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(54) **DISPLAY PANEL AND DISPLAY DEVICE**

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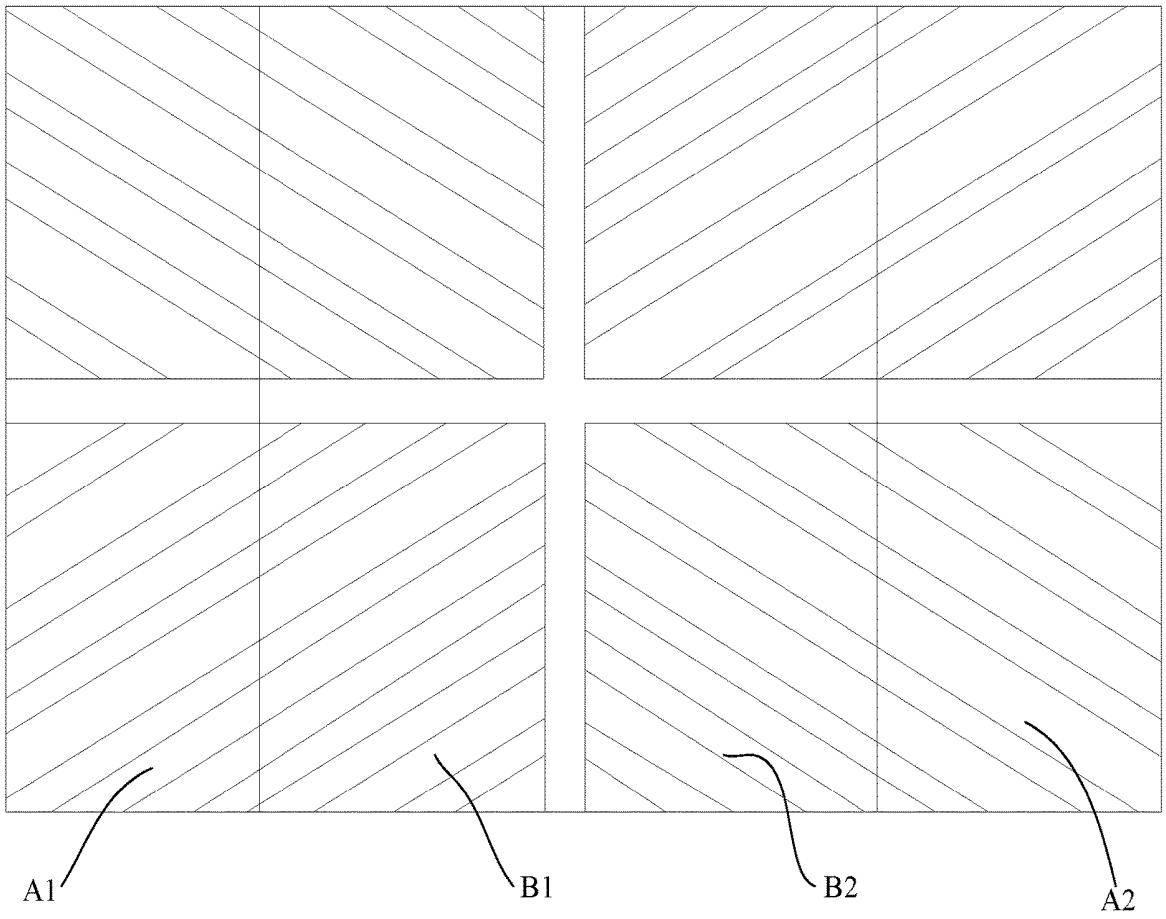
(57) **ABSTRACT**

The present disclosure discloses a display panel, and a display device, the display panel includes a first substrate, defining a pixel electrode; a second substrate, facing the first substrate, a surface of the second substrate facing the first substrate defines a common electrode, and the common electrode faces the pixel electrode; a liquid crystal layer, defined between the second substrate and the first substrate; and an insulating layer, configured to isolate the liquid crystal layer from the common electrode, or isolate the liquid crystal layer from the pixel electrode, a surface of the insulating layer near the liquid crystal layer is defined as a first surface, the first surface is flush with the liquid crystal layer, a surface of the insulating layer away from the liquid crystal layer is defined as a second surface, and vertical distances between the second surface and the first surface are different.



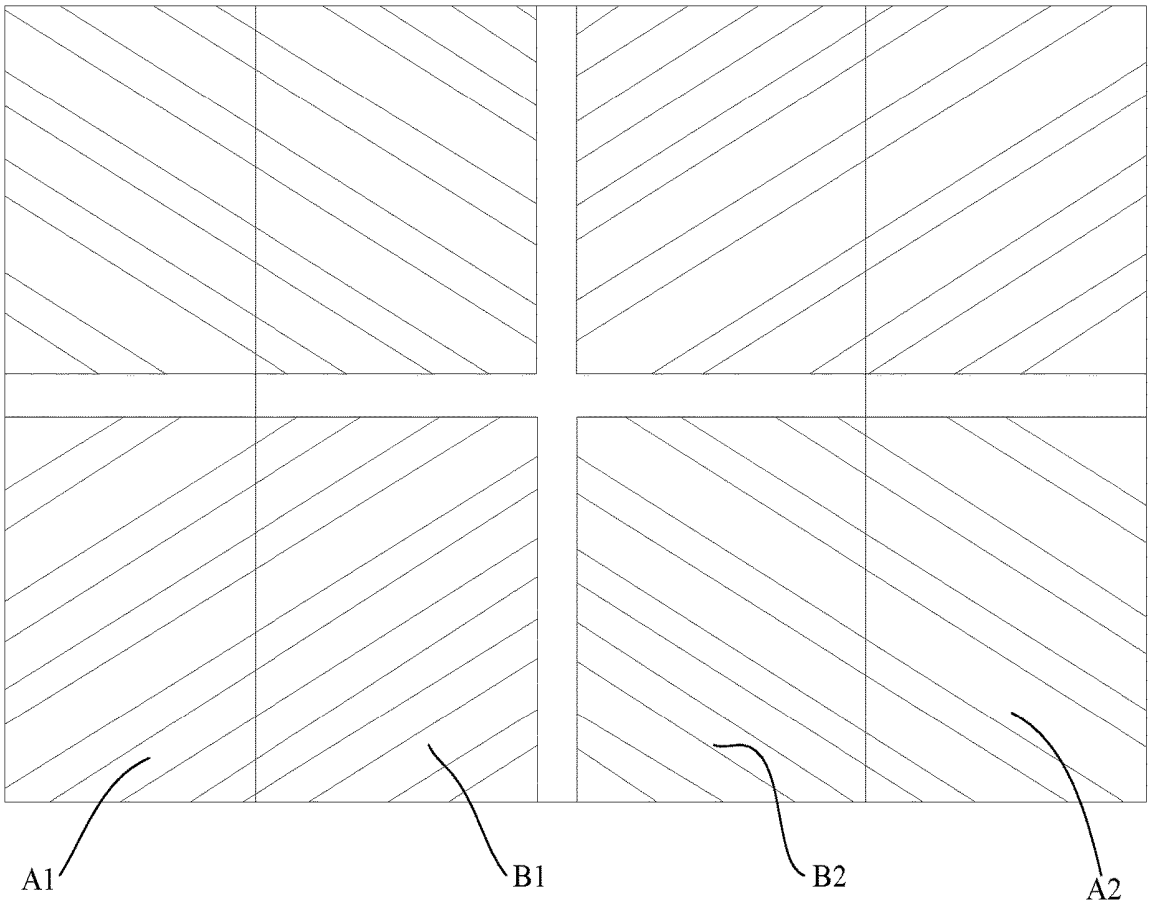



FIG. 1

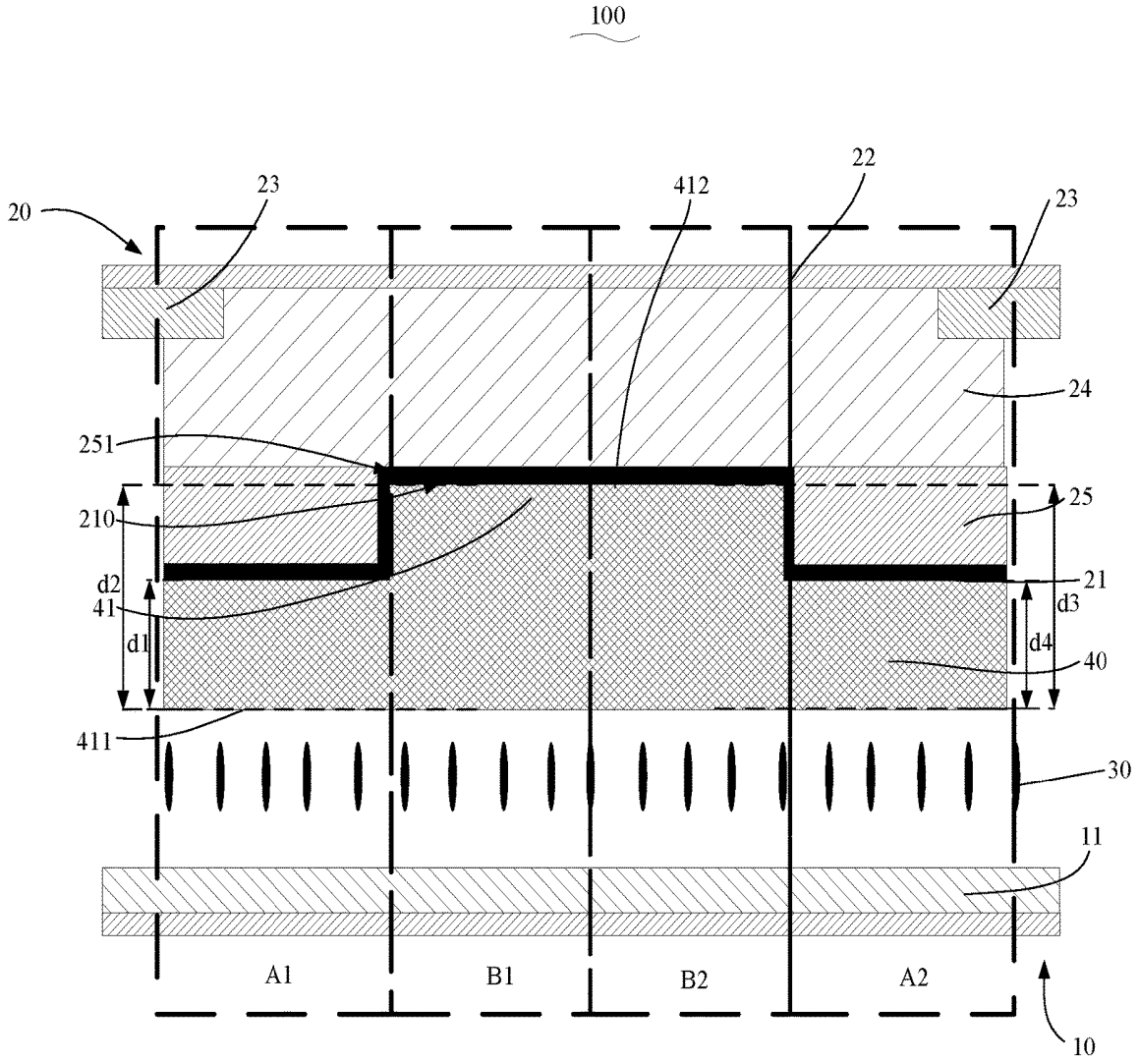

100
20
23
412
22
23
24
251
210
25
d2
41
21
d3
d1
d4
40
411
30
11
A1
B1
B2
A2
10

FIG. 2

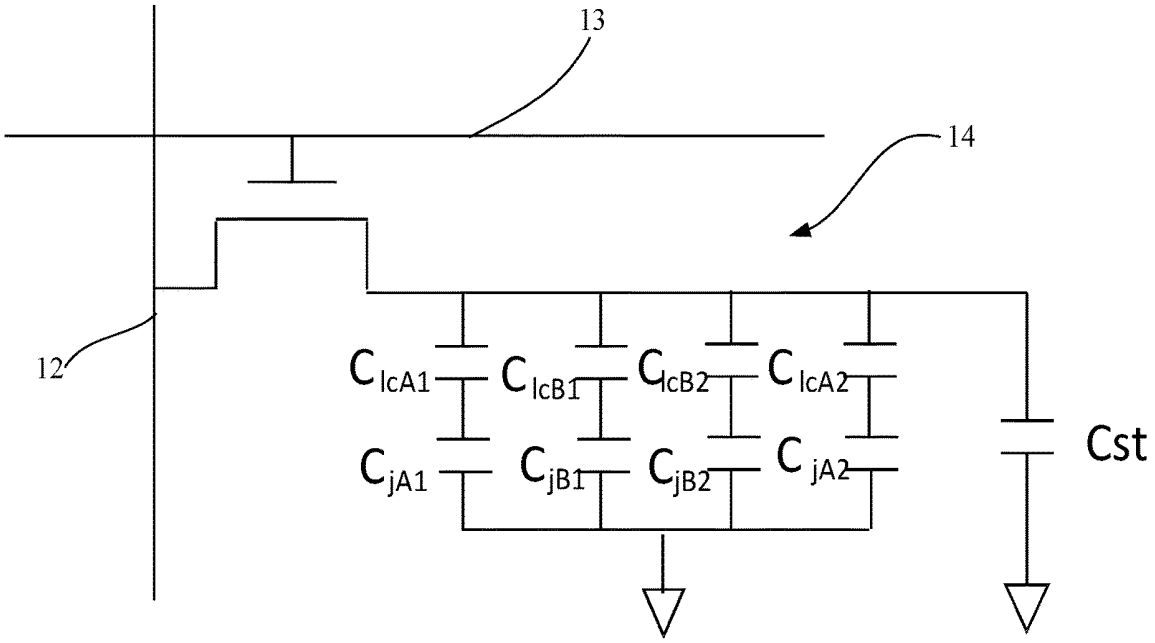



FIG. 3

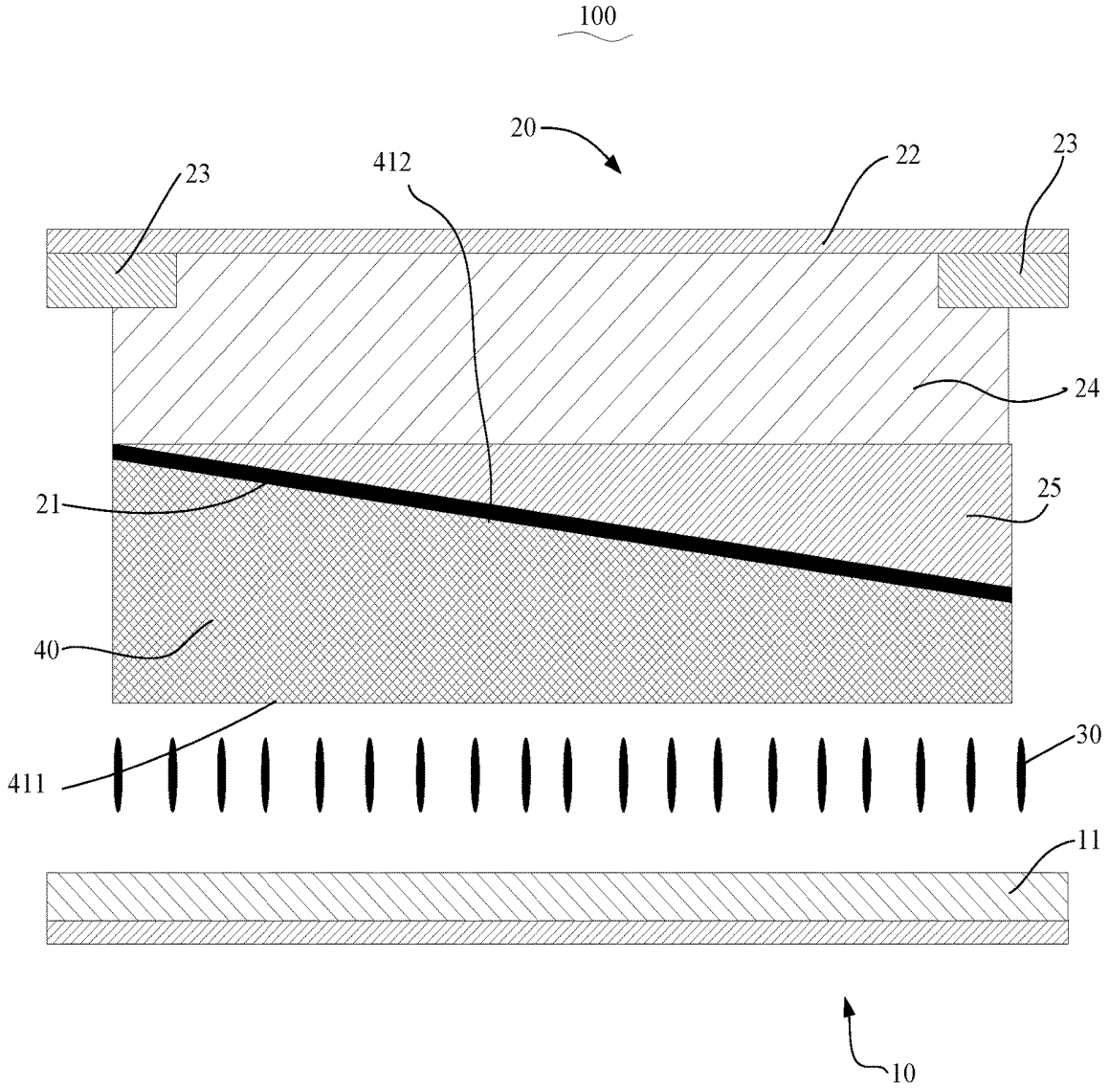



FIG. 4

# DISPLAY PANEL AND DISPLAY DEVICE

## CROSS-REFERENCE TO RELATED APPLICATIONS

**[0001]** The present application is a Continuation Application of PCT Application No. PCT/CN2018/122090 filed on Dec. 19, 2018, which claims the benefit of China Patent Application No. 201821857993.4, filed on Nov. 12, 2018, with the State Intellectual Property Office and entitled "display panel and display device", the entirety of which is hereby incorporated herein by reference.

## TECHNICAL FIELD

**[0002]** The present disclosure generally relates to the technical field of liquid crystal display, and more particularly relates to a display panel, and a display device.

## BACKGROUND

**[0003]** Currently, liquid crystal displays are widely used for various electronic products.

**[0004]** However, due to the axial light transmission characteristics of liquid crystal molecules, when the view angle of the display screen is two large, color shift often occurs when viewing from the lateral side of the display screen, causing serious distortion of the images presented for people. Therefore, solving the color shift problem is an important breakthrough to improve the large view angle of the liquid crystal display. The statements herein merely provide background information related to the present disclosure and do not necessarily constitute prior art.

## SUMMARY

**[0005]** It is therefore one main object of the disclosure to provide a display panel, which aims to improve the color shift of the display panel and enlarge the view angle.

**[0006]** In order to realize the above aim, the display panel provided by the present disclosure includes:

**[0007]** a first substrate, the first substrate defines a pixel electrode;

**[0008]** a second substrate, facing the first substrate, a surface of the second substrate facing the first substrate defines a common electrode, and the common electrode faces the pixel electrode;

**[0009]** a liquid crystal layer, defined between the second substrate and the first substrate; and

**[0010]** an insulating layer, configured to isolate the liquid crystal layer from the common electrode, or isolate the liquid crystal layer from the pixel electrode, a surface of the insulating layer near the liquid crystal layer is defined as a first surface, the first surface is flush with the liquid crystal layer, a surface of the insulating layer away from the liquid crystal layer is defined as a second surface, and vertical distances between the second surface and the first surface are different.

**[0011]** Electively, the insulating layer is defined on a surface of the common electrode near the liquid crystal layer.

**[0012]** Electively, the second substrate includes a base substrate, and a black matrix, a color resistance layer, and a dielectric layer all sequentially defined on the base substrate, the common electrode is defined on a surface of the dielectric layer away from the color resistance layer, and a surface of the dielectric layer near the common electrode is defined as a third surface, a surface of the dielectric layer away from the common electrode is defined as a fourth surface, and vertical distances between the third surface and the fourth surface are different.

**[0013]** Electively, the third surface defines a first groove, the common electrode defines a second groove corresponding to the first groove, the second groove is received in the first groove, and the second surface defines a protrusion accommodated in the second groove.

**[0014]** Electively, the plane of an end of the protrusion located is parallel to the first surface, and the vertical distances between the planes of two sides of the second surface without the protrusion located and the first surface are defined as d**1** and d**4** respectively, d**1**=d**4**.

**[0015]** Electively, the third surface is an inclined surface, and the second surface matches with the inclined surface.

**[0016]** Electively, the third surface is an arc-shaped surface, and the second surface matches with the arc-shaped surface.

**[0017]** Electively, the first substrate defines data lines, scan lines, and a plurality of pixel units defined by the data lines and the scan lines, each of the pixel units includes a plurality of sub pixels, and each of the sub pixels includes the pixel electrode.

**[0018]** Electively, the pixel unit has an eight-domain structure.

**[0019]** Electively, a display panel includes:

**[0020]** a first substrate, the first substrate defines a pixel electrode;

**[0021]** a second substrate, facing the first substrate, a surface of the second substrate facing the first substrate defines a common electrode, and the common electrode faces the pixel electrode;

**[0022]** a liquid crystal layer, defined between the second substrate and the first substrate; and

**[0023]** an insulating layer, configured to isolate the liquid crystal layer from the common electrode, or isolate the liquid crystal layer from the pixel electrode, a surface of the insulating layer near the liquid crystal layer is defined as a first surface, the first surface is flush with the liquid crystal layer, a surface of the insulating layer away from the liquid crystal layer is defined as a second surface, and vertical distances between the second surface and the first surface are different;

**[0024]** the second substrate includes a base substrate, and a black matrix, a color resistance layer, and a dielectric layer all sequentially defined on the base substrate, the common electrode is defined on a surface of the dielectric layer away from the color resistance layer, and a surface of the dielectric layer near the common electrode is defined as a third surface, a surface of the dielectric layer away from the common electrode is defined as a fourth surface, and vertical distances between the third surface and the fourth surface are different, the third surface is an inclined surface, and the second surface matches with the inclined surface.

**[0025]** The present disclosure further provides a display device, the display device includes a display panel, the display panel includes:

**[0026]** a first substrate, the first substrate defines a pixel electrode;

**[0027]** a second substrate, facing the first substrate, a surface of the second substrate facing the first substrate defines a common electrode, and the common electrode faces the pixel electrode;

**[0028]** a liquid crystal layer, defined between the second substrate and the first substrate; and

**[0029]** an insulating layer, configured to isolate the liquid crystal layer from the common electrode, or isolate the liquid crystal layer from the pixel electrode, a surface of the insulating layer near the liquid crystal layer is defined as a first surface, the first surface is flush with the liquid crystal layer, a surface of the insulating layer away from the liquid crystal layer is defined as a second surface, and vertical distances between the second surface and the first surface are different.

**[0030]** The display panel of the present disclosure includes the first substrate, the second substrate, the liquid crystal layer, and the insulating layer, the first substrate defines the pixel electrode and the second substrate defines the common electrode. By arranging the first surface of the insulating layer close to the liquid crystal layer to be flush with the liquid crystal layer, the vertical distances between the second surface and the first surface of the insulating layer are different, so that the deflection angles of liquid crystal molecules are different, and the functions of compensating the view angle and improving the color shift are achieved, which not only does not increase the difficulty of the preparation process and does not increase the cost, but also does not reduce the effective display area of the display panel. That is, the opening ratio of the display panel is not reduced, thus realizing the large view angle display effect.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0031]** To better illustrate the technical solutions that are reflected in various embodiments according to this disclosure or that are found in the prior art, the accompanying drawings intended for the description of the embodiments herein or for the prior art will now be briefly described, it is evident that the accompanying drawings listed in the following description show merely some embodiments according to this disclosure, and that those having ordinary skill in the art will be able to obtain other drawings based on the arrangements shown in these drawings without making inventive efforts.

**[0032]** FIG. **1** is a structural diagram of the second substrate of the present disclosure according to some embodiments;

**[0033]** FIG. **2** is a cross sectional diagram of the display panel shown in FIG. **1**;

**[0034]** FIG. **3** is a schematic circuit diagram of FIG. **2**;

**[0035]** FIG. **4** is a cross sectional diagram of the subject display panel of the present disclosure according to another embodiments.

**[0036]** Labels illustration for drawings:

| Label | Name |
|---|---|
| 100 | display panel |
| 10 | first substrate |
| 11 | pixel electrode |
| 12 | data line |
| 13 | scan line |
| 14 | pixel unit |
| 20 | second substrate |
| 21 | common electrode |
| 210 | second groove |
| 22 | base substrate |
| 23 | black matrix |
| 24 | color resistance layer |
| 25 | dielectric layer |
| 251 | first groove |
| 30 | liquid crystal layer |
| 40 | insulating layer |
| 41 | protrusion |
| 411 | first surface |
| 412 | second surface |

**[0037]** The realization of the aim, functional characteristics, advantages of the present disclosure are further described specifically with reference to the accompanying drawings and embodiments.

## DETAILED DESCRIPTION

**[0038]** The technical solutions of the embodiments of the present disclosure will be clearly and completely described in the following with reference to the accompanying drawings. It is obvious that the embodiments to be described are only a part rather than all of the embodiments of the present disclosure. All other embodiments obtained by persons skilled in the art based on the embodiments of the present disclosure without creative efforts shall fall within the protection scope of the present disclosure.

**[0039]** It is to be understood that, all of the directional instructions in the exemplary embodiments of the present disclosure (such as top, down, left, right, front, back . . . ) can only be used for explaining relative position relations, moving condition of the elements under a special form (referring to figures), and so on, if the special form changes, the directional instructions changes accordingly.

**[0040]** It should be further noted that in depictions of the present disclosure, terms such as "connect" should be understood in a broad sense, unless otherwise prescribed or defined explicitly. In other words, the connection can be a fixed connection, a removable connection or an integral connection. Of course, the connection can also be a direct connection, an indirect connection via an intermediary, or an internal communication between two elements. For a person having ordinary skills in the art, he/she can understand specific meanings of the above terms in the present disclosure upon specific situations.

**[0041]** In addition, the descriptions, such as the "first", the "second" in the exemplary embodiment of present disclosure, can only be used for describing the aim of description, and cannot be understood as indicating or suggesting relative importance or impliedly indicating the number of the indicated technical character. Therefore, the character indicated by the "first", the "second" can express or impliedly include at least one character. In addition, the technical proposal of each exemplary embodiment can be combined with each other, however the technical proposal must base on that the ordinary skill in that art can realize the technical proposal, when the combination of the technical proposals occurs contradiction or cannot realize, it should consider that the combination of the technical proposals does not existed, and is not contained in the protection scope required by the present disclosure.

**[0042]** The present disclosure provides a display panel **100**.

**[0043]** Referring to FIGS. **1** to **4**, in some embodiments of the present disclosure, the display panel **100** includes:

**[0044]** a first substrate **10**, the first substrate **10** defines a pixel electrode **11**;

**[0045]** a second substrate **20**, facing the first substrate **10**, the surface of the second substrate **20** facing the first substrate **10** defines a common electrode **21**, and the common electrode **21** faces the pixel electrode **11**;

**[0046]** a liquid crystal layer **30**, defined between the second substrate **20** and the first substrate **10**; and

**[0047]** an insulating layer **40**, configured to isolate the liquid crystal layer **30** from the common electrode **21**, or isolate the liquid crystal layer **30** from the pixel electrode **11**, a surface of the insulating layer **40** near the liquid crystal layer **30** is defined as a first surface **411**, the first surface **411** is flush with the liquid crystal layer **30**, a surface of the insulating layer **40** away from the liquid crystal layer **30** is defined as a second surface **412**, and vertical distances between the second surface **412** and the first surface **411** are different.

**[0048]** Specifically, the first substrate **10** and the second substrate **20** are both transparent substrates, such as glass substrates, quartz substrates, etc. The pixel electrode **11** and the common electrode **21** are respectively formed on an inner side of the first substrate **10** and an inner side of the second substrate **20** facing the inner side of the first substrate **10**, and the liquid crystal layer **30** is provided between the first substrate **10** and the second substrate **20**. By applying a driving voltage between the pixel electrode **11** and the common electrode **21**, the rotation of liquid crystal molecules in the liquid crystal layer **30** is controlled by the electric field formed between the pixel electrode **11** and the common electrode **21**, so as to refract the light of the backlight module to generate an image.

**[0049]** The pixel electrode **11** of the first substrate **10** may be a translucent electrode or a reflective electrode. When the pixel electrode **11** is the translucent electrode, the pixel electrode **11** may include a transparent conductive layer. The transparent conductive layer may include at least one selected from a group consisting of indium tin oxide (ITO), indium zinc oxide (IZO), zinc oxide (ZnO), indium oxide ($In_2O_3$), indium gallium oxide (IGO), and aluminum zinc oxide (AZO), for example. In addition to the transparent conductive layer, the pixel electrode **11** may include a transflective layer arranged to improve light emission efficiency. The transflective layer may be a thin layer (e.g., the thin layer has a thickness of several nanometers to tens of nanometers) and may include at least one selected from a group consisting of Ag, Mg, Al, Pt, Pd, Au, Ni, Nd, IR, Cr, Li, Ca, and Yb.

**[0050]** The insulating layer **40** is defined between the liquid crystal layer **30** and the common electrode **21**, or between the liquid crystal layer **30** and the pixel electrode **11**. It can be understood that the insulating layer **40** may be defined between the common electrode **21** and the liquid crystal layer **30**, or between the pixel electrode **11** and the liquid crystal layer **30**, and the location of the insulating layer **40** is not limited here. The vertical distances between the second surface **412** and the first surface **411** of the insulating layer **40** are different, so that the thicknesses between the common electrode **21** and the pixel electrode **11** in different regions may be different, and the voltage across the liquid crystal layer **30** in different regions may also be different, which makes the threshold voltage of the voltage penetration (V-T) characteristic curve between them also different. In regions of the insulating layer **40** with large thickness, the threshold voltage difference may also be large, thus achieving the effect of low color shift.

**[0051]** The display panel **100** of the present disclosure includes the first substrate **10**, the second substrate **20**, the liquid crystal layer **30**, and the insulating layer **40**, the first substrate **10** defines the pixel electrode **11** and the second substrate **20** defines the common electrode **21**. By arranging the first surface **411** of the insulating layer **40** close to the liquid crystal layer **30** to be flush with the liquid crystal layer **30**, the vertical distances between the second surface **412** and the first surface **411** of the insulating layer **40** are different, so that the deflection angles of liquid crystal molecules are different, and the functions of compensating the view angle and improving the color shift are achieved, which not only does not increase the difficulty of the preparation process and does not increase the cost, but also does not reduce the effective display area of the display panel **100**. That is, the opening ratio of the display panel **100** is not reduced, thus realizing the large view angle display effect.

**[0052]** In some embodiments, since the driving circuit defined on the first substrate **10** is more complex than that on the second substrate **20**, the insulating layer **40** can be optionally defined on the surface of the common electrode **21** near the liquid crystal layer **30**, to simplify the process steps.

**[0053]** In some embodiments, the second substrate **20** includes a base substrate **22**, and a black matrix **23**, a color barrier layer **24**, and a dielectric layer **25** sequentially defined on the base substrate **22**. The common electrode **21** is defined on the surface of the dielectric layer **25** away from the color barrier layer **24**, the surface of the dielectric layer **25** near the common electrode **21** is defined as a third surface, the surface of the dielectric layer **25** away from the common electrode **21** is defined as a fourth surface, and the vertical distances between the third surface and the fourth surface are different.

**[0054]** In some embodiments, the second substrate **20** includes the base substrate **22**, the black matrix **23**, the color resist layer **24**, and the dielectric layer **25**, the base substrate **22** may be a transparent substrate that does not affect the passage of the backlight and provides a basic carrier, the base substrate **22** may be a glass substrate or a quartz substrate. The color resistance layer **24** is located in the light-transmitting region of the black matrix **23**. The dielectric layer **25** is made of a material with insulating properties, and the dielectric layer **25** and the insulating layer **40** may be made of the same material or different materials, and the materials of the dielectric layer **25** and the insulating layer **40** are not limited here. The common electrode **21** is sandwiched between the dielectric layer **25** and the insulating layer **40**, and the thickness of the common electrode **21** in its extending direction is uniform. When the common electrode **21** is defined on the dielectric layer **25**, the common electrode **21** matches with the third surface of the dielectric layer **25** in shape, and the second surface **412** of the insulating layer **40** matches with the common electrode **21** in shape. The vertical distances between the third surface and the fourth surface of the dielectric layer **25** are different, so that the thicknesses of different regions between the common electrode **21** and the pixel electrode **11** are different, and the voltage across the liquid crystal layer **30** in different regions may be different, which makes the threshold voltage of the voltage penetration (V-T) characteristic

curve between them also different. In regions of the insulating layer **40** with large thickness, the threshold voltage difference may also be large, thus achieving the effect of low color shift.

**[0055]** Referring to FIGS. **1** to **3**, in some embodiments of the present disclosure, the third surface defines a first groove **251**, the common electrode **21** defines a second groove **210** corresponding to the first groove **251**, the second groove **210** is received in the first groove **251**, and the second surface **412** defines a protrusion **41** accommodated in the second groove **210**.

**[0056]** In some embodiments, different regions of the dielectric layer **25** have different thicknesses, that is, the third surface defines the first groove **251**, the common electrode **21** defines the second groove **210**, the second groove **210** is received in the first groove **251**, and the second surface **412** defines the protrusion **41** accommodated in the second groove **210**, as such the thicknesses between the common electrode **21** and the pixel electrode **11** are non-uniform.

**[0057]** In some embodiments, the plane of an end of the protrusion **41** located is parallel to the first surface **411**, and the vertical distances between the planes of two sides of the second surface **412** without the protrusion **41** located and the first surface **411** are defined as d**1** and d**4** respectively, d**1**=d**4**.

**[0058]** In some embodiments, the thicknesses of the insulating layer **40** sandwiched between the common electrode **21** and the liquid crystal layer **30** are non-uniform. According to FIG. **1**, each pixel unit **14** facing the second substrate **20** and the first substrate **10** is divided into four regions: a first domain display region A**1**, a second domain display region B**1**, a third domain display region B**2**, and a fourth domain display region A**2**. The distances between the common electrode **21** in four regions and the liquid crystal layer **30** are defined as d**1**, d**2**, d**3**, d**4**, respectively. In some embodiments, d**1**=d**4**, d**2**=d**3**, d**2**>d**1**. Please referring to FIG. **3**, the liquid crystal layer **30** and the insulating layer **40** are sandwiched between the pixel electrode **11** and the common electrode **21**, it can be understood that, capacitance Clc and capacitance Cj can be formed between the pixel electrode **11** and the common electrode **21**. In the first domain display region A**1**, capacitance ClcA**1** and capacitance CjA**1** can be formed between the pixel electrode **11** and the common electrode **21**. In the second domain display region B**1**, capacitance ClcB**1** and capacitance CjB**1** can be formed between the pixel electrode **11** and the common electrode **21**. In the third domain display region B**2**, capacitance ClcB**2** and capacitance CjB**2** can be formed between the pixel electrode **11** and the common electrode **21**. In the fourth domain display area A**2**, capacitance ClcA**2** and capacitance CjA**2** can be formed between the pixel electrode **11** and the common electrode **21**. Since the voltage across the pixel electrode **11** and the common electrode **21** remains the same in the four regions A**1**, A**2**, B**1** and B**2**, but the thickness d**1** (d**4**) and the thickness d**2** (d**3**) of the insulating layer **40** in the regions A**1** (A**2**) and B**1** (B**2**) are different, the voltage across the liquid crystal layer **30** in region A**1** (A**2**) and region B**1** (B**2**) may also be different, which makes the threshold voltage of the voltage penetration (V-T) characteristic curve between them also different. When the different between the thickness d**1** (d**4**) and the thickness d**2** (d**3**) of the insulating layer **40** increases, the threshold voltage difference may also be increase, thus achieving the effect of low color shift.

**[0059]** Referring to FIG. **3**, the first substrate **10** defines data lines **12**, scan lines **13**, and a plurality of pixel units **14** defined by the data lines **12** and the scan lines **13**, each of the pixel units includes a plurality of sub pixels, and each of the sub pixels includes the pixel electrode **11**.

**[0060]** In some embodiments, the first substrate **10** defines data lines **12**, scan lines **13**, and the plurality of pixel units **14** defined by the data lines **12** and the scan lines **13**. Each pixel unit includes the plurality of sub pixels, each sub pixel includes the pixel electrode **11**, and the pixel electrode **11** is internally provided with stripe branches with different orientations. Each orientation area of the stripe branches is defined as a domain. In some embodiments, each pixel unit **14** is divided into four areas: a first domain display area A**1**, a second domain display area B**1**, a third domain display area B**2**, and a fourth domain display area A**2**, each domain display area is divided into two domains which have the same size and are symmetrically arranged by a horizontal spacing band. As such the pixel unit **14** forms an eight domain structure. As the thicknesses of the different portions of the regions between the common electrode **21** and the liquid crystal later **30** are different, the color shifts are different in different regions. This design realizes the eight-domain design without increasing the number of thin film transistors and increases the aperture ratio.

**[0061]** Referring to FIG. **4**, in some embodiments of the present disclosure, the third surface is an inclined surface, and the second surface **412** matches with the inclined surface.

**[0062]** In some embodiments, the third surface is designed as the inclined surface, and the second surface **412** matches with the inclined surface, so that the effect of improving color shift can also be achieved assuming that the insulating layer **40** between the common electrode **21** and the liquid crystal layer **30** has the non-uniform thickness.

**[0063]** In some embodiments of the present disclosure, the third surface is an arc-shaped surface, and the second surface **412** matches with the arc-shaped surface.

**[0064]** In some embodiments, the third surface is designed as the arc-shaped surface, and the second surface **412** matches with the arc-shaped surface, so that the effect of improving color shift can also be realized assuming that the insulating layer **40** between the common electrode **21** and the liquid crystal layer **30** has the non-uniform thickness.

**[0065]** This present disclosure also provides a display device which includes a display panel **100**, the specific structure of display panel **100** can be referred to the above-mentioned embodiments. As the display device adopts all the technical proposals of the above exemplary embodiments, the display device at least has all of the beneficial effects of the technical proposals of the above exemplary embodiments, no need to repeat again.

**[0066]** The display device of the embodiment may be any product or component with display function such as electronic paper, mobile phone, tablet computer, television, displayer, notebook computer, digital photo frame, navigator, etc.

**[0067]** The foregoing description merely depicts some embodiments of the present disclosure and therefore is not intended to limit the scope of the application. An equivalent structural or flow changes made by using the content of the

specification and drawings of the present disclosure, or any direct or indirect applications of the disclosure on any other related fields shall all fall in the scope of the application.

**1**. A display panel, wherein, the display panel comprises:

a first substrate, the first substrate defines a pixel electrode;

a second substrate, facing the first substrate, a surface of the second substrate facing the first substrate defines a common electrode, and the common electrode faces the pixel electrode;

a liquid crystal layer, defined between the second substrate and the first substrate; and

an insulating layer, configured to isolate the liquid crystal layer from the common electrode, or isolate the liquid crystal layer from the pixel electrode, a surface of the insulating layer near the liquid crystal layer is defined as a first surface, the first surface is flush with the liquid crystal layer, a surface of the insulating layer away from the liquid crystal layer is defined as a second surface, and vertical distances between the second surface and the first surface are different.

**2**. The display panel according to claim **1**, wherein the insulating layer is defined on a surface of the common electrode near the liquid crystal layer.

**3**. The display panel according to claim **2**, wherein the second substrate comprises a base substrate, and a black matrix, a color resistance layer, and a dielectric layer all sequentially defined on the base substrate, the common electrode is defined on a surface of the dielectric layer away from the color resistance layer, and a surface of the dielectric layer near the common electrode is defined as a third surface, a surface of the dielectric layer away from the common electrode is defined as a fourth surface, and vertical distances between the third surface and the fourth surface are different.

**4**. The display panel according to claim **3**, wherein the third surface defines a first groove, the common electrode defines a second groove corresponding to the first groove, the second groove is received in the first groove, and the second surface defines a protrusion accommodated in the second groove.

**5**. The display panel according to claim **4**, wherein the plane of an end of the protrusion located is parallel to the first surface, and the vertical distances between the planes of two sides of the second surface without the protrusion located and the first surface are defined as d**1** and d**4** respectively, d**1**=d**4**.

**6**. The display panel according to claim **3**, wherein the third surface is an inclined surface, and the second surface matches with the inclined surface.

**7**. The display panel according to claim **3**, wherein the third surface is an arc-shaped surface, and the second surface matches with the arc-shaped surface.

**8**. The display panel according to claim **1**, wherein the first substrate defines data lines, scan lines, and a plurality of pixel units defined by the data lines and the scan lines, each of the pixel units includes a plurality of sub pixels, and each of the sub pixels includes the pixel electrode.

**9**. The display panel according to claim **8**, wherein the pixel unit has an eight-domain structure.

**10**. The display panel according to claim **8**, wherein each of the pixel units defines a four-domain display area.

**11**. The display panel according to claim **1**, wherein the insulating layer is defined between the common electrode and the liquid crystal layer, and is located at a surface of the common electrode near the liquid crystal layer.

**12**. The display panel according to claim **1**, wherein the insulating layer is defined between the pixel electrode and the liquid crystal layer, and is located at a surface of the pixel electrode near the liquid crystal layer.

**13**. The display panel according to claim **3**, wherein the black matrix defines a light-transmitting region and an opaque region on the base substrate, and the color resist layer is defined in the light-transmitting region.

**14**. The display panel according to claim **3**, wherein the common electrode is sandwiched between the dielectric layer and the insulating layer, and the common electrode has a uniform thickness along its extending direction.

**15**. A display panel, wherein, the display panel comprises:

a first substrate, the first substrate defines a pixel electrode;

a second substrate, facing the first substrate, a surface of the second substrate facing the first substrate defines a common electrode, and the common electrode faces the pixel electrode;

a liquid crystal layer, defined between the second substrate and the first substrate; and

an insulating layer, configured to isolate the liquid crystal layer from the common electrode, or isolate the liquid crystal layer from the pixel electrode, a surface of the insulating layer near the liquid crystal layer is defined as a first surface, the first surface is flush with the liquid crystal layer, a surface of the insulating layer away from the liquid crystal layer is defined as a second surface, and vertical distances between the second surface and the first surface are different;

the second substrate comprises a base substrate, and a black matrix, a color resistance layer, and a dielectric layer all sequentially defined on the base substrate, the common electrode is defined on a surface of the dielectric layer away from the color resistance layer, and a surface of the dielectric layer near the common electrode is defined as a third surface, a surface of the dielectric layer away from the common electrode is defined as a fourth surface, and vertical distances between the third surface and the fourth surface are different, the third surface is an inclined surface, and the second surface matches with the inclined surface.

**16**. A display device, wherein the display device comprises a display panel, the display panel comprises:

a first substrate, the first substrate defines a pixel electrode;

a second substrate, facing the first substrate, a surface of the second substrate facing the first substrate defines a common electrode, and the common electrode faces the pixel electrode;

a liquid crystal layer, defined between the second substrate and the first substrate; and

an insulating layer, configured to isolate the liquid crystal layer from the common electrode, or isolate the liquid crystal layer from the pixel electrode, a surface of the insulating layer near the liquid crystal layer is defined as a first surface, the first surface is flush with the liquid crystal layer, a surface of the insulating layer away from the liquid crystal layer is defined as a second surface, and vertical distances between the second surface and the first surface are different.

**17**. The display device according to claim **16**, wherein the insulating layer is defined at a surface of the common electrode near the liquid crystal layer; and

the second substrate comprises a base substrate, and a black matrix, a color resistance layer, and a dielectric layer all sequentially defined on the base substrate, the common electrode is defined on a surface of the dielectric layer away from the color resistance layer, and a surface of the dielectric layer near the common electrode is defined as a third surface, a surface of the dielectric layer away from the common electrode is defined as a fourth surface, and vertical distances between the third surface and the fourth surface are different

**18**. The display device according to claim **17**, wherein the third surface defines a first groove, the common electrode defines a second groove corresponding to the first groove, the second groove is received in the first groove, and the second surface defines a protrusion accommodated in the second groove; and

the plane of an end of the protrusion located is parallel to the first surface, and the vertical distances between the planes of two sides of the second surface without the protrusion located and the first surface are defined as d**1** and d**4** respectively, d**1**=d**4**.

**19**. The display device according to claim **17**, wherein the third surface is an inclined surface, and the second surface matches with the inclined surface; or the third surface is an arc-shaped surface, and the second surface matches with the arc-shaped surface.

**20**. The display device according to claim **16**, wherein the first substrate defines data lines, scan lines, and a plurality of pixel units defined by the data lines and the scan lines, each of the pixel units includes a plurality of sub pixels, and each of the sub pixels includes the pixel electrode, the pixel unit has an eight-domain structure.

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摘要(译)

本公开公开了一种显示面板和显示装置，该显示面板包括第一基板，该第一基板限定像素电极； 第二基板，面对第一基板，第二基板的面对第一基板的表面限定公共电极，并且公共电极面对像素电极。 液晶层，限定在第二基板和第一基板之间； 绝缘层，用于将所述液晶层与所述公共电极隔离或将所述液晶层与所述像素电极隔离，所述绝缘层靠近所述液晶层的表面定义为第一表面，所述第一表面为 与液晶层齐平，将绝缘层的背离液晶层的表面定义为第二表面，第二表面与第一表面之间的垂直距离不同。