



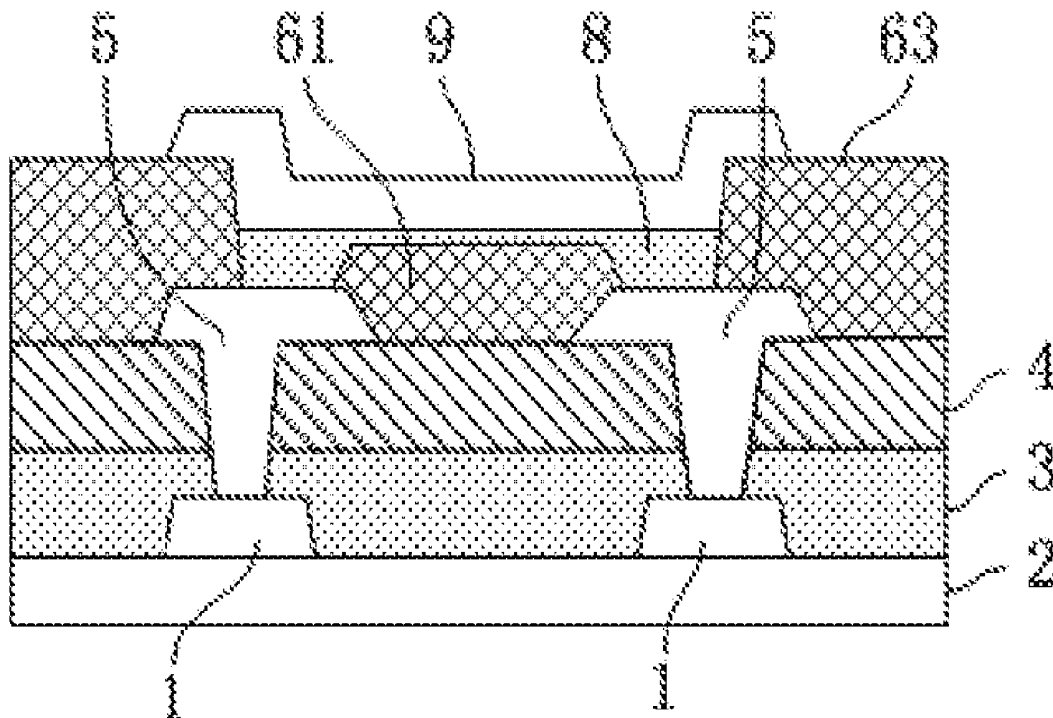
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LIU et al.(10) **Pub. No.: US 2019/0214443 A1**(43) **Pub. Date: Jul. 11, 2019**(54) **INKJET PRINTING OLED DISPLAY PANEL
AND MANUFACTURING METHOD FOR
THE SAME**(71) Applicant: **Shenzhen China Star Optoelectronics
Semiconductor Display Technology
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Zhaosong LIU, Shenzhen (CN)**(21) Appl. No.: **16/009,614**(22) Filed: **Jun. 15, 2018****Related U.S. Application Data**(63) Continuation of application No. PCT/CN2018/
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2251/303 (2013.01); **H01L 2251/308**
(2013.01); **H01L 51/56** (2013.01)(57) **ABSTRACT**

An inkjet printing OLED display panel and manufacturing method are provided. The method includes sequentially forming a passivation layer and a planarization layer on thin-film transistors on a glass substrate, and the passivation layer covers the thin-film transistors; forming vias both at the passivation layer and the planarization layer; forming anodes on the planarization layer, and the anodes are electrically connected to the thin-film transistors through the vias; depositing a pixel definition layer on the planarization layer, and the pixel definition layer covers the anodes; using a half-tone mask to define a pattern of the pixel definition layer such that a region of the pixel definition layer located above the anodes forms a notch, and a height of the pixel definition layer located between the anodes is decreased; using an inkjet printing technology to form a light-emitting layer in the notch of the pixel definition layer.



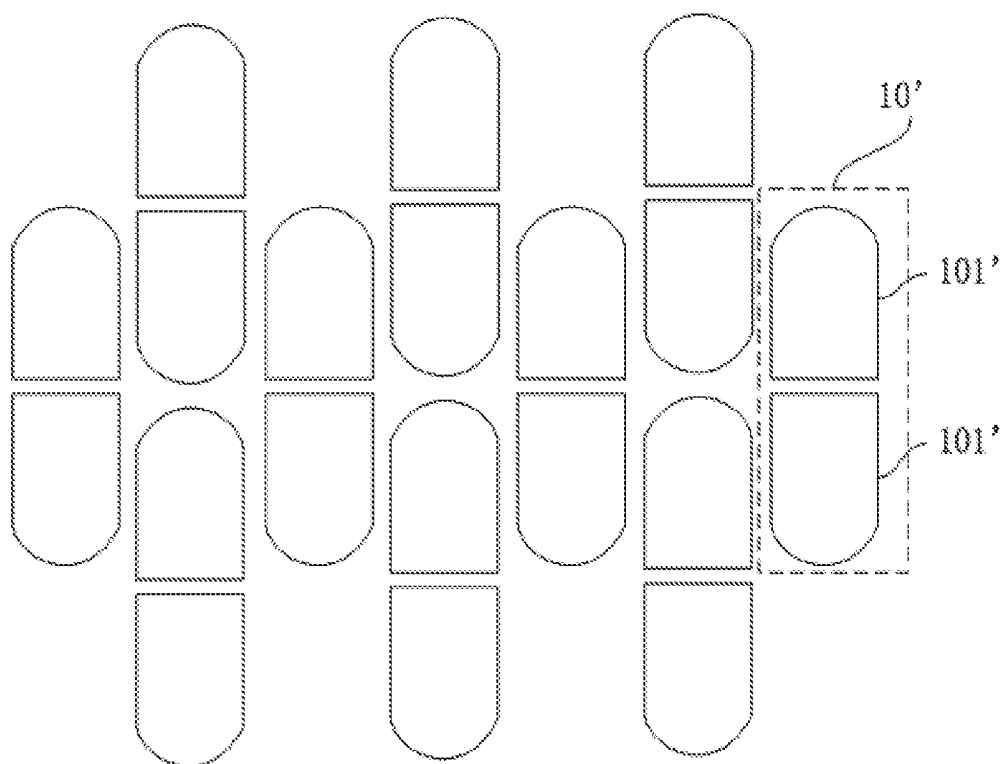


FIG. 1 (Prior art)

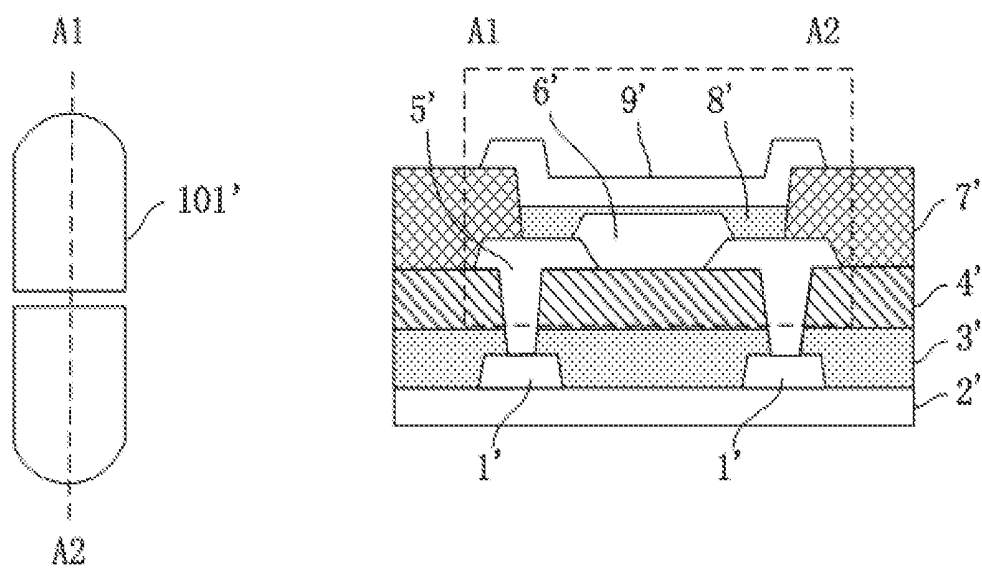


FIG. 2 (Prior art)

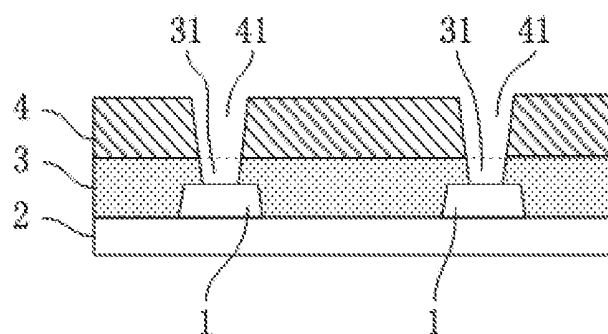


FIG. 3

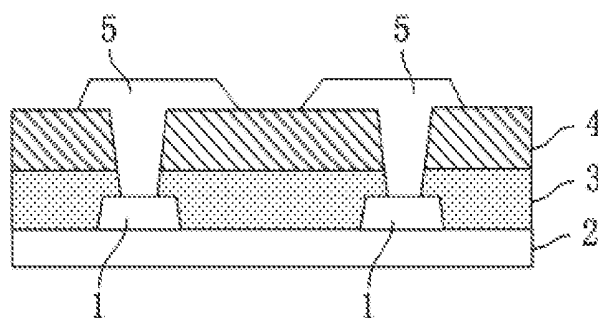


FIG. 4

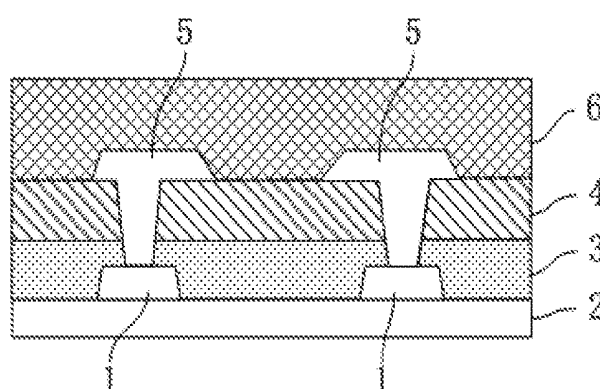


FIG. 5

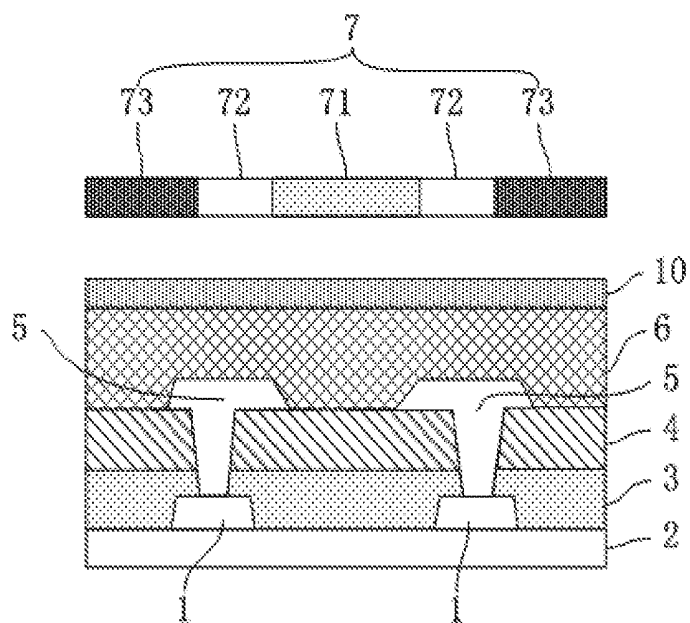


FIG. 6

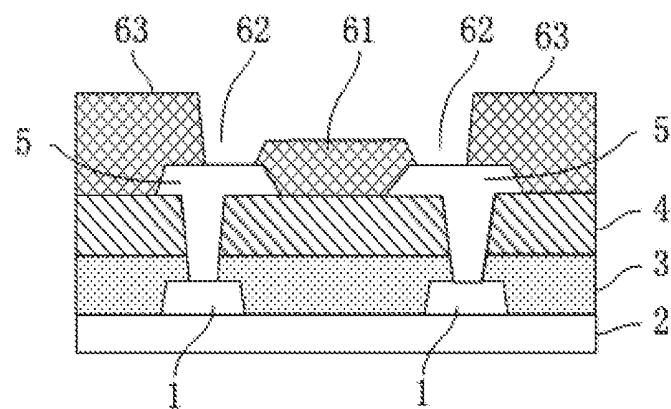


FIG. 7

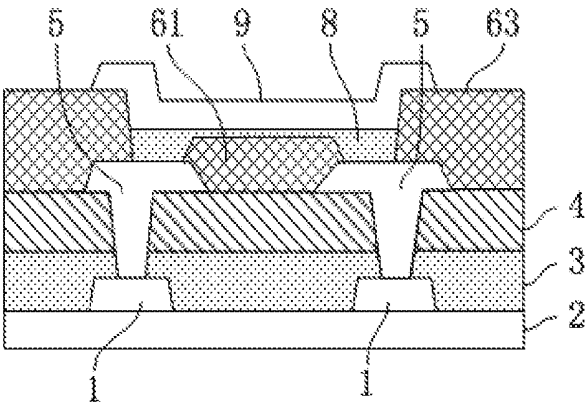


FIG. 8

INKJET PRINTING OLED DISPLAY PANEL AND MANUFACTURING METHOD FOR THE SAME

CROSS REFERENCE

[0001] This application is a continuing application of PCT Patent Application No. PCT/CN2018/079002, entitled “INKJET PRINTING OLED DISPLAY PANEL AND MANUFACTURING METHOD FOR THE SAME”, filed on Mar. 14, 2018, which claims priority to China Patent Application No. CN 201810020268.X filed on Jan. 9, 2018, both of which are hereby incorporated in its entirety by reference.

FIELD OF THE INVENTION

[0002] The present invention relates to a display technology field, and more particularly to an Inkjet printing OLED display panel and a manufacturing method for the same.

BACKGROUND OF THE INVENTION

[0003] In manufacturing an OLED (Organic Light-Emitting Diode) display panel, an inkjet printing technology is adopted to manufacture pixels of the OLED panel. That kind of OLED display panel named the inkjet printing OLED display panel. To decrease the difficulty of the IJP technology, a “2 in 1” pixel structure is designed. The pixel structure is shown in FIG. 1. One pixel 10' of the inkjet printing OLED display panel includes two sub-pixels 101'. The above design can utilize the space more effectively in order to increase the resolution. In another aspect, using one printing to finish the two sub-pixels can increase the manufacturing efficiency for the sub-pixel.

[0004] In order to realize one printing to finish two sub-pixels, except an array process, a SiO process is required to form an electrode spacer layer. Firstly, depositing a SiO layer between anodes. Then, using a mask to define the pattern of the SiO layer as the electrode spacer layer. As shown in FIG. 2, two anodes 5', light-emitting layer 8' located above the two anodes 5' commonly form the two sub-pixels 101'. Between two anodes 5', an electrode spacer 6' is disposed. Numeral 9' is a cathode. Numerals 1', 2', 4', 7' are respectively a thin-film transistor, a substrate, a passivation layer, a planarization layer, and a pixel definition layer. After verification, the SiO process will cause a deterioration of the thin-film transistor.

SUMMARY OF THE INVENTION

[0005] In order to solve the above technology problem, the present invention can provide a manufacturing method for an inkjet printing OLED display panel and a manufacturing method for the same, which can save one mask, improve the performance of the thin-film transistor of the inkjet printing OLED display panel and effectively suppress the drift of the threshold voltage without decreasing the mobility of the thin-film transistor.

[0006] The present invention provides a manufacturing method for an inkjet printing OLED display panel, comprising steps of: sequentially forming a passivation layer and a planarization layer on at least one pair of thin-film transistors on a glass substrate, and the passivation layer covers the at least one pair of thin-film transistors; forming at least one pair of vias both at the passivation layer and the planarization layer; forming at least one pair of anodes on

the planarization layer, wherein the least one pair of anodes are electrically connected to the least one pair of thin-film transistors through the vias at the passivation layer and the planarization layer; depositing a pixel definition layer on the planarization layer, and the pixel definition layer covers the at least one pair of anodes; using a half-tone mask to define a pattern of the pixel definition layer such that a region of the pixel definition layer located above the at least one pair of the anodes forms a notch, and a height of the pixel definition layer 61 located between the least one pair of the anodes is decreased; using an inkjet printing technology to form a light-emitting layer in the notch of the pixel definition layer, and the light-emitting layer covers the pixel definition layer located between the least one pair of anodes.

[0007] Preferably, the method further comprises a step of: manufacturing a cathode on the light-emitting layer.

[0008] Preferably, the step of using a half-tone mask to define a pattern of the pixel definition layer comprises steps of: disposing the half-tone mask to be above the pixel definition layer, a partial-light-transmitting region of the half-tone mask is located above the pixel definition layer located between the at least one pair of anodes, a light-transmitting region of the half-tone mask is located above the at least one pair of anodes, and through a yellow light to define the pattern of the pixel definition layer by the half-tone mask.

[0009] Preferably, the passivation layer includes at least one layer of SiOx and/or at least one layer of SiNx, and a thickness range of the passivation layer is 1000~5000 angstrom; and the planarization layer includes at least one photoresist layer having at least one kind of photoresist, and a thickness range of the planarization layer is 10000~20000 angstrom.

[0010] Preferably, the step of depositing an ITO (Indium Tin Oxide) material layer on the planarization layer, and utilizing the yellow light for patterning the ITO material layer in order to obtain the at least one pair of anodes, wherein a thickness range of the anode 5 is 500~1000 angstrom.

[0011] Preferably, the pixel definition layer includes at least one photoresist layer having at least one kind of photoresist, a thickness range of the pixel definition layer located at two sides of the at least one pair of anodes is 10000~20000 angstrom.

[0012] Preferably, using the yellow light to form at least one pair of vias at the passivation layer and the planarization layer.

[0013] The present invention also provides a manufacturing method for an inkjet printing OLED display panel, comprising steps of: sequentially forming a passivation layer and a planarization layer on at least one pair of thin-film transistors on a glass substrate, and the passivation layer covers the at least one pair of thin-film transistors; forming at least one pair of vias both at the passivation layer and the planarization layer; forming at least one pair of anodes on the planarization layer, wherein the least one pair of anodes are electrically connected to the least one pair of thin-film transistors through the vias at the passivation layer and the planarization layer; depositing a pixel definition layer on the planarization layer, and the pixel definition layer covers the at least one pair of anodes; using a half-tone mask to define a pattern of the pixel definition layer such that a region of the pixel definition layer located above the at least one pair of the anodes forms a notch, and a height of the pixel definition

layer **61** located between the least one pair of the anodes is decreased; using an inkjet printing technology to form a light-emitting layer in the notch of the pixel definition layer, and the light-emitting layer covers the pixel definition layer located between the least one pair of anodes; and manufacturing a cathode on the light-emitting layer.

[0014] Preferably, the step of using a half-tone mask to define a pattern of the pixel definition layer comprises steps of disposing the half-tone mask to be above the pixel definition layer, a partial-light-transmitting region of the half-tone mask is located above the pixel definition layer located between the at least one pair of anodes, a light-transmitting region of the half-tone mask is located above the at least one pair of anodes, and through a yellow light to define the pattern of the pixel definition layer by the half-tone mask.

[0015] Preferably, the passivation layer includes at least one layer of SiO_x and/or at least one layer of SiN_x, and a thickness range of the passivation layer is 1000~5000 angstrom, and the planarization layer includes at least one photoresist layer having at least one kind of photoresist, and a thickness range of the planarization layer is 10000~20000 angstrom.

[0016] Preferably, the step of depositing an ITO (Indium Tin Oxide) material layer on the planarization layer, and utilizing the yellow light for patterning the no material layer in order to obtain the at least one pair of anodes, wherein a thickness range of the anode is 500~1000 Angstrom.

[0017] Preferably, the pixel definition layer includes at least one photoresist layer having at least one kind of photoresist, a thickness range of the pixel definition layer located at two sides of the at least one pair of anodes is 10000~20000 angstrom.

[0018] Preferably, using the yellow light to form at least one pair of vias at the passivation layer and the planarization layer.

[0019] The present invention also provides an inkjet printing OLED display panel, comprising: at least one pair of thin-film transistors; a passivation layer and a planarization layer which are disposed sequentially and stacked above the at least one pair of thin-film transistors, wherein the passivation layer and the planarization layer both provide with at least one pair of vias, the vias at the passivation layer and the vias at the planarization layer are exactly corresponded, and are all located above the at least one pair of thin-film transistors; at least one pair of anodes disposed on the planarization layer, wherein the least one pair of anodes are electrically connected to the least one pair of thin-film transistors through the vias at the passivation layer and the vias at the planarization layer; a pixel definition layer disposed on the planarization layer, wherein the pixel definition layer includes at least one pair of notches, the at least one pair of notches are respectively located above the at least one pair of anodes, a height of the pixel definition layer located between the least one pair of anodes is less than a height of the pixel definition layer located at two sides of the least one pair of anodes; and a light-emitting layer disposed in the at least one pair of notches, and the light-emitting layer covers the pixel definition layer located between the least one pair of anodes.

[0020] Preferably, a cathode is disposed on the light-emitting layer.

[0021] Preferably, the passivation layer includes at least one layer of SiO_x and/or at least one layer of SiN_x, and a

thickness range of the passivation layer is 1000~5000 angstrom; the planarization layer includes at least one photoresist layer having at least one kind of photoresist, and a thickness range of the planarization layer is 10000~20000 angstrom; and the pixel definition layer includes at least one photoresist layer having at least one kind of photoresist, a thickness range of the pixel definition layer located at two sides of the at least one pair of anodes is 10000~20000 angstrom.

[0022] The present invention has following beneficial effect: in the present invention, through forming the passivation layer and a planarization layer on the thin-film transistors, forming the vias at the passivation layer and a planarization layer, forming the anode on the planarization layer, the anode electrically connecting to the thin-film transistor by the vias at the passivation layer and a planarization layer, forming the pixel definition layer on the planarization layer to cover the anode, through using the half-tone mask to define the pattern of the pixel definition layer such that the pixel definition layer located above the anode forms the notch in order to form the light-emitting layer, and decrease the height of the pixel definition layer located between the anodes as an electrode spacer layer of the anode. Accordingly, when defining the pattern of the pixel definition layer in the present invention, the electrode spacer layer of the anode has been formed, a process for forming an electrode spacer layer is not required, depositing a SiO layer between the anodes and using a mask to define a pattern of the SiO layer is not required. Therefore, comparing to the manufacturing method of the conventional inkjet printing OLED display panel, one mask process can be saved in order to save the time and cost for manufacturing the inkjet printing OLED display panel.

[0023] Besides, the electrode spacer layer between the anodes adopts the material of the pixel definition layer, not the material of SiO. The pixel definition layer does not like the material of SiO, which includes hydrogen bond and hydrogen ion so that the present invention will not decrease the mobility of the thin-film transistor, and can suppress the drift of the threshold voltage without causing deterioration to the thin-film transistor of the OLED display panel.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] In order to more clearly illustrate the technical solution in the present invention or in the prior art, the following will illustrate the figures used for describing the embodiments or the prior art. It is obvious that the following figures are only some embodiments of the present invention. For the person of ordinary skill in the art without creative effort, it can also obtain other figures according to these figures.

[0025] FIG. 1 is a schematic diagram of a pixel structure in an inkjet printing OLED display panel of the conventional art;

[0026] FIG. 2 is a cross-sectional view of the pixel of the conventional art;

[0027] FIG. 3 is a schematic diagram of forming a passivation layer and a planarization layer on the thin-film transistor of the present invention;

[0028] FIG. 4 is a schematic diagram of forming a pair of anodes on the planarization layer of the present invention;

[0029] FIG. 5 is a schematic diagram of forming a pixel definition layer on the planarization layer of the present invention;

[0030] FIG. 6 is a schematic diagram of forming a pattern of the pixel definition layer using a half-tone mask shown in FIG. 5 of the present invention;

[0031] FIG. 7 is a schematic diagram of a pattern of the pixel definition layer of the present invention; and

[0032] FIG. 8 is a cross-sectional diagram of the pixel in the inkjet printing OLED display panel of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0033] The present invention provides a manufacturing method for an inkjet printing OLED display panel, and the manufacturing method comprises steps of:

[0034] As shown in FIG. 3, manufacturing at least one pair of thin-film transistors 1 on a glass substrate 2;

[0035] Depositing a passivation layer 3 on the glass substrate 2, and the passivation layer 3 covers the at least one pair of thin-film transistors 1;

[0036] Depositing a planarization layer 4 on the passivation layer 3;

[0037] Forming at least one pair of vias both at the passivation layer 3 and the planarization layer 4, the vias 31 at the passivation layer 3 and the vias 41 at the planarization layer 4 are exactly corresponded, and the vias 31 at the passivation layer 3 and the vias 41 at the planarization layer 4 are all located above the pair of thin-film transistors 1;

[0038] As shown in FIG. 4, manufacturing at least one pair of anodes 5 on the planarization layer 4, and the least one pair of anodes 5 are electrically connected to the least one pair of thin-film transistors 1 through the vias 31 at the passivation layer 3 and the vias 41 at the planarization layer 4.

[0039] As shown in FIG. 5, depositing a pixel definition layer 6 on the planarization layer 4, and the pixel definition layer 6 covers the at least one pair of anodes 5.

[0040] Using a half-tone mask 7 as shown in FIG. 6 to define a pattern of the pixel definition layer 6. As shown in FIG. 7, a region of the pixel definition layer 6 located above the at least one pair of the anodes 5 forms a notch 62. The at least one pair of anodes 5 are exposed through the notch 62 and decrease a height of the pixel definition layer 61 located between the least one pair of the anodes 5.

[0041] As shown in FIG. 8, manufacturing a light-emitting layer 8 in the notch 62 of the pixel definition layer using an inkjet printing technology, and the light-emitting layer 8 covers the pixel definition layer 61 located between the least one pair of anodes 5.

[0042] It should be noted that the step of defining a pattern of the pixel definition layer 6 in the present invention is generally coated a photoresist 10 on the pixel definition layer 6, and disposing the half-tone mask 7 above the pixel definition layer 6. Then, using a yellow light to perform an exposure and development to the photoresist 10 on the surface of the pixel definition layer 6 through the half-tone mask 7. Using the photoresist 10 after the exposure and development as a barrier layer to etch the pixel definition layer 6. Here, a thickness of the portion of the pixel definition layer 61 located between the at least one pair of the anodes 5 can be adjusted through adjusting an exposure amount of the yellow light.

[0043] Furthermore, the manufacturing method for the inkjet printing OLED display panel further includes following steps:

[0044] Manufacturing a cathode 9 on the light-emitting layer 8.

[0045] Furthermore, when using a half-tone mask 7 to define the pattern of the pixel definition layer, disposing the half-tone mask 7 to be above the pixel definition layer 6, a partial-light-transmitting region 71 of the half-tone mask 7 is located above the pixel definition layer 6 located between the at least one pair of anodes 5, a light-transmitting region 72 of the half-tone mask 7 is located above the at least one pair of anodes 5, and through a yellow light to define the pattern of the pixel definition layer by the half-tone mask 7. As shown in FIG. 6, a region of the half-tone mask 7 except the partial-light-transmitting region 71 and the light-transmitting region 72 is a light-blocking region 73.

[0046] Furthermore, the passivation layer 3 includes at least one layer of SiO_x and/or at least one layer of SiN_x, $x > 1$, and a thickness range of the passivation layer 3 is 1000~5000 angstrom.

[0047] The planarization layer 4 includes at least one photoresist layer having at least one kind of photoresist, and a thickness range of the planarization layer 4 is 10000~20000 angstrom.

[0048] Furthermore, the step of manufacturing at least one pair of anodes 5 on the planarization layer 4 includes following steps:

[0049] Depositing an ITO (Indium Tin Oxide) material layer on the planarization layer 4, and utilizing the yellow light for patterning the ITO material layer in order to obtain the at least one pair of anodes 5. Wherein a thickness range of the anode 5 is 500~1000 angstrom.

[0050] Furthermore, the pixel definition layer includes at least one photoresist layer having at least one kind of photoresist. A thickness range of the pixel definition layer 63 located at two sides of the at least one pair of anodes 5 is 10000~20000 angstrom.

[0051] Furthermore, using the yellow light to form at least one pair of vias at the passivation layer 3 and the planarization layer 4.

[0052] In the present invention, when forming the vias at the passivation layer 3 and the planarization layer 4, coating a photoresist layer on the planarization layer 4, then, exposing and developing the photoresist layer using the yellow light. Using the photoresist layer after being exposed and developed as a barrier layer to perform an etching to the passivation layer 3 and the planarization layer 4 in order to form the vias.

[0053] The present invention also provides an inkjet printing OLED display panel. As shown in FIG. 8, the inkjet printing OLED display panel includes: at least one pair of thin-film transistors 1, a passivation layer 3 and a planarization layer 4 which are disposed sequentially and stacked above the at least one pair of thin-film transistors 1. The passivation layer 3 and the planarization layer 4 both provide with at least one pair of vias. The vias 31 at the passivation layer 3 and the vias 41 at the planarization layer 4 are exactly corresponded, and are all located above the at least one pair of thin-film transistors 1. At least one pair of anodes 5 are disposed on the planarization layer 4, and the least one pair of anodes 5 are electrically connected to the least one pair of thin-film transistors 1 through the vias 31 at the passivation layer 3 and the vias 41 at the planarization layer 4.

[0054] A pixel definition layer 6 is disposed on the planarization layer 4, and the pixel definition layer 6 includes

at least one pair of notches 62 shown in FIG. 7. The at least one pair of notches 62 are respectively located above the at least one pair of anodes 5. A height of the pixel definition layer 61 located between the least one pair of anodes 5 is less than a height of the pixel definition layer 63 located at two sides of the least one pair of anodes 5.

[0055] A light-emitting layer 8 is disposed in the at least one pair of notches 62, and the light-emitting layer 8 covers the pixel definition layer located between the least one pair of anodes 5. A cathode 9 is disposed on the light-emitting layer 8.

[0056] Furthermore, the passivation layer 3 includes at least one layer of SiOx and/or at least one layer of SiNx, $x > 1$, and a thickness range of the passivation layer 3 is 1000~5000 angstrom.

[0057] The planarization layer 4 includes at least one photoresist layer having at least one kind of photoresist, and a thickness range of the planarization layer is 10000~20000 angstrom.

[0058] Furthermore, the pixel definition layer includes at least one photoresist layer having at least one kind of photoresist, a thickness range of the pixel definition layer 63 located at two sides of the at least one pair of anodes 5 is 10000~20000 angstrom.

[0059] In summary, in the present invention, through forming the passivation layer 3 and a planarization layer 4 on the thin-film transistors 1, forming the vias 31, 41 at the passivation layer 3 and a planarization layer 4, forming the anode 5 on the planarization layer 4, the anode 5 electrically connecting to the thin-film transistor 1 by the vias 31, 41 at the passivation layer 3 and a planarization layer 4, forming the pixel definition layer 6 on the planarization layer 4 to cover the anode 5, through using the half-tone mask 7 to define the pattern of the pixel definition layer such that the pixel definition layer located above the anode 5 forms the notch 62 in order to form the light-emitting layer 8, and decrease the height of the pixel definition layer 61 located between the anodes 5 as an electrode spacer layer of the anode 5. Accordingly, when defining the pattern of the pixel definition layer in the present invention, the electrode spacer layer of the anode 5 has been formed, a process for forming an electrode spacer layer is not required, depositing a SiO layer between the anodes and using a mask to define a pattern of the SiO layer is not required. Therefore, comparing to the manufacturing method of the conventional inkjet printing OLED display panel, one mask process can be saved in order to save the time and cost for manufacturing the inkjet printing OLED display panel.

[0060] Besides, the electrode spacer layer between the anodes adopts the material of the pixel definition layer, not the material of SiO. The pixel definition layer does not like the material of SiO, which includes hydrogen bond and hydrogen ion so that the present invention will not decrease the mobility of the thin-film transistor, and can suppress the drift of the threshold voltage without causing deterioration to the thin-film transistor of the OLED display panel.

[0061] The inkjet printing OLED display panel adopts the inkjet printing technology, and can print two sub-pixels at the same time, which can increase the resolution of the OLED display panel, and reduce the difficulty of the inkjet printing technology.

[0062] The compound adhesive structure and a display panel provided by the embodiment of the present invention has following beneficial effects: multiple flexible enhance-

ment bodies which are disposed on a surface of the optical adhesive body and/or inside the optical adhesive body and arranged along a preset direction, wherein each of the flexible enhancement bodies includes a large end and a small end which is gradually narrowing in cross section from the large end, wherein a refractive index of each of the flexible enhancement bodies is similar to a refractive index of the optical adhesive body, and a density of each of the flexible enhancement bodies is similar to a density of the optical adhesive body. The present invention can suppress and break a viscosity flowing of the optical adhesive in the bending and deformation process of the display panel, and improve a wrinkle phenomenon in the bending process of the display panel.

What is claimed is:

1. A manufacturing method for an inkjet printing OLED display panel, comprising steps of:

sequentially forming a passivation layer and a planarization layer on at least one pair of thin-film transistors on a glass substrate, and the passivation layer covers the at least one pair of thin-film transistors;

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

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

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

using a half-tone mask to define a pattern of the pixel definition layer such that a region of the pixel definition layer located above the at least one pair of the anodes forms a notch, and a height of the pixel definition layer 61 located between the least one pair of the anodes is decreased;

using an inkjet printing technology to form a light-emitting layer in the notch of the pixel definition layer, and the light-emitting layer covers the pixel definition layer located between the least one pair of anodes.

2. The manufacturing method for an inkjet printing OLED display panel according to claim 1, wherein the method further comprises a step of:

manufacturing a cathode on the light-emitting layer.

3. The manufacturing method for an inkjet printing OLED display panel according to claim 1, wherein the step of using a half-tone mask to define a pattern of the pixel definition layer comprises steps of:

disposing the half-tone mask to be above the pixel definition layer, a partial-light-transmitting region of the half-tone mask is located above the pixel definition layer located between the at least one pair of anodes, a light-transmitting region of the half-tone mask is located above the at least one pair of anodes, and through a yellow light to define the pattern of the pixel definition layer by the half-tone mask.

4. The manufacturing method for an inkjet printing OLED display panel according to claim 1, wherein the passivation layer includes at least one layer of SiOx and/or at least one layer of SiNx, and a thickness range of the passivation layer is 1000~5000 angstrom; and

the planarization layer includes at least one photoresist layer having at least one kind of photoresist, and a thickness range of the planarization layer is 10000~20000 angstrom.

5. The manufacturing method for an inkjet printing OLED display panel according to claim 1, wherein the step of depositing an ITO (Indium Tin Oxide) material layer on the planarization layer, and utilizing the yellow light for patterning the ITO material layer in order to obtain the at least one pair of anodes, wherein a thickness range of the anode 5 is 500~1000 angstrom.

6. The manufacturing method for an inkjet printing OLED display panel according to claim 1, wherein the pixel definition layer includes at least one photoresist layer having at least one kind of photoresist, a thickness range of the pixel definition layer located at two sides of the at least one pair of anodes is 10000~20000 angstrom.

7. The manufacturing method for an inkjet printing OLED display panel according to claim 1, wherein using the yellow light to form at least one pair of vias at the passivation layer and the planarization layer.

8. A manufacturing method for an inkjet printing OLED display panel, comprising steps of:

sequentially forming a passivation layer and a planarization layer on at least one pair of thin-film transistors on a glass substrate, and the passivation layer covers the at least one pair of thin-film transistors;

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

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

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

using a half-tone mask to define a pattern of the pixel definition layer such that a region of the pixel definition layer located above the at least one pair of the anodes forms a notch, and a height of the pixel definition layer 61 located between the least one pair of the anodes is decreased;

using an inkjet printing technology to form a light-emitting layer in the notch of the pixel definition layer, and the light-emitting layer covers the pixel definition layer located between the least one pair of anodes; and manufacturing a cathode on the light-emitting layer.

9. The manufacturing method for an inkjet printing OLED display panel according to claim 8, wherein the step of using a half-tone mask to define a pattern of the pixel definition layer comprises steps of:

disposing the half-tone mask to be above the pixel definition layer, a partial-light-transmitting region of the half-tone mask is located above the pixel definition layer located between the at least one pair of anodes, a light-transmitting region of the half-tone mask is located above the at least one pair of anodes, and through a yellow light to define the pattern of the pixel definition layer by the half-tone mask.

10. The manufacturing method for an inkjet printing OLED display panel according to claim 8, wherein the passivation layer includes at least one layer of SiOx and/or

at least one layer of SiNx, and a thickness range of the passivation layer is 1000~5000 angstrom; and

the planarization layer includes at least one photoresist layer having at least one kind of photoresist, and a thickness range of the planarization layer is 10000~20000 angstrom.

11. The manufacturing method for an inkjet printing OLED display panel according to claim 8, wherein the step of depositing an ITO (Indium Tin Oxide) material layer on the planarization layer, and utilizing the yellow light for patterning the no material layer in order to obtain the at least one pair of anodes, wherein a thickness range of the anode is 500~1000 angstrom.

12. The manufacturing method for an inkjet printing OLED display panel according to claim 8, wherein the pixel definition layer includes at least one photoresist layer having at least one kind of photoresist, a thickness range of the pixel definition layer located at two sides of the at least one pair of anodes is 10000~20000 angstrom.

13. The manufacturing method for an inkjet printing MED display panel according to claim 8, wherein using the yellow light to form at least one pair of vias at the passivation layer and the planarization layer.

14. An inkjet printing OLED display panel, comprising: at least one pair of thin-film transistors;

a passivation layer and a planarization layer which are disposed sequentially and stacked above the at least one pair of thin-film transistors, wherein the passivation layer and the planarization layer both provide with at least one pair of vias, the vias at the passivation layer and the vias at the planarization layer are exactly corresponded, and are all located above the at least one pair of thin-film transistors;

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

a pixel definition layer disposed on the planarization layer, wherein the pixel definition layer includes at least one pair of notches, the at least one pair of notches are respectively located above the at least one pair of anodes, a height of the pixel definition layer located between the least one pair of anodes is less than a height of the pixel definition layer located at two sides of the least one pair of anodes; and

a light-emitting layer disposed in the at least one pair of notches, and the light-emitting layer covers the pixel definition layer located between the least one pair of anodes.

15. The inkjet printing OLED display panel according to claim 14, wherein a cathode is disposed on the light-emitting layer.

16. The inkjet printing OLED display panel according to claim 14, wherein the passivation layer includes at least one layer of SiOx and/or at least one layer of SiNx, and a thickness range of the passivation layer is 1000~5000 angstrom;

the planarization layer includes at least one photoresist layer having at least one kind of photoresist, and a thickness range of the planarization layer is 10000~20000 angstrom; and

the pixel definition layer includes at least one photoresist layer having at least one kind of photoresist, a thickness

range of the pixel definition layer located at two sides of the at least one pair of anodes is 10000~20000 angstrom.

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专利名称(译)	喷墨印刷OLED显示板及其制造方法		
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[标]发明人	LIU FANGMEI LIU ZHAOSONG		
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摘要(译)

提供一种喷墨印刷OLED显示面板和制造方法。该方法包括顺序形成钝化层和a。玻璃基板上的薄膜晶体管上的平坦化层,钝化层覆盖薄膜晶体管;在钝化层和平坦化层上形成通孔;在平坦化层上形成阳极,阳极通过通孔电连接到薄膜晶体管;在平坦化层上沉积像素定义层,像素定义层覆盖阳极;使用半色调掩模来定义像素定义层的图案,使得位于阳极上方的像素定义层的区域形成凹口,并且位于阳极之间的像素限定层的高度减小;使用喷墨印刷技术在像素限定层的凹口中形成发光层。

