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(54) **DISPLAY PANEL**

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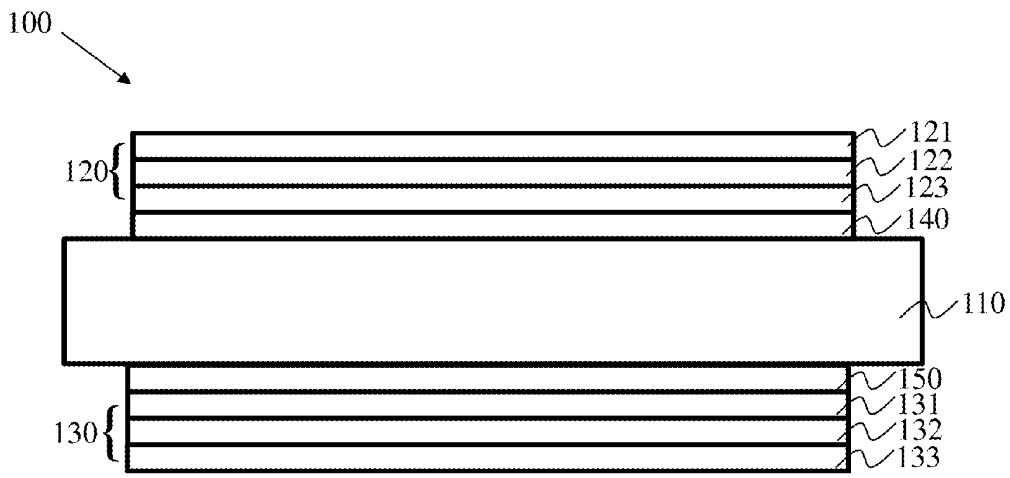
(57) **ABSTRACT**

The present invention provides a display pane comprising a liquid crystal cell and two polarizers disposed at both sides of the liquid crystal cell, wherein one of the polarizers at one side of the liquid crystal cell includes a compensation film, and a first optical path difference R_0 of the compensation film is 0.15 to 0.35 times an optical path difference R of the liquid crystal cell. The liquid crystal display pane of the present invention can have a low cost and a wide viewing angle, so as to solve the problems that the contrast of the conventional display panel is reduced, and the dual compensation films have a higher cost.



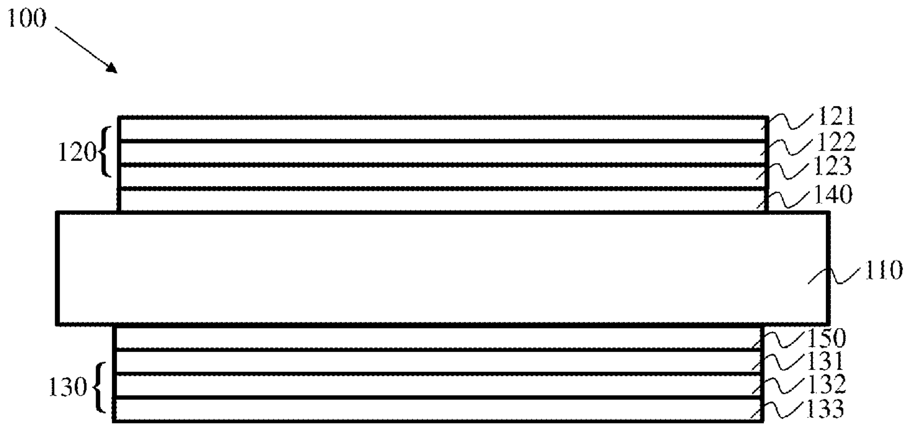
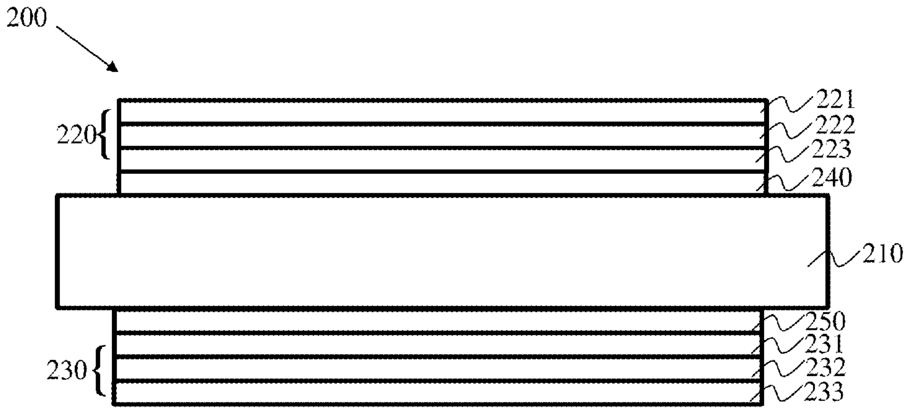

100
120
121
122
123
140
110
150
131
132
133
130

FIG.1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223
240
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232
233
230

FIG.2

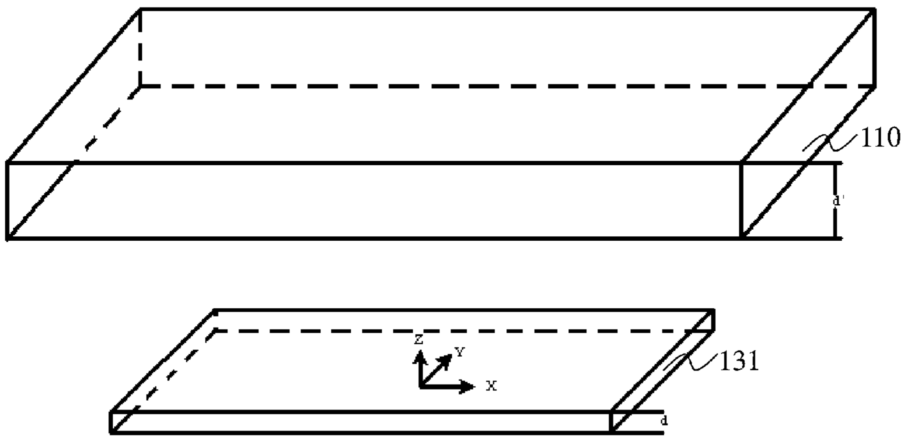


FIG.3

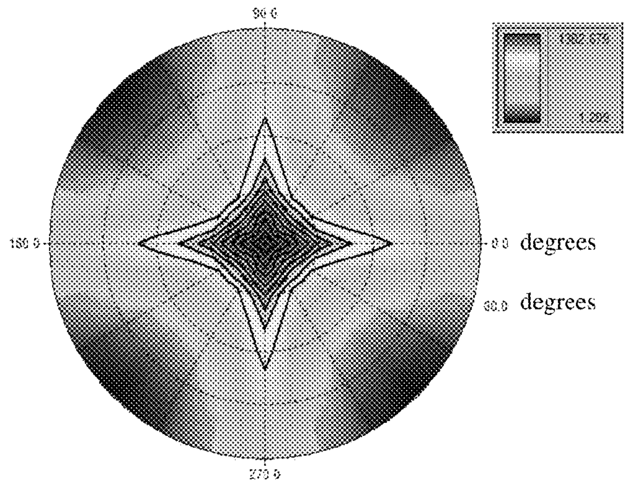


FIG.4

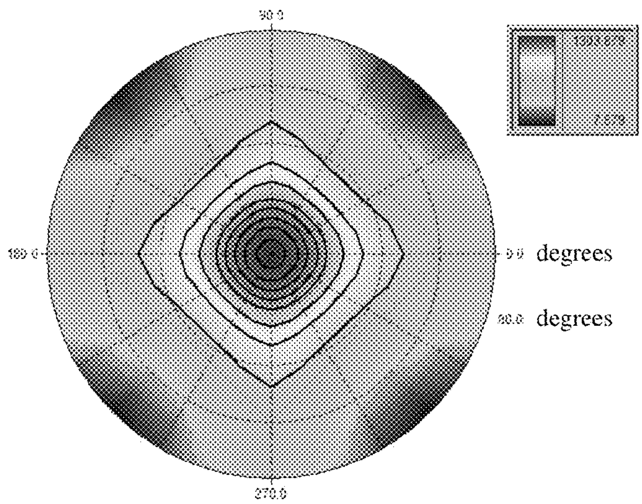


FIG.5

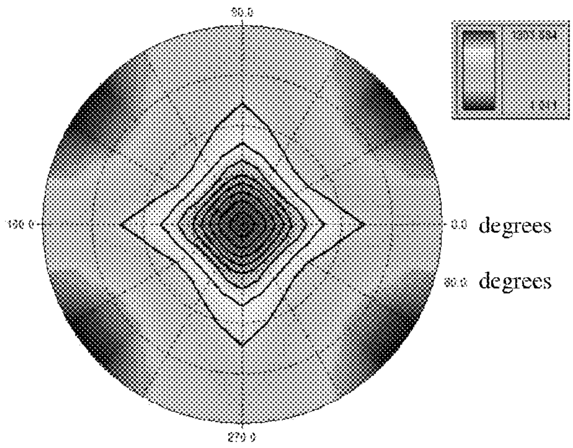


FIG.6

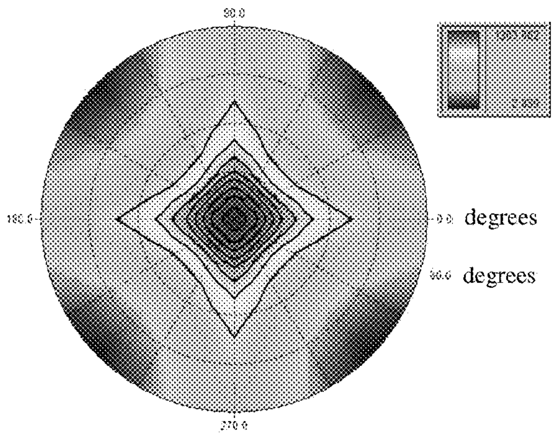
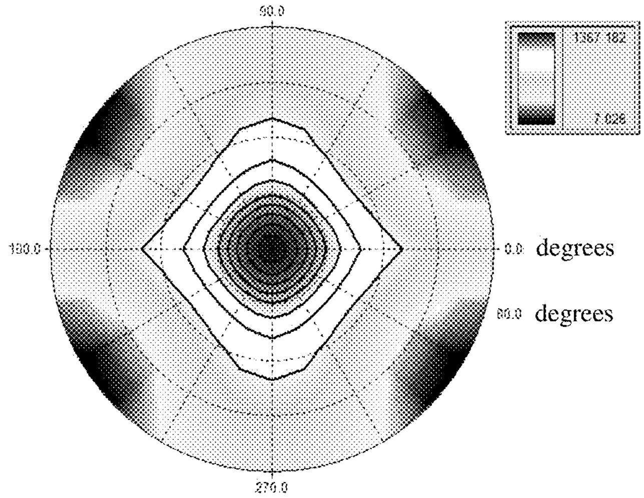


FIG.7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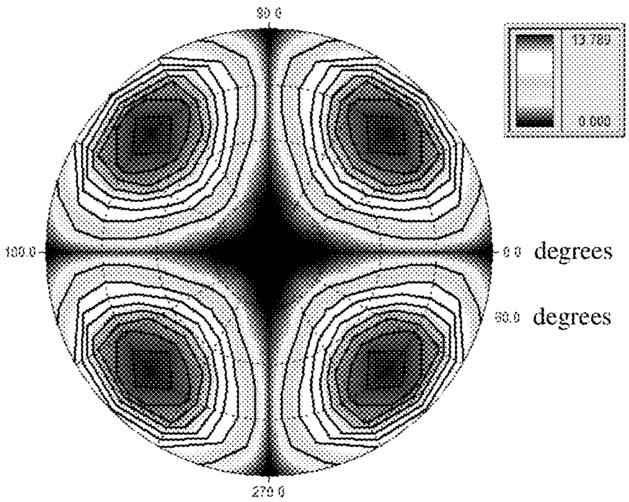
0.0 degrees
60.0 degrees
270.0

FIG.8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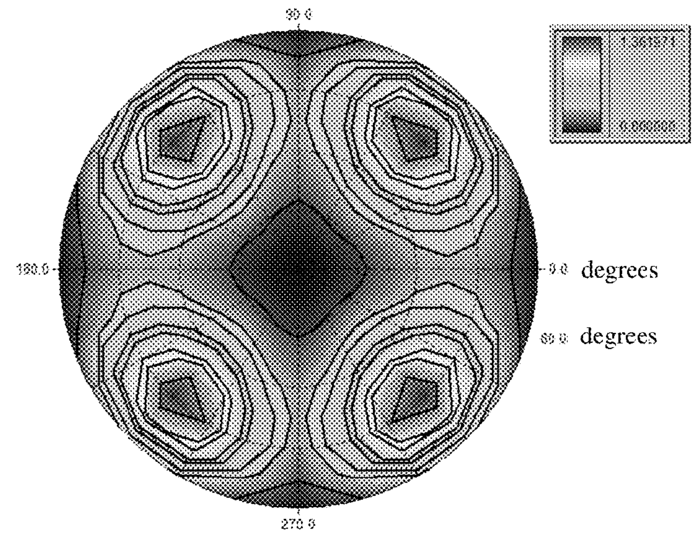
0.0 degrees
60.0 degrees
270.0

FIG.9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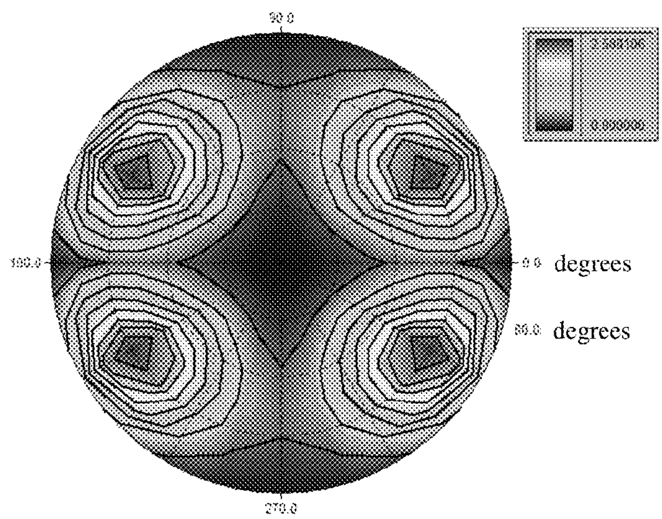
0.0 degrees
80.0 degrees
270.0

FIG.10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180.0
0.0 degrees
80.0 degrees
270.0

FIG.11

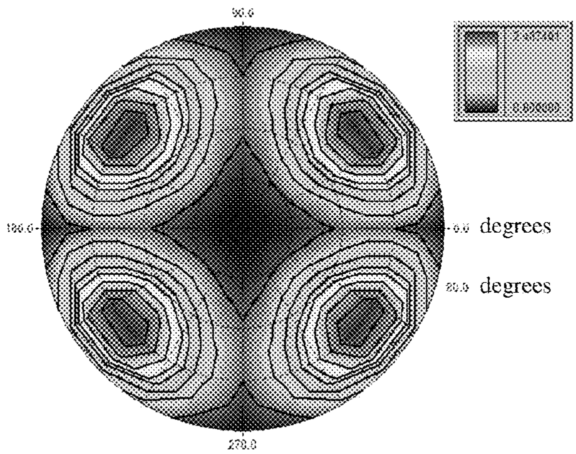

FIG.12

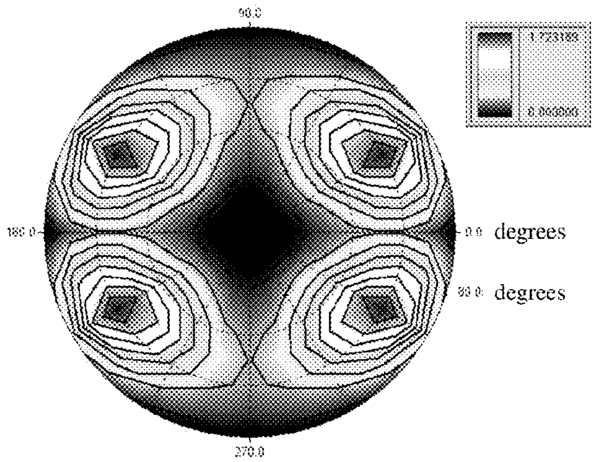

FIG.13

DISPLAY PANEL

FIELD OF THE INVENTION

[0001] The present invention relates to a field of a liquid crystal display technology, and more particularly to a display panel with a low cost and a wide viewing angle.

BACKGROUND OF THE INVENTION

[0002] At present, a liquid crystal display (LCD) panel can apply an electric field to rotate liquid crystal (LC) molecules for alter a polarization state of an incident light, so as to control light rays of a backlight source to pass the LCD panel or not. In this case, the forming of the polarized light is determined by polarizers which are disposed at both sides of the LC cell. The electric field can control the orientation of the liquid crystal molecules in the LC cell for altering the polarization state of the light passing through the LC cell. However, when a user views the display panel from different directions, the light transmittance of the panel from different directions is different due to different orientations of the liquid crystal molecules. That is, the LC molecules have a larger optical path difference (OPD) at different viewing angles, thereby deteriorating the normal display of the display panel.

[0003] With regard to the problem that the LC molecules in the display panel have the larger optical path difference at different viewing angles resulting in a low contrast of the display panel at a wide viewing angle, in the conventional technology, compensation films are disposed on the polarizers which are disposed at outer sides of the LC cell for compensating the optical path between the LC molecules at the large viewing angle by adjusting the refractive index of the compensation films. In general, the compensation films on the LC cell are designed as dual compensation films. That is, two compensation films are disposed on the polarizers at both sides of the LC cell, respectively. However, the material of the compensation films is more expensive, and thus the cost of the dual compensation films is higher.

[0004] As a result, it is necessary to provide a display panel to solve the problems existing in the conventional technologies, as described above.

SUMMARY OF THE INVENTION

[0005] A primary object of the present invention is to provide a display panel with a low cost and a wide viewing angle, so as to solve the problems that the contrast of the conventional display panel is reduced, and the dual compensation films have a higher cost.

[0006] For solving the above-mentioned problems, the technical solutions are provided by the present invention as below:

[0007] The present invention relates to a display panel, comprising: a liquid crystal cell; and two polarizers disposed at both sides of the liquid crystal cell, respectively, wherein one of the polarizers at one side of the liquid crystal cell includes a compensation film, and a first optical path difference R_0 of the compensation film is 0.15 to 0.35 times an optical path difference R of the liquid crystal cell, and the first optical path difference R_0 and the optical path difference R of the liquid crystal cell are expressed as follows: $R_0=|n_x-n_y|\times d$, $R=\Delta n\times d'$, wherein n_x indicates the refractive index of the compensation film in a first direction, and n_y indicates the refractive index of the compensation film in a second direction, and the first direction and the second direction are vertical to each other and parallel to a light-incident surface of the compensation film, and d indicates a thickness of the compensation film, and Δn indicates a refractive index difference of liquid crystal molecules of the liquid crystal cell, and d' indicates a thickness of the liquid crystal cell; wherein a second optical path difference R_{th} of the compensation film is 0.6 to 1.2 times the optical path difference R of the liquid crystal cell, and the second optical path difference R_{th} of the compensation film is expressed as follows: $R_{th}=|(n_x+n_y)/2-n_z|*d$, wherein n_z indicates the refractive index of the compensation film in a third direction, and the third direction is vertical to the first direction and the second direction, and a value of Δn is 0.07 to 0.11, and a value of d' is 3 μm to 4 μm, and the compensation film is disposed on one of the polarizers at a light-incident side or a light-emitting side of the liquid crystal cell, and the compensation film is disposed between a polarizing film of the polarizers and the liquid crystal cell.

[0008] The present invention relates to a display panel, comprising: a liquid crystal cell; and two polarizers disposed at both sides of the liquid crystal cell, respectively, wherein one of the polarizers at one side of the liquid crystal cell includes a compensation film, and a first optical path difference R_0 of the compensation film is 0.15 to 0.35 times an optical path difference R of the liquid crystal cell, and the first optical path difference R_0 and the optical path difference R of the liquid crystal cell are expressed as follows: $R_0=|n_x-n_y|\times d$, $R=\Delta n\times d'$, wherein n_x indicates the refractive index of the compensation film in a first direction, and n_y indicates the refractive index of the compensation film in a second direction, and the first direction and the second direction are vertical to each other and parallel to a light-incident surface of the compensation film, and d indicates a thickness of the compensation film, and Δn indicates a refractive index difference of liquid crystal molecules of the liquid crystal cell, and d' indicates a thickness of the liquid crystal cell.

[0009] In the display panel of the present invention, a second optical path difference R_{th} of the compensation film is 0.6 to 1.2 times the optical path difference R of the liquid crystal cell, and the second optical path difference R_{th} of the compensation film is expressed as follows: $R_{th}=|(n_x+n_y)/2-n_z|*d$, wherein n_z indicates the refractive index of the compensation film in a third direction, and the third direction is vertical to the first direction and the second direction.

[0010] In the display panel of the present invention, a value of Δn is 0.07 to 0.11.

[0011] In the display panel of the present invention, a value of d' is 3 μm to 4 μm.

[0012] In the display panel of the present invention, a value of Δn is 0.07 to 0.11, and a value of d' is 3 μm to 4 μm.

[0013] In the display panel of the present invention, the compensation film is disposed on one of the polarizers at a light-incident side or a light-emitting side of the liquid crystal cell.

[0014] In the display panel of the present invention, the compensation film is disposed between a polarizing film of the polarizers and the liquid crystal cell.

[0015] The display panel of the present invention has the following beneficial effects: a low cost and a wide viewing angle, so as to solve the problems that the contrast of the conventional display panel is reduced, and the dual compensation films have a higher cost.

[0016] The structure and the technical means adopted by the present invention to achieve the above and other objects can be best understood by referring to the following detailed description of the preferred embodiments and the accompanying drawings.

DESCRIPTION OF THE DRAWINGS

[0017] FIG. **1** is a structural diagram showing a display panel according to a first preferred embodiment of the present invention;

[0018] FIG. **2** is a structural diagram showing a display panel according to a second preferred embodiment of the present invention;

[0019] FIG. **3** is a structural diagram showing a liquid crystal cell and a compensation film according to the first preferred embodiment of the present invention;

[0020] FIG. **4** is a diagram showing an equal contrast ratio contour of a conventional display panel without using the compensation film;

[0021] FIG. **5** is a diagram showing an equal contrast ratio contour of a conventional display panel using the dual compensation films;

[0022] FIG. **6** is a diagram showing an equal contrast ratio contour using the display panel according to the first preferred embodiment of the present invention;

[0023] FIG. **7** is a diagram showing an equal contrast ratio contour using the display panel according to the second preferred embodiment of the present invention;

[0024] FIG. **8** is a diagram showing an equal contrast ratio contour using the display panel according to a third preferred embodiment of the present invention;

[0025] FIG. **9** is a diagram showing an equal color difference contour of a conventional display panel without using the compensation film;

[0026] FIG. **10** is a diagram showing an equal color difference contour of a conventional display panel using the dual compensation films;

[0027] FIG. **11** is a diagram showing an equal color difference contour using the display panel according to the first preferred embodiment of the present invention;

[0028] FIG. **12** is a diagram showing an equal color difference contour using the display panel according to the second preferred embodiment of the present invention;

[0029] FIG. **13** is a diagram showing an equal color difference contour using the display panel according to a third preferred embodiment of the present invention;

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0030] The following embodiments are referring to the accompanying drawings for exemplifying specific implementable embodiments of the present invention.

[0031] Referring to FIG. **1**, a structural diagram showing a display panel according to a first preferred embodiment of the present invention is illustrated. The display panel **100** comprises a liquid crystal cell **110** and two polarizers disposed at both sides of the liquid crystal cell **110**, and one of the polarizers at a light-incident side of the liquid crystal cell **110** includes a compensation film **132**. As shown in FIG. **1**, the display panel **100** comprises the liquid crystal cell **110**, the light-emitting polarizer **120** and the light-incident polarizer **130**. The liquid crystal cell **110** comprises a first substrate, a second substrate and a liquid crystal layer. In this embodiment, the first substrate may be a glass substrate or other material substrate with color filters (CF), and the second substrate may be a glass substrate or other material substrate with a thin film transistor (TFT) array. It notes that the CF and the TFT array may also be disposed on the same substrate in other embodiments.

[0032] The display panel **100** comprises a protective film **121**, a polarizing film **122**, a protective film **123**, an adhesive layer **140**, the liquid crystal cell **110**, an adhesive layer **150**, the compensation film **131**, a polarizing film **132** and a protective film **133** in sequence from inside to outside. In this case, the outside structures of the protective film **121**, the polarizing film **122** and the protective film **123** form the light-emitting polarizer **120** at a light-emitting side. The inside structures of the compensation film **131**, the polarizing film **132** and the protective film **133** form the light-incident polarizer **130** at the light-incident side. The light-emitting polarizer **120** is bonded to a light-emitting surface of the liquid crystal cell **110** by using the adhesive layer **140**, and the light-incident polarizer **130** is bonded to a light-incident surface of the liquid crystal cell **110** by using the adhesive layer **150**. when using the display panel **100**, an incident light enters the light-incident polarizer **130**, and the polarizing film **132** of the light-incident polarizer **130** the polarizes the incident light, and then the compensation film **131** of the light-incident polarizer **130** compensates the refractive index of the liquid crystal cell **110** in different directions for modifying the optical path difference at different viewing angles. Thereafter, the compensated light is emitted into the liquid crystal cell **110**, and the light is emitted out the light-emitting polarizer **120** at one side of the liquid crystal cell **110** after polaroid analysis.

[0033] In the FIG. **1**, a first optical path difference R_0 of the compensation film **131** is 0.15 to 0.35 times an optical path difference R of the liquid crystal cell, and the first optical path difference R_0 is expressed as follows:

$$R_0=|n_x-n_y|\times d,$$

[0034] and the optical path difference R of the liquid crystal cell is expressed as follows:

$$R=\Delta n\times d',$$

[0035] In this case, n_x indicates the refractive index of the compensation film **131** in a first direction X, and n_y indicates the refractive index of the compensation film **131** in a second direction Y, and the first direction X and the second direction Y are vertical to each other and parallel to a light-incident surface of the compensation film **131**, and d indicates a thickness of the compensation film **131**, and Δn indicates a refractive index difference of liquid crystal molecules of the liquid crystal cell **110**, and d' indicates a thickness of the liquid crystal cell **110** (referring to FIG. **3**).

[0036] In the FIG. **1**, a second optical path difference R_{th} of the compensation film **131** is 0.6 to 1.2 times the optical path difference R of the liquid crystal cell, and the second optical path difference R_{th} of the compensation film is expressed as follows:

$$R_{th}=|(n_x+n_y)/2-n_z|*d,$$

[0037] wherein n_z indicates the refractive index of the compensation film **131** in a third direction Z, and the third direction Z is vertical to the first direction X and the second direction Y (referring to FIG. **3**).

[0038] In this case, the thickness d' of the liquid crystal cell **110** is preferably 3 μm to 4 μm, and the refractive index difference Δn of the liquid crystal molecules of the liquid crystal cell **110** is preferably 0.07 to 0.11, so as to achieve an optimum compensation effect of the compensation film **131**.

[0039] The compensation film **131** is disposed between the polarizing film **132** of the light-incident polarizer **130** and the liquid crystal cell **110**, thereby efficiently compensating the optical path difference in different directions by means of the compensation film **131**, as well as protecting the compensation film **131**.

[0040] Referring to FIG. **2**, a structural diagram showing a display panel according to a second preferred embodiment of the present invention is illustrated. The display panel **200** comprises a liquid crystal cell **210** and two polarizers disposed at both sides of the liquid crystal cell **210**, and one of the polarizers at a light-emitting side of the liquid crystal cell **110** includes a compensation film **223**. As shown in FIG. **2**, display panel **200** comprises a protective film **221**, a polarizing film **222**, the compensation film **223**, an adhesive layer **240**, the liquid crystal cell **210**, an adhesive layer **250**, the compensation film **231**, a polarizing film **232** and a protective film **233** in sequence from inside to outside. In this case, the outside structures of the protective film **221**, the polarizing film **222** and the compensation film **223** form the light-emitting polarizer **220** at the light-emitting side. The inside structures of the protective film **231**, the polarizing film **232** and the protective film **233** form the light-incident polarizer **230** at the light-incident side. The light-emitting polarizer **220** is bonded to a light-emitting surface of the liquid crystal cell **210** by using the adhesive layer **240**, and the light-incident polarizer **230** is bonded to a light-incident surface of the liquid crystal cell **210** by using the adhesive layer **250**. when using the display panel **200**, an incident light enters the light-incident polarizer **230**, and the polarizing film **232** of the light-incident polarizer **230** the polarizes the incident light, and then the light is emitted into the liquid crystal cell **210**. Subsequently, the compensation film **223** of the light-emitting polarizer **220** compensates the refractive index of the liquid crystal cell **210** in different directions for modifying the optical path difference at different viewing angles. Thereafter, the light is emitted out the polarizing film **222** after polaroid analysis.

[0041] In the FIG. **2**, a first optical path difference R_0 of the compensation film **223** is 0.15 to 0.35 times an optical path difference R of the liquid crystal cell, and the first optical path difference R_0 is expressed as follows:

$$R_0=|n_x-n_y|\times d,$$

[0042] and the optical path difference R of the liquid crystal cell is expressed as follows:

$$R=\Delta n\times d',$$

[0043] In this case, n_x indicates the refractive index of the compensation film **223** in a first direction X, and n_y indicates the refractive index of the compensation film **223** in a second direction Y, and the first direction X and the second direction Y are vertical to each other and parallel to a light-incident surface of the compensation film **223**, and d indicates a thickness of the compensation film **223**, and Δn indicates a refractive index difference of liquid crystal molecules of the liquid crystal cell **210**, and d' indicates a thickness of the liquid crystal cell **210**.

[0044] In the FIG. **2**, a second optical path difference R_{th} of the compensation film **223** is 0.6 to 1.2 times the optical path difference R of the liquid crystal cell, and the second optical path difference R_{th} of the compensation film is expressed as follows:

$$R_{th}=|(n_x+n_y)/2-n_z|*d,$$

[0045] wherein n_z indicates the refractive index of the compensation film **131** in a third direction Z, and the third direction Z is vertical to the first direction X and the second direction Y.

[0046] In this case, the thickness d' of the liquid crystal cell **110** is preferably 3 μm to 4 μm, and the refractive index difference Δn of the liquid crystal molecules of the liquid crystal cell **210** is preferably 0.07 to 0.11, so as to achieve an optimum compensation effect of the compensation film **223**.

[0047] The compensation film **223** is disposed between the polarizing film **222** of the light-emitting polarizer **220** and the liquid crystal cell **210**, thereby efficiently compensating the optical path difference in different directions by means of the compensation film **223**, as well as protecting the compensation film **223**.

[0048] The following preferred embodiment is referring to equal contrast ratio contours and equal color difference contours of the display of the present invention for exemplifying that the display of the present invention with low cost can provide a wide-viewing-angle display similar to the effect by using the dual compensation films.

[0049] In this case, FIG. **4** shows the equal contrast ratio contour of a display panel without using the compensation film, and FIG. **5** shows the equal contrast ratio contour of a display panel using the dual compensation films, wherein the first optical path difference R_0 of the compensation film is about 0.18R, and the second optical path difference R_{th} is about 0.4R. FIG. **6** shows the equal contrast ratio contour of a display panel using the single compensation film with the first optical path difference R_0 of 0.15R to 0.35R and the second optical path difference R_{th} of about 0.47R. FIG. **7** shows the equal contrast ratio contour of a display panel using the single compensation film with the first optical path difference R_0 of about 0.125R and the second optical path difference R_{th} of 0.6R to 1.2R. FIG. **8** shows the equal contrast ratio contour of a display panel using the single compensation film with the first optical path difference R_0 of 0.15R to 0.35R, and the second optical path difference R_{th} of 0.6R to 1.2R.

[0050] As shown in FIG. **4**, a contrast difference between different viewing angles of the display panel without using the compensation film is larger, and the display panel using the dual compensation films as shown in FIG. **5** can have an improved contrast uniformity at different viewing angles. The contrast uniformity at different viewing angle of the display panel using the single compensation film as shown in FIG. **6** and FIG. **7** is also better than the display panel without using the compensation film. The contrast uniformity at different viewing angle of the display panel using the single compensation film as shown in FIG. **8** is almost similar to the contrast uniformity at different viewing angle of the display panel using the dual compensation films, thereby achieving a compensation effect of using the dual compensation films.

[0051] FIG. **9** shows the equal color difference contour (at the viewing angle of 60 degrees) of a display panel without using the compensation film, and FIG. **10** shows the equal color difference contour (at the viewing angle of 60 degrees) of a display panel using the dual compensation films, wherein the first optical path difference R_0 of the compensation film is about 0.18R, and the second optical path difference R_{th} is about 0.4R. FIG. **11** shows the equal color difference contour (at the viewing angle of 60 degrees) of a display panel using the single compensation film with the first optical path difference R_0 of 0.15R to 0.35R and the second optical path difference R_{th} of about 0.47R. FIG. **12** shows the equal color difference contour (at the viewing angle of 60 degrees) of a display panel using the single compensation film with the first optical path difference R_0 of about 0.125R and the second optical path difference R_{th} of 0.6R to 1.2R. FIG. **13** shows the equal color difference contour (at the viewing angle of 60 degrees) of a display panel using the single compensation film with the first optical path difference R_0 of 0.15R to 0.35R, and the second optical path difference R_{th} of 0.6R to 1.2R.

[0052] As shown in drawings, the display panel as shown in FIG. **13** has the best color difference range which is only better than the display panel using the dual compensation films as shown in FIG. **10**. The color difference range of the display panel as shown in FIG. **11** and FIG. **12** is greatly better than the color difference range of the display panel without using the compensation film as shown in FIG. **9**. Therefore, the color difference range of the display panel using the single compensation film can similar to the color difference range using the dual compensation films, even better than the color difference range using the dual compensation films, thereby achieving a compensation effect of using the dual compensation films.

[0053] The present invention has been described with a preferred embodiment thereof and it is understood that many changes and modifications to the described embodiment can be carried out without departing from the scope and the spirit of the invention that is intended to be limited only by the appended claims.

1. A display panel, characterized in that: comprising:

a liquid crystal cell; and

two polarizers disposed at both sides of the liquid crystal cell, respectively, wherein one of the polarizers at one side of the liquid crystal cell includes a compensation film, and a first optical path difference R_0 of the compensation film is 0.15 to 0.35 times an optical path difference R of the liquid crystal cell, and the first optical path difference R_0 and the optical path difference R of the liquid crystal cell are expressed as follows:

$$R_0=|n_x-n_y|\times d, R=\Delta n\times d',$$

wherein n_x indicates the refractive index of the compensation film in a first direction, and n_y indicates the refractive index of the compensation film in a second direction, and the first direction and the second direction are vertical to each other and parallel to a light-incident surface of the compensation film, and d indicates a thickness of the compensation film, and Δn indicates a refractive index difference of liquid crystal molecules of the liquid crystal cell, and d' indicates a thickness of the liquid crystal cell;

wherein a second optical path difference R_{th} of the compensation film is 0.6 to 1.2 times the optical path difference R of the liquid crystal cell, and the second optical path difference R_{th} of the compensation film is expressed as follows:

$$R_{th}=|(n_x+n_y)/2-n_z|*d,$$

wherein n_z indicates the refractive index of the compensation film in a third direction, and the third direction is vertical to the first direction and the second direction, and a value of Δn is 0.07 to 0.11, and a value of d' is 3 μm to 4 μm, and the compensation film is disposed on one of the polarizers at a light-incident side or a light-emitting side of the liquid crystal cell, and the compensation film is disposed between a polarizing film of the polarizers and the liquid crystal cell.

2. A display panel, characterized in that: comprising:

a liquid crystal cell; and

two polarizers disposed at both sides of the liquid crystal cell, respectively, wherein one of the polarizers at one side of the liquid crystal cell includes a compensation film, and a first optical path difference R_0 of the compensation film is 0.15 to 0.35 times an optical path difference R of the liquid crystal cell, and the first optical path difference R_0 and the optical path difference R of the liquid crystal cell are expressed as follows:

$$R_0=|n_x-n_y|\times d, R=\Delta n\times d',$$

wherein n_x indicates the refractive index of the compensation film in a first direction, and n_y indicates the refractive index of the compensation film in a second direction, and the first direction and the second direction are vertical to each other and parallel to a light-incident surface of the compensation film, and d indicates a thickness of the compensation film, and Δn indicates a refractive index difference of liquid crystal molecules of the liquid crystal cell, and d' indicates a thickness of the liquid crystal cell.

3. The display panel according to claim **2**, characterized in that: a second optical path difference R_{th} of the compensation film is 0.6 to 1.2 times the optical path difference R of the liquid crystal cell, and the second optical path difference R_{th} of the compensation film is expressed as follows:

$$R_{th}=|(n_x+n_y)/2-n_z|*d,$$

wherein n_z indicates the refractive index of the compensation film in a third direction, and the third direction is vertical to the first direction and the second direction.

4. The display panel according to claim **2**, characterized in that: a value of Δn is 0.07 to 0.11.

5. The display panel according to claim **2**, characterized in that: a value of d' is 3 μm to 4 μm.

6. The display panel according to claim **2**, characterized in that: the compensation film is disposed on one of the polarizers at a light-incident side or a light-emitting side of the liquid crystal cell.

7. The display panel according to claim **2**, characterized in that: the compensation film is disposed between a polarizing film of the polarizers and the liquid crystal cell.

8. The display panel according to claim **3**, characterized in that: a value of Δn is 0.07 to 0.11.

9. The display panel according to claim **3**, characterized in that: a value of d' is 3 μm to 4 μm.

10. The display panel according to claim **3**, characterized in that: the compensation film is disposed on one of the polarizers at a light-incident side or a light-emitting side of the liquid crystal cell.

11. The display panel according to claim **3**, characterized in that: the compensation film is disposed between a polarizing film of the polarizers and the liquid crystal cell.

12. The display panel according to claim **4**, characterized in that: a value of d' is 3 μm to 4 μm.

13. The display panel according to claim **4**, characterized in that: the compensation film is disposed on one of the polarizers at a light-incident side or a light-emitting side of the liquid crystal cell.

14. The display panel according to claim **4**, characterized in that: the compensation film is disposed between a polarizing film of the polarizers and the liquid crystal cell.

15. The display panel according to claim **5**, characterized in that: the compensation film is disposed on one of the polarizers at a light-incident side or a light-emitting side of the liquid crystal cell.

16. The display panel according to claim **5**, characterized in that: the compensation film is disposed between a polarizing film of the polarizers and the liquid crystal cell.

17. The display panel according to claim **6**, characterized in that: the compensation film is disposed between a polarizing film of the polarizers and the liquid crystal cell.

18. The display panel according to claim **12**, characterized in that: the compensation film is disposed on one of the polarizers at a light-incident side or a light-emitting side of the liquid crystal cell.

19. The display panel according to claim **12**, characterized in that: the compensation film is disposed between a polarizing film of the polarizers and the liquid crystal cell.

20. The display panel according to claim **18**, characterized in that: the compensation film is disposed between a polarizing film of the polarizers and the liquid crystal cell.

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摘要(译)

本发明提供一种显示面板，包括液晶单元和设置在液晶单元两侧的两个偏振器，其中液晶单元一侧的一个偏振器包括补偿膜和第一光程差R0补偿膜的厚度是液晶盒的光程差R的0.15至0.35倍。本发明的液晶显示面板可以具有低成本和宽视角，从而解决了传统显示面板的对比度降低，双补偿膜成本较高的问题。