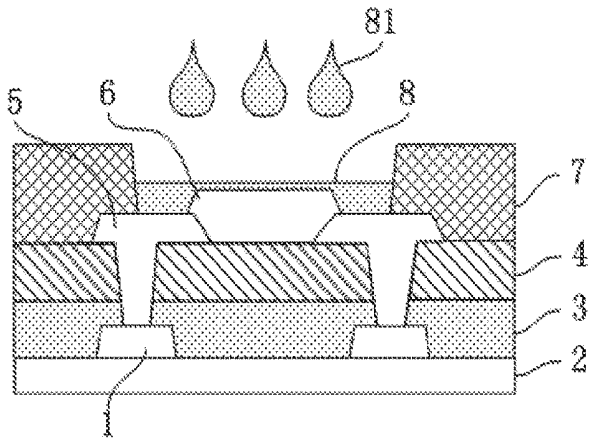


FIG. 6

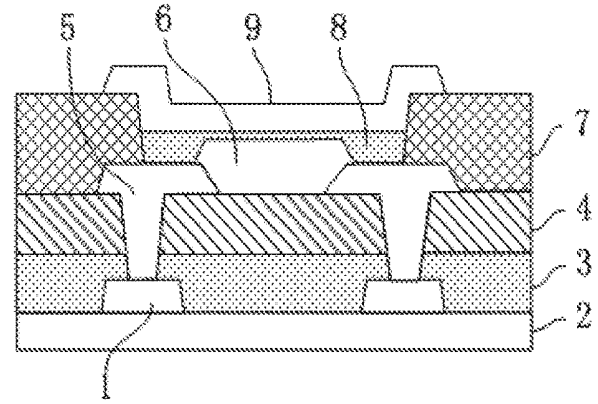


FIG. 7

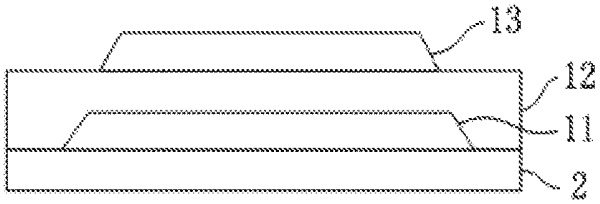


FIG. 8

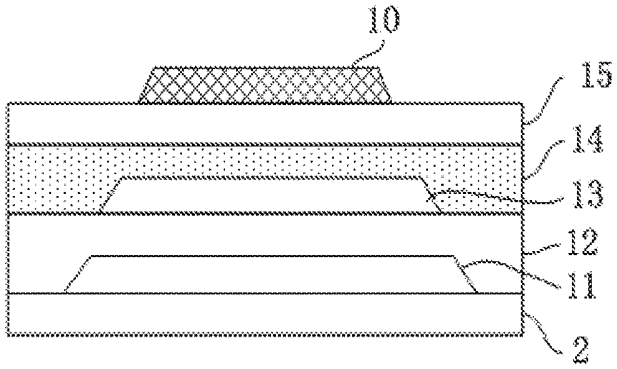


FIG. 9

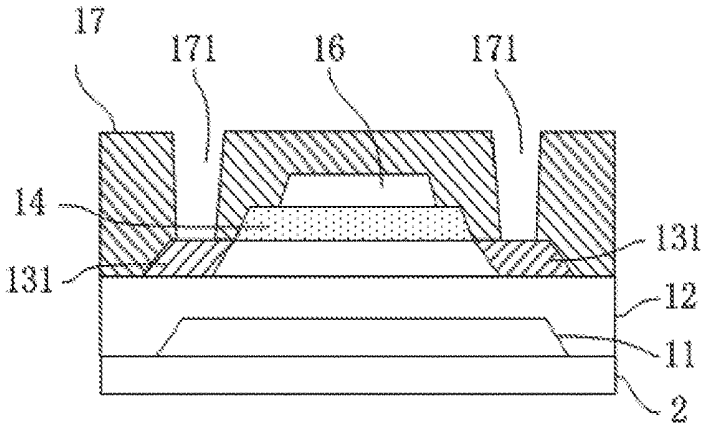


FIG. 10

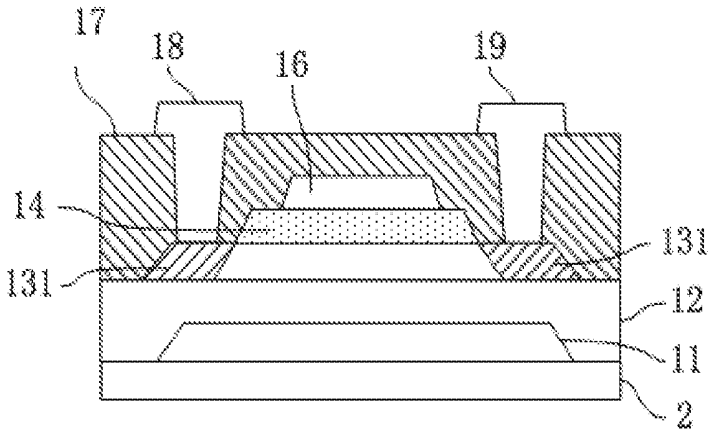


FIG. 11

INK JET PRINTING ORGANIC LIGHT EMITTING DIODE DISPLAY PANEL AND MANUFACTURING METHOD THEREOF

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application is a continuing application of PCT Patent Application No. PCT/CN2018/078999 entitled "Ink jet printing organic light emitting diode display panel and manufacturing method thereof", filed on Mar. 14, 2018, which claims priority to Chinese Patent Application No. 201810020262.2, filed on Jan. 9, 2018, both of which are hereby incorporated in its entireties by reference.

FIELD OF THE INVENTION

[0002] The present invention relates to a display field, and more particularly to an ink jet printing organic light emitting diode display panel and a manufacturing method thereof.

BACKGROUND OF THE INVENTION

[0003] As manufacturing an OLED (Organic Light-Emitting Diode) display panel, an OLED display panel pixel is prepared by an IJP (ink-jet printing) process. The OLED display panel is referred as an ink-jet printing OLED display panel. In order to reduce the difficulty of the IJP process, a 2 in 1 pixel structure is designed. As shown in FIG. **1**, one pixel **10'** of an ink-jet printing OLED display panel includes two sub pixels **101'**. Such design can utilize the space more effectively to improve the resolution; meanwhile, the design can accomplish the preparation of 2 sub pixels in one printing and can improve the preparation efficiency of the sub pixels.

[0004] For printing two sub pixels at one time, a SiO process is introduced as an electrode separation layer in addition to the array substrate process. As shown in FIG. **2**, the two anodes **5'** and the light emitting layers **8'** over the two anodes **5'** constitute two sub pixels **101'**, together. The electrode separation layer **6'** is configured between the two anodes **5'**. The number **9'** indicates a cathode. The numbers **1'**, **2'**, **3'**, **4'** and **7'** respectively indicate a thin film transistor, a substrate, a passivation layer, a planarization layer and a pixel definition layer. With verification, the SiO process will cause degradation of thin film transistors.

SUMMARY OF THE INVENTION

[0005] For solving the aforesaid technical issue, the present invention provides an ink jet printing organic light emitting diode display panel and a manufacturing method thereof, which can improve performance of thin film transistors in the ink jet printing organic light emitting diode display panel without reducing the mobility of the thin film transistors, and can also effectively suppress the threshold voltage drift.

[0006] The present invention provides a manufacturing method of an ink jet printing organic light emitting diode display panel, comprising steps of:

[0007] sequentially forming a passivation layer and a planarization layer on a carrier substrate prepared with at least one pair of thin film transistors, wherein the passivation layer covers the at least one pair of thin film transistors;

[0008] forming at least one pair of vias in the passivation layer and the planarization layer;

[0009] forming at least one pair of anodes on the planarization layer, wherein the at least one pair of anodes are electrically connected to the at least one pair of thin film transistors through the at least one pair of vias in the passivation layer and the planarization layer;

[0010] preparing an electrode separation layer between the at least one pair of anodes with Al_2O_3 or an organic photoresist material;

[0011] forming a light emitting layer over the at least one pair of anodes by ink jet printing, wherein the light emitting layer covers the electrode separation layer.

[0012] Preferably, before the step of forming the light emitting layer over the at least one pair of anodes, the manufacturing method further comprises steps of:

[0013] forming a pixel definition layer on the planarization layer, wherein the planarization layer covers the at least one pair of anodes;

[0014] patterning the pixel definition layer by photolithography to expose the electrode separation layer and the at least one pair of anodes.

[0015] Preferably, the pixel definition layer comprises at least one photoresist layer, and a thickness range of the pixel definition layer is from 10,000 angstroms to 20,000 angstroms.

[0016] Preferably, the manufacturing method further comprises a step of:

[0017] preparing a cathode on the light emitting layer.

[0018] Preferably, a thickness range of the passivation layer is from 1,000 angstroms to 5,000 angstroms, and the passivation layer comprises at least one layer of SiOx and/or SiNx;

[0019] a thickness range of the planarization layer is from 10,000 angstroms to 20,000 angstroms, and a material of the planarization layer is a photoresist material.

[0020] Preferably, the step of forming the at least one pair of anodes on the planarization layer comprises:

[0021] forming a conductive film material layer on the planarization layer, wherein a thickness range of the conductive film material layer is from 500 angstroms to 1,000 angstroms;

[0022] patterning the conductive film material layer by photolithography to obtain the at least one pair of anodes.

[0023] Preferably, the step of preparing the electrode separation layer between the at least one pair of anodes with Al_2O_3 or the organic photoresist material comprises:

[0024] depositing Al_2O_3 by atomic layer deposition or coating at least one organic photoresist material between the at least one pair of anodes;

[0025] patterning the deposited Al_2O_3 or the organic photoresist material by photolithography.

[0026] The present invention further provides a manufacturing method of an ink jet printing organic light emitting diode display panel, comprising steps of:

[0027] sequentially forming a passivation layer and a planarization layer on a carrier substrate prepared with at least one pair of thin film transistors, wherein the passivation layer covers the at least one pair of thin film transistors;

[0028] forming at least one pair of vias in the passivation layer and the planarization layer;

[0029] forming at least one pair of anodes on the planarization layer, wherein the at least one pair of anodes are electrically connected to the at least one pair of thin film transistors through the at least one pair of vias in the passivation layer and the planarization layer;

[0030] preparing an electrode separation layer between the at least one pair of anodes with Al_2O_3 or an organic photoresist material;

[0031] forming a light emitting layer over the at least one pair of anodes by ink jet printing, wherein the light emitting layer covers the electrode separation layer;

[0032] preparing a cathode on the light emitting layer.

[0033] Preferably, before the step of forming the light emitting layer over the at least one pair of anodes, the manufacturing method further comprises steps of:

[0034] forming a pixel definition layer on the planarization layer, wherein the planarization layer covers the at least one pair of anodes;

[0035] patterning the pixel definition layer by photolithography to expose the electrode separation layer and the at least one pair of anodes.

[0036] Preferably, the pixel definition layer comprises at least one photoresist layer, and a thickness range of the pixel definition layer is from 10,000 angstroms to 20,000 angstroms.

[0037] Preferably, a thickness range of the passivation layer is from 1,000 angstroms to 5,000 angstroms, and the passivation layer comprises at least one layer of SiOx and/or SiNx;

[0038] a thickness range of the planarization layer is from 10,000 angstroms to 20,000 angstroms, and a material of the planarization layer is a photoresist material.

[0039] Preferably, the step of forming the at least one pair of anodes on the planarization layer comprises:

[0040] forming a conductive film material layer on the planarization layer, wherein a thickness range of the conductive film material layer is from 500 angstroms to 1,000 angstroms;

[0041] patterning the conductive film material layer by photolithography to obtain the at least one pair of anodes.

[0042] Preferably, the step of preparing the electrode separation layer between the at least one pair of anodes with Al_2O_3 or the organic photoresist material comprises:

[0043] depositing Al_2O_3 by atomic layer deposition or coating at least one organic photoresist material between the at least one pair of anodes;

[0044] patterning the deposited Al_2O_3 or the organic photoresist material by photolithography.

[0045] The present invention further provides an ink jet printing organic light emitting diode display panel, comprising: at least one pair of thin film transistors, and a passivation layer and a planarization layer, which are sequentially formed on the at least one pair of thin film transistors, wherein at least one pair of vias are arranged in the passivation layer and the planarization layer, and the at least one pair of vias are arranged in the passivation layer and the planarization layer are located on the at least one pair of thin film transistors;

[0046] at least one pair of anodes are arranged on the planarization layer, and the at least one pair of anodes are electrically connected to the at least one pair of thin film transistors through the at least one pair of vias in the passivation layer and the planarization layer;

[0047] an electrode separation layer is arranged between the at least one pair of anodes, and a material of the electrode separation layer is Al_2O_3 or an organic photoresist material.

[0048] Preferably, a pixel definition layer is further formed on the planarization layer, an opening is arranged in the pixel defining layer, and the opening is located above the at least one pair of anodes;

[0049] a light emitting layer is arranged in the opening of the pixel definition layer, and the light emitting layer covers the electrode separation layer;

[0050] a cathode is arranged on the light emitting layer.

[0051] Preferably, the pixel definition layer comprises at least one photoresist layer, and a thickness range of the pixel definition layer is from 10,000 angstroms to 20,000 angstroms;

[0052] a thickness range of the passivation layer is from 1,000 angstroms to 5,000 angstroms, and the passivation layer comprises at least one layer of SiOx and/or SiNx;

[0053] a thickness range of the planarization layer is from 10,000 angstroms to 20,000 angstroms, and a material of the planarization layer is a photoresist material.

[0054] The implementation of the present invention possesses the benefits: as an ink jet printing organic light emitting diode display panel is manufactured, an electrode separation layer is prepared between the two of anodes in the same pixel with Al2O3 or the organic photoresist material. The Al2O3 or the organic photoresist material will not influence the formation of the light emitting layer by ink jet printing. Since the Al_2O_3 and organic photoresist materials do not contain hydrogen bonds and hydrogen ions and do not reduce the mobility of thin film transistors, and can also effectively suppress the threshold voltage drift, thus do not cause degradation of thin film transistors in the ink jet printing organic light emitting diode display panel and extend the service lifetime of the ink jet printing organic light emitting diode display panel.

BRIEF DESCRIPTION OF THE DRAWINGS

[0055] In order to more clearly illustrate the embodiments of the present invention or prior art, the following figures will be described in the embodiments are briefly introduced. It is obvious that the drawings are merely some embodiments of the present invention, those of ordinary skill in this field can obtain other figures according to these figures without paying the premise.

[0056] FIG. **1** is a diagram of a pixel structure in an ink jet printing organic light emitting diode display panel provided by the present invention.

[0057] FIG. **2** is a sectional diagram of a pixel provided by the present invention.

[0058] FIG. **3** is a diagram of a passivation layer and a planarization layer formed on a thin film transistor provided by the present invention.

[0059] FIG. **4** is a diagram of anodes and an electrode separation layer formed on a planarization layer provided by the present invention.

[0060] FIG. **5** is a diagram of a pixel definition layer formed on a planarization layer provided by the present invention.

[0061] FIG. **6** is a diagram of preparation of a light emitting layer provided by the present invention.

[0062] FIG. **7** is a diagram of preparation of a cathode provided by the present invention.

[0063] FIG. **8** is a diagram of preparation of a light shielding layer, a buffer layer and a semiconductor layer provided by the present invention.

[0064] FIG. **9** is a diagram of a gate insulation layer, a gate metal layer and a photoresist layer provided by the present invention.

[0065] FIG. **10** is a diagram of an interlayer insulation layer provided by the present invention.

[0066] FIG. **11** is a structural diagram f a thin film transistor provided by the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0067] The present invention provides a manufacturing method of an ink jet printing organic light emitting diode display panel, comprising steps of:

[0068] as shown in FIG. **3**, sequentially forming a passivation layer **3** and a planarization layer **4** on a carrier substrate **2** prepared with at least one pair of thin film transistors **1**, wherein the passivation layer **3** covers the at least one pair of thin film transistors **1**;

[0069] forming at least one pair of vias **41** in the passivation layer **3** and the planarization layer **4**;

[0070] as shown in FIG. **4**, forming at least one pair of anodes **5** on the planarization layer **4**, wherein the at least one pair of anodes **5** are electrically connected to the at least one pair of thin film transistors **1** through the at least one pair of vias **41** in the passivation layer **3** and the planarization layer **4**;

[0071] preparing an electrode separation layer **6** between the at least one pair of anodes **5** with Al_2O_3 or an organic photoresist material;

[0072] forming a light emitting layer **8** over the at least one pair of anodes **5** by ink jet printing, wherein the light emitting layer **8** covers the electrode separation layer **6**.

[0073] Furthermore, before the step of forming the light emitting layer **8** over the at least one pair of anodes **5**, the manufacturing method further comprises steps of:

[0074] as shown in FIG. **5**, forming a pixel definition layer **7** on the planarization layer **4**, wherein the planarization layer **4** covers the at least one pair of anodes **5**;

[0075] patterning the pixel definition layer **7** by photolithography to expose the electrode separation layer **6** and the at least one pair of anodes **5**.

[0076] The pixel definition layer **7** comprises at least one photoresist layer, and a thickness range of the pixel definition layer **7** is from 10,000 angstroms to 20,000 angstroms.

[0077] As shown in FIG. **6**, the light emitting layer **8** is formed over the at least one pair of anodes **5** by ink jet printing. The number **81** is a liquid of anode material.

[0078] Furthermore, the manufacturing method of the ink jet printing organic light emitting diode display panel further comprises a step of: as shown in FIG. **7**, preparing a cathode **9** on the light emitting layer **8**.

[0079] Furthermore, a thickness range of the passivation layer **3** is from 1,000 angstroms to 5,000 angstroms, and the passivation layer **3** comprises at least one layer of SiOx and/or SiNx; a thickness range of the planarization layer **4** is from 10,000 angstroms to 20,000 angstroms, and a material of the planarization layer **4** is a photoresist material.

[0080] Furthermore, the step of forming the at least one pair of anodes **5** on the planarization layer **4** comprises:

[0081] forming a conductive film material layer on the planarization layer **4**, wherein a thickness range of the conductive film material layer is from 500 angstroms to 1,000 angstroms;

[0082] patterning the conductive film material layer by photolithography to obtain the at least one pair of anodes **5**.

[0083] Furthermore, the step of preparing an electrode separation layer **6** between the at least one pair of anodes **5** with Al_2O_3 or the organic photoresist material comprises:

[0084] depositing Al_2O_3 or coating of at least one organic photoresist material between the at least one pair of anodes **5** by atomic layer deposition;

[0085] patterning the deposited Al_2O_3 or the organic photoresist material by photolithography.

[0086] Specifically, in the case of patterning the pixel definition layer by photolithography, generally, a photoresist is first coated on the film layer, and then exposure and development are performed by photolithography, and the photoresist layer exposed by the exposure and development is used as a stopper layer for etching the patterned film layer.

[0087] The present invention further provides an ink jet printing organic light emitting diode display panel. As shown in FIG. **7**, the display panel comprises: at least one pair of thin film transistors **1**, and a passivation layer **3** and a planarization layer **4**, which are sequentially formed on the at least one pair of thin film transistors **1**, wherein at least one pair of vias are arranged in the passivation layer **3** and the planarization layer **4**, and the at least one pair of vias are arranged in the passivation layer **3** and the planarization layer **4** are located on the at least one pair of thin film transistors **1**;

[0088] at least one pair of anodes **5** are arranged on the planarization layer **4**, and the at least one pair of anodes **5** are electrically connected to the at least one pair of thin film transistors **1** through the at least one pair of vias in the passivation layer **3** and the planarization layer **4**;

[0089] an electrode separation layer **6** is arranged between the at least one pair of anodes **5**, and a material of the electrode separation layer **6** is Al_2O_3 or an organic photoresist material.

[0090] Furthermore, a pixel definition layer **7** is further formed on the planarization layer **4**, an opening **71** shown in FIG. **5** is arranged in the pixel defining layer **7**, and the opening **71** is located above the at least one pair of anodes **5**.

[0091] A light emitting layer **8** is arranged in the opening **71** of the pixel definition layer **7**, and the light emitting layer **8** covers the electrode separation layer **6**; a cathode **9** is arranged on the light emitting layer **8**.

[0092] Furthermore, the pixel definition layer **7** comprises at least one photoresist layer, and a thickness range of the pixel definition layer **7** is from 10,000 angstroms to 20,000 angstroms; a thickness range of the passivation layer **3** is from 1,000 angstroms to 5,000 angstroms, and the passivation layer **3** comprises at least one layer of SiOx and/or SiNx; a thickness range of the planarization layer **4** is from 10,000 angstroms to 20,000 angstroms, and a material of the planarization layer **4** is a photoresist material.

[0093] In another embodiment provided by the present invention, the manufacturing method of an ink jet printing organic light emitting diode display panel, comprising steps of:

[0094] 1. cleaning the glass substrate **2**, as shown in FIG. **8**, and depositing a layer of metal with a thickness of 500 angstroms to 2,000 angstroms on the glass substrate **2** as the light shielding layer **11** of the thin film transistor **1**. The metal of the light shielding layer **11** may be Mo, Al, Cu, Ti or an alloy of these metals, such as, one of molybdenum

alloy, aluminum alloy, copper alloy and titanium alloy. Photolithography is used for patterning.

[0095] 2. depositing a layer of SiOx film as a buffer layer **12** with a thickness of 1,000 angstroms to 5,000 angstroms.

[0096] 3. depositing a layer of metal oxide semiconductor (Oxide) as a semiconductor layer **13**, which can be IGZO (Indium Gallium Zinc Oxide), IZTO (Indium Zinc Tin Oxide), IGZTO (Indium Gallium Zinc Tin Oxide) with a thickness of 100 angstroms to 1,000 angstroms. Photolithography is used for patterning.

[0097] 4. as shown in FIG. **9**, depositing a layer of SiOx thin film as the gate insulation layer **14** with a thickness of 1,000 angstroms to 3,000 angstroms.

[0098] 5. depositing a layer of metal as the gate metal layer **15**, which can be Mo, Al, Cu, Ti or an alloy of these metals with a thickness of 2,000 angstroms to 8,000 angstroms.

[0099] 6. forming the photoresist layer on the gate metal layer **15** and utilizing photolithography to obtain the patterned photoresist layer **10** in FIG. **9**, and then employing the photoresist layer **10** as the stopper layer to etch and form the pattern of the gate metal layer **15**, and then employing the gate metal pattern **16** in FIG. **10** for self-alignment for etching to form the gate insulation layer **14**. The gate insulation layer **14** only exists under the gate metal pattern **16**. The rest of the gate insulation layer **14** will be etched.

[0100] 7. implementing the plasma process for the entire surface to significantly reduce the resistance of the metal oxide semiconductor material without protection of the gate insulation layer **14** and the gate metal pattern **16** to form the N+ conductor layer **131** as the source contact and the drain contact; the metal oxide semiconductor material under the gate insulation layer **14** is not processed and the semiconductor characteristics are maintained as the channel of the thin film transistor **1**.

[0101] 8. as shown in FIG. **10**, depositing the interlayer insulation layer **17** (ILD layer), which can be a sandwich structure of SiOx, SiNx or SiOx and SiNx. The thickness of the interlayer insulation layer **17** is from 3,000 angstroms to 10,000 angstroms, and the source and drain contact area openings **171** are prepared.

[0102] 9. as shown in FIG. **11**, depositing a layer of metal as the source-drain metal layer, which can be Mo, Al, Cu, Ti or an alloy of these metals with a thickness of 2,000 angstroms to 8,000 angstroms. Then, the pattern is defined to form the source **18** and the drain **19**.

[0103] 10. depositing a SiOx thin film as the passivation layer **3** in FIG. **3** with a thickness of 1,000 angstroms to 5,000 angstroms, and etching a via.

[0104] 11. preparing the planarization layer **4** (PLN layer), which can be a photoresist layer of various compositions with a thickness of 10,000 angstroms to 20,000 angstroms. Vias are formed by photolithography.

[0105] 12. depositing the anodes **5** in FIG. **5**, which can be made of a transparent oxide, such as ITO (Indium Tin Oxide) with a thickness of 500 angstroms to 1,000 angstroms. Photolithography is used for patterning.

[0106] 13. preparing the electrode separation layer **6**, which can have many options but H (hydrogen bonds, hydrogen ions, etc.) cannot be introduced. For instance, a layer of Al_2O_3 can be deposited by atomic layer deposition. Then, the pattern is formed by photolithography: or, organic photoresists of various types are directly coated, and photolithography is used for patterning.

[0107] 14. preparing the pixel definition layer **7** (PDL layer) in FIG. **5**, which can comprise a photoresist layer of various compositions with a thickness of 10,000 angstroms to 20,000 angstroms. The light emitting area is defined by photolithography to complete the production of back plate.

[0108] In conclusion, as an ink jet printing organic light emitting diode display panel is manufactured, an electrode separation layer is prepared between the two of anodes in the same pixel with Al_2O_3 or the organic photoresist material. The Al_2O_3 or the organic photoresist material will not influence the formation of the light emitting layer by ink jet printing. Since the Al_2O_3 and organic photoresist materials do not contain hydrogen bonds and hydrogen ions and do not reduce the mobility of thin film transistors, and can also effectively suppress the threshold voltage drift, thus do not cause degradation of thin film transistors in the ink jet printing organic light emitting diode display panel and extend the service lifetime of the ink jet printing organic light emitting diode display panel.

[0109] The above content with the specific preferred embodiments of the present invention is further made to the detailed description, the specific embodiments of the present invention should not be considered limited to these descriptions. Those of ordinary skill in the art for the present invention, without departing from the spirit of the present invention, can make various simple deductions or replacements, should be deemed to belong to the scope of the present invention.

What is claimed is:

1. A manufacturing method of an ink jet printing organic light emitting diode display panel, comprising steps of:

sequentially forming a passivation layer and a planarization layer on a carrier substrate prepared with at least one pair of thin film transistors, wherein the passivation layer covers the at least one pair of thin film transistors;

forming at least one pair of vias in the passivation layer and the planarization layer;

forming at least one pair of anodes on the planarization layer, wherein the at least one pair of anodes are electrically connected to the at least one pair of thin film transistors through the at least one pair of vias in the passivation layer and the planarization layer;

preparing an electrode separation layer between the at least one pair of anodes with Al_2O_3 or an organic photoresist material;

forming a light emitting layer over the at least one pair of anodes by ink jet printing, wherein the light emitting layer covers the electrode separation layer.

2. The manufacturing method of an ink jet printing organic light emitting diode display panel according to claim **1**, wherein before the step of forming the light emitting layer over the at least one pair of anodes, the manufacturing method further comprises steps of:

forming a pixel definition layer on the planarization layer, wherein the planarization layer covers the at least one pair of anodes;

patterning the pixel definition layer by photolithography to expose the electrode separation layer and the at least one pair of anodes.

3. The manufacturing method of an ink jet printing organic light emitting diode display panel according to claim **2**, wherein

the pixel definition layer comprises at least one photoresist layer, and a thickness range of the pixel definition layer is from 10,000 angstroms to 20,000 angstroms.

4. The manufacturing method of an ink jet printing organic light emitting diode display panel according to claim **1**, further comprising a step of:

preparing a cathode on the light emitting layer.

5. The manufacturing method of an ink jet printing organic light emitting diode display panel according to claim **1**, wherein

a thickness range of the passivation layer is from 1,000 angstroms to 5,000 angstroms, and the passivation layer comprises at least one layer of SiOx and/or SiNx;

a thickness range of the planarization layer is from 10,000 angstroms to 20,000 angstroms, and a material of the planarization layer is a photoresist material.

6. The manufacturing method of an ink jet printing organic light emitting diode display panel according to claim **1**, wherein the step of forming the at least one pair of anodes on the planarization layer comprises:

forming a conductive film material layer on the planarization layer, wherein a thickness range of the conductive film material layer is from 500 angstroms to 1,000 angstroms;

patterning the conductive film material layer by photolithography to obtain the at least one pair of anodes.

7. The manufacturing method of an ink jet printing organic light emitting diode display panel according to claim **1**, wherein the step of preparing the electrode separation layer between the at least one pair of anodes with Al_2O_3 or the organic photoresist material comprises:

depositing Al_2O_3 by atomic layer deposition or coating at least one organic photoresist material between the at least one pair of anodes;

patterning the deposited Al_2O_3 or the organic photoresist material by photolithography.

8. A manufacturing method of an ink jet printing organic light emitting diode display panel, comprising steps of:

sequentially forming a passivation layer and a planarization layer on a carrier substrate prepared with at least one pair of thin film transistors, wherein the passivation layer covers the at least one pair of thin film transistors;

forming at least one pair of vias in the passivation layer and the planarization layer;

forming at least one pair of anodes on the planarization layer, wherein the at least one pair of anodes are electrically connected to the at least one pair of thin film transistors through the at least one pair of vias in the passivation layer and the planarization layer;

preparing an electrode separation layer between the at east one pair of anodes with Al_2O_3 or an organic photoresist material;

forming a light emitting layer over the at least one pair of anodes by ink jet printing, wherein the light emitting layer covers the electrode separation layer;

preparing a cathode on the light emitting layer,

9. The manufacturing method of an ink jet printing organic light emitting diode display panel according to claim **8**, wherein before the step of forming the light emitting layer over the at least one pair of anodes, the manufacturing method further comprises steps of:

forming a pixel definition layer on the planarization layer, wherein the planarization layer covers the at least one pair of anodes;

patterning the pixel definition layer by photolithography to expose the electrode separation layer and the at least one pair of anodes.

10. The manufacturing method of an ink jet printing organic light emitting diode display panel according to claim **9**, wherein

the pixel definition layer comprises at least one photoresist layer, and a thickness range of the pixel definition layer is from 10,000 angstroms to 20,000 angstroms.

11. The manufacturing method of an ink jet printing organic light emitting diode display panel according to claim **8**, wherein

a thickness range of the passivation layer is from 1,000 angstroms to 5,000 angstroms, and the passivation layer comprises at least one layer of SiOx and/or SiNx;

a thickness range of the planarization layer is from 10,000 angstroms to 20,000 angstroms, and a material of the planarization layer is a photoresist material.

12. The manufacturing method of an ink jet printing organic light emitting diode display panel according to claim **8**, wherein the step of forming the at least one pair of anodes on the planarization layer comprises:

forming a conductive film material layer on the planarization layer, wherein a thickness range of the conductive film material layer is from 500 angstroms to 1,000 angstroms;

patterning the conductive film material layer by photolithography to obtain the at least one pair of anodes.

13. The manufacturing method of an ink jet printing organic light emitting diode display panel according to claim **8**, wherein the step of preparing the electrode separation layer between the at least one pair of anodes with Al_2O_3 or the organic photoresist material comprises:

depositing Al_2O_3 by atomic layer deposition or coating at least one organic photoresist material between the at least one pair of anodes;

patterning the deposited Al_2O_3 or the organic photoresist material by photolithography.

14. An ink jet printing organic light emitting diode display panel, comprising: at least one pair of thin film transistors, and a passivation layer and a planarization layer, which are sequentially formed on the at least one pair of thin film transistors, wherein at least one pair of vias are arranged in the passivation layer and the planarization layer, and the at least one pair of vias are arranged in the passivation layer and the planarization layer are located on the at least one pair of thin film transistors;

at least one pair of anodes are arranged on the planarization layer, and the at least one pair of anodes are electrically connected to the at least one pair of thin film transistors through the at least one pair of vias in the passivation layer and the planarization layer;

an electrode separation layer is arranged between the at least one pair of anodes, and a material of the electrode separation layer is Al_2O_3 or an organic photoresist material.

15. The ink jet printing organic light emitting diode display panel according to claim **14**, wherein a pixel definition layer is further formed on the planarization layer, an opening is arranged in the pixel defining layer, and the opening is located above the at least one pair of anodes;

a light emitting layer is arranged in the opening of the pixel definition layer, and the light emitting layer covers the electrode separation layer;

a cathode is arranged on the light emitting layer.

16. The ink jet printing organic light emitting diode display panel according to claim **14**, wherein the pixel definition layer comprises at least one photoresist layer, and a thickness range of the pixel definition layer is from 10,000 angstroms to 20,000 angstroms;

a thickness range of the passivation layer is from 1,000 angstroms to 5,000 angstroms, and the passivation layer comprises at least one layer of SiOx and/or SiNx;

a thickness range of the planarization layer is from 10,000 angstroms to 20,000 angstroms, and a material of the planarization layer is a photoresist material.

* * * * *

专利名称(译)	喷墨打印有机发光二极管显示面板及其制造方法		
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[标]申请(专利权)人(译)	深圳市华星光电技术有限公司		
[标]发明人	LIU ZHAOSONG HSU YUANJUN		
发明人	LIU, ZHAOSONG HSU, YUANJUN		
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摘要(译)

提供一种喷墨打印有机发光二极管显示面板及其制造方法。该方法包括：在用一对薄膜晶体管制备的载体基板上依次形成钝化层和平坦化层，其中钝化层覆盖一对薄膜晶体管;在钝化层和平坦化层中形成一对通孔;在平坦化层上形成一对阳极，其中一对阳极通过钝化层和平坦化层中的一对通孔电连接到一对薄膜晶体管;在具有Al 2 O 3 的一对阳极或有机光致抗蚀剂材料之间制备电极分离层;通过喷墨印刷在所述一对阳极上形成发光层，其中所述发光层覆盖所述电极分离层。