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(54) ORGANIC LIGHT-EMITTING DIODE ARRAY SUBSTRATE AND DISPLAY DEVICE

ORGANISCHES LED-ARRAY-SUBSTRAT UND ANZEIGEVORRICHTUNG

SUBSTRAT DE RÉSEAU DE DIODES ÉLECTROLUMINESCENTES ORGANIQUES ET DISPOSITIF D'AFFICHAGE

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Description

FIELD OF THE INVENTION

[0001] The present invention belongs to the field of display technology, particularly to an organic light emitting diode array substrate, and a display device.

BACKGROUND OF THE INVENTION

[0002] An array substrate of an organic light emitting diode (OLED) display device comprises a plurality of sub-pixels, each of the sub-pixels being provided with an organic light emitting diode for emitting light of a corresponding color, the organic light emitting diode comprises a cathode, an anode, a light emitting layer, and may also have a hole transport layer, a hole injection layer, an electron transport layer, an electron injection layer etc. Wherein, the materials of the light emitting layers of the sub-pixels of different colors are different, so their luminous efficiency and life time are also different. Generally speaking, the existing green light emitting layer has the highest efficiency and the longest life time, while the blue light emitting layer and the red light emitting layer have a relatively bad efficiency and life time (wherein the blue is generally the worst).

[0003] In the existing array substrate, the sub-pixels of respective colors are all rectangle of the same size; the array substrate in this form has a simple structure which is clear and neat, however, wherein the red sub-pixels and the blue sub-pixels (actually the light emitting layers therein) have relatively short life times, when their performances are degraded or damaged, the green sub-pixels are usually still in good condition, thereby rendering the whole life time of the array substrate to be relatively short, such that the performance of the green sub-pixels cannot be utilized sufficiently.

[0004] US2006/087227A1 discloses an organic EL display device with at least three light emitting regions. A first side of a virtual rectangle is in contact with part of the boundary of the first light emitting region. A second side of the virtual rectangle that is parallel or substantially parallel to the first side is in contact with portions of the boundaries of the second and third light emitting regions. A third side of the virtual rectangle that is perpendicular or substantially perpendicular to the first side is in contact with portions of the boundaries of the first and second light emitting regions. A fourth side of the virtual rectangle that is parallel or substantially parallel to the third side is in contact with portions of the boundaries of the first and third light emitting regions. The second and third light emitting regions have substantially the same width in the direction of extension of the third side.

[0005] US2006/017375A1 discloses an organic EL element including a substrate, a plurality of first electrodes which are arranged on the substrate in a matrix configuration, a wall-like insulating layer which is formed on the substrate, organic light emitting layers which are formed on the first electrodes, respectively, an auxiliary electrode which is formed on top of the wall-like insulating layer and a second electrode which is formed to cover the surfaces of the wall-like insulating layer, the auxiliary electrode and the light emitting layers and electrically connected to the auxiliary electrode. The second electrode is transparent to light from the light emitting layers.

[0006] JP2005/129505A discloses a luminescent device using an organic EL element as a light emitting element. Each pixel is divided into four subpixels of four colors of RGBW in two rows and two columns by dividing lines and their intersecting points. At least one of the four subpixels has an area different from those of other subpixels. After a nearly quadrangular virtual pixel area is divided by setting the intersecting points, one-side subpixels in the upper and lower rows are laterally interchanged, one-side subpixels in the left and right columns are vertically interchanged, or positions are mutually shifted in the upper and lower rows or in the left and right columns. By forming the layout by such a procedure, the subpixels having an optimum area ratio can easily be designed in various pixel arrangement.

SUMMARY OF THE INVENTION

[0007] The technical problem to be solved by the present invention includes, with respect to the problem that the sub-pixels of different colors in the existing organic light emitting diode array substrate have different life times, providing an organic light emitting diode array substrate with balanced life times and high resolutions of various sub-pixels.

[0008] The technical solution adopted for solving the technical problem of the present invention is an organic light emitting diode array substrate, comprising a plurality of sub-pixels having light emitting layers, the sub-pixels being divided into three different colors comprising first color sub-pixels, second color sub-pixels and third color sub-pixels with the same amount, and

the first color sub-pixels are in a diamond shape;

the second color sub-pixels and the third color sub-pixels are in a parallelogram shape, and lengths of their short sides are equal to a side length of the first color sub-pixels, lengths of their long sides are both greater than the side length of the first color sub-pixels. Each of the sub-pixels comprises one group of opposite sides parallel to a first direction and the other group of opposite sides parallel to a second direction. The lengths of the long sides of the second color sub-pixels and the third color sub-pixels are both 1.5 times of the side length of the first color sub-pixels. The array substrate comprises a plurality of repeating units, each of the repeating units comprising four first color sub-pixels, four second color sub-pixels and four third color sub-pixels. In each of the repeating units, the long sides of two second color sub-pixels are parallel to the first direction, and the long sides of the other two second color sub-pixels are parallel to the second direction; the long sides of two third color sub-

pixels are parallel to the first direction, and the long sides of the other two third color sub-pixels are parallel to the second direction.

[0009] Preferably, in each of the repeating units, two first color sub-pixels are arranged adjacently along the first direction, the other two first color sub-pixels are arranged adjacently along the second direction; the two second color sub-pixels whose long sides are parallel to the first direction are arranged adjacently along the first direction, the two second color sub-pixels whose long sides are parallel to the second direction are arranged adjacently along the second direction; the two third color sub-pixels whose long sides are parallel to the first direction are arranged adjacently along the first direction, the two third color sub-pixels whose long sides are parallel to the second direction are arranged adjacently along the second direction.

[0010] Further preferably, in each of the repeating units, the two second color sub-pixels arranged adjacently along the first direction and the two first color sub-pixels arranged adjacently along the first direction are arranged in a first column; one end of the two second color sub-pixels arranged adjacently along the second direction coincides with a side of the first color sub-pixel at the end of the first column; a side of the two third color sub-pixels arranged adjacently along the second direction coincides with a side of the two second color sub-pixels arranged adjacently along the second direction; a side of the two third color sub-pixels arranged adjacently along the first direction coincides with a side of two second color sub-pixels in the first column, and one end of the two third color sub-pixels arranged adjacently along the first direction is in contact with a side of the other two third color sub-pixels; one end of the two first color sub-pixels arranged adjacently along the second direction coincides with one end of the two third color sub-pixels arranged adjacently along the second direction.

[0011] In this way, the respective sub-pixels are arranged compactly. That is to say, the respective sub-pixels are combined and arranged together in a seamless way, thereby filling in the display area of the whole array substrate.

[0012] Further preferably, the first color is green; one of the second color and the third color is red, the other is blue.

[0013] The technical solution adopted for solving the technical problem of the present invention is a display device comprising an organic light emitting diode array substrate stated above.

[0014] The sub-pixels of different colors in the organic light emitting diode array substrate of the present invention have different areas, the sub-pixel with a relatively short life time may have a relatively large area, the sub-pixel with a relatively long life time may have a relatively small area, according to the known rule, in the case of the same required display luminance (i.e., the luminance perceived by human eyes), the larger the area of the sub-pixel (actually the light emitting layer) is, the lower the luminance of a unit area will be, so the smaller the current density through the sub-pixel will be, its life time can be prolonged; therefore, the life times of sub-pixels of different colors can be balanced and the whole life time of the array substrate can be prolonged by adjusting the sizes of the sub-pixels of different colors; meanwhile, the luminous efficiencies of sub-pixels of different colors are different, the sensitivities of human eyes to different colors are also different, so in the array substrate, the areas of the sub-pixels can also be adjusted based on these factors, thereby achieving a better display effect; in addition, since the respective sub-pixels are arranged compactly and seamlessly, the organic light emitting diode array substrate has a relatively high resolution and a space utilization ratio, i.e., it can prolong the life time on the basis of increase of the resolution.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015]

Fig. 1 is a schematic view of a structure of a repeating unit in an organic light emitting diode array substrate of an embodiment of the present invention;

Fig. 2 is a schematic view of an organic light emitting diode array substrate of an embodiment of the present invention constituted by the repeating unit in Fig. 1;

Fig. 3 is a schematic view of structure of another representing form of a repeating unit in an organic light emitting diode array substrate of an embodiment of the present invention;

Fig. 4 is a schematic view of an organic light emitting diode array substrate of an embodiment of the present invention constituted by the repeating unit in Fig. 3.

DETAILED DESCRIPTION OF THE INVENTION

[0016] In order to enable the skilled person in the art to understand the technical solution of the present invention better, next, the present invention will be described in more details with reference to the drawings and the specific embodiments.

Embodiment 1:

[0017] This embodiment provides an organic light emitting diode array substrate, comprising a plurality of sub-pixels having light emitting layers, the sub-pixels comprising first color sub-pixels, second color sub-pixels and third color sub-pixels with the same amount, and
the first color sub-pixels are in a diamond shape;
the second color sub-pixels and the third color sub-pixels are in a parallelogram shape, and lengths of their short

sides are equal to a side length of the first color sub-pixels, lengths of their long sides are both greater than the side length of the first color sub-pixels.

Embodiment 2:

[0018] This embodiment provides an organic light emitting diode array substrate, comprising a plurality of sub-pixels having light emitting layers, the sub-pixels comprising first color sub-pixels, second color sub-pixels and third color sub-pixels with the same amount.

[0019] That is to say, the organic light emitting diode array substrate of this embodiment is constituted by a plurality of sub-pixels, and these sub-pixels are arranged compactly, thereby filling in the display area of the whole array substrate seamlessly. Wherein, each sub-pixel comprises an organic light emitting diode, the organic light emitting diode is provided with a light emitting layer for emitting light. The sub-pixels in the array substrate are divided into three different colors (such as red, green, and blue), and the sub-pixels of each color have the same amount.

[0020] Of course, in the sub-pixel, except for the organic light emitting diode (in which a light emitting layer is provided), other structures such as a thin film transistor, a pixel definition layer (PDL, for separating the light emitting layers in different sub-pixels) are also provided, so the light emitting layer will not occupy the whole area of the sub-pixel, however, this does not influence the rule that the larger the area of the sub-pixel is, the larger the area of the light emitting layer is.

[0021] Wherein, the first color sub-pixels are in a diamond shape; the second color sub-pixels and the third color sub-pixels are in a parallelogram shape, and lengths of their short sides are equal to a side length of the first color sub-pixels, lengths of their long sides are both greater than the side length of the first color sub-pixels.

[0022] That is to say, in the array substrate, the sub-pixel of one color is in a diamond shape (with the equal side length), the sub-pixels of the other two colors are in a parallelogram shape (with unequal side lengths), and the length of the short side of the parallelogram is equal to the side length of the diamond, the length of the long side of the parallelogram is greater than the side length of the diamond.

[0023] The sub-pixels of different colors in the organic light emitting diode array substrate of the present invention have different areas, according to the known rule, in the case of the same required display luminance (i.e., the luminance perceived by human eyes), the larger the area of the sub-pixel (actually the light emitting layer) is, the lower the luminance of a unit area will be, so the smaller the current density through the sub-pixel will be, its life time can be prolonged. Therefore, the life times of sub-pixels of different colors can be balanced and the whole life time of the array substrate can be prolonged by adjusting the sizes of the sub-pixels of different colors; meanwhile, the luminous efficiencies of sub-pixels of different colors are different, the sensitivities of human eyes to different colors are also different, so in the array substrate, the areas of the sub-pixels can also be adjusted based on these factors, thereby achieving a better display effect; in addition, since the respective sub-pixels are arranged compactly and seamlessly, the organic light emitting diode array substrate has a relatively high resolution and a space utilization ratio, i.e., it can prolong the life time on the basis of increase of the resolution.

[0024] Preferably, the above first color is green, and one of the second color and the third color is red, the other is blue.

[0025] That is to say, preferably, the area of the green sub-pixel is relatively small, while the areas of the sub-pixels of the other two colors are relatively large. Because with respect to the performance of the existing light emitting layer material, in the case of the same area of the sub-pixels, generally the life time of the green sub-pixels is the longest (meanwhile efficiency is the highest, and the human eyes are also most sensitive to green), while the life times of the blue and red sub-pixels are relatively short, so the areas of the blue sub-pixels and the red sub-pixels can be enlarged to prolong their life times. Specifically, the commonly used doped-type green light material includes C-545T, C-545MT, DMQA, DPT etc., the doped-type red light material includes DCJT, DCJTB, Tubrene etc., the undoped-type red light material includes ACEN, (PPA)(PPA)Pe etc., the blue light material includes TBADN, BCZVBi, DPVBI, DSA, TPP etc.

[0026] Of course, the above contents are not definitions to the protection scope of the present invention, i.e., the first color can also be red or blue, or the colors of the respective sub-pixels are other colors than red, green, blue.

[0027] Each of the sub-pixels comprises one group of opposite sides parallel to a first direction and the other group of opposite sides parallel to a second direction. That is to say, the corresponding sides of the respective parallelograms and diamonds are parallel with one another, thus it is convenient for compact arrangement of the sub-pixels.

[0028] The lengths of the long sides of the second color sub-pixels and the third color sub-pixels are both 1.5 times of the side length of the first color sub-pixels. That is to say, the sizes of the parallelograms of the second color sub-pixels and the third color sub-pixels are preferably equal, and the area thereof is 1.5 times of the first color sub-pixel. Such a multiple relationship on the one hand facilitates compact arrangement; on the other hand, for the existing light emitting layer material, enabling the area of the blue and the red sub-pixels to be 1.5 times of the area of the green sub-pixels can achieve both a better effect of prolonging the life time and a better display effect.

[0029] The array substrate comprises a plurality of repeating units, each of the repeating units comprising four first color sub-pixels, four second color sub-pixels and

four third color sub-pixels.

That is to say, as shown in Fig. 2 and Fig. 4, the array substrate can also be regarded as being formed by arrangement of a plurality of same repeating units, wherein each repeating unit has the same structure, and comprises twelve sub-pixels arranged in a certain form. The advantage of such a form lies in that the arrangement of the sub-pixels in the whole array substrate is relatively regular, so it is relatively convenient for fabricating and driving.

[0030] As shown in Fig. 1 and Fig. 3, in each of the repeating units, the long sides of two second color sub-pixels are parallel to the first direction, and the long sides of the other two second color sub-pixels are parallel to the second direction; the long sides of two third color sub-pixels are parallel to the first direction, and the long sides of the other two third color sub-pixels are parallel to the second direction.

[0031] That is to say, in the four second color sub-pixels of the repeating unit, the long sides of two are parallel to the first direction (the short sides thereof are parallel to the second direction correspondingly), the long sides of the other two are parallel to the second direction (the short sides thereof are parallel to the first direction correspondingly); the rule of the four third color sub-pixels is similar as this.

[0032] When the above arrangement condition is met, it is easy to realize compact arrangement of the respective sub-pixels in the case of relatively uniform distribution.

[0033] More preferably, the arrangement manner of the twelve sub-pixels in the repeating unit can be in the form as shown in Fig. 1.

[0034] The repeating unit in such a form can constitute an array substrate according to the manner as shown in Fig. 2, in the array substrate, the respective sub-pixels are arranged compactly, and the sub-pixels of different colors are distributed uniformly, it is easy to realize display of a high resolution, and the display effect is relatively good, the driving manner is relatively simple.

[0035] In addition, the above arrangement manner has a further advantage, i.e., wherein many sub-pixels of the same color are arranged adjacently, in this way, when the light emitting layers are formed through evaporation, the light emitting layers in such adjacent sub-pixels of the same color can be formed through an opening in a fine metal mask (FMM) plate. For the fine metal mask plate, the minimum size of its opening is limited (mainly limited by the process conditions), such that the minimum size of the light emitting layer formed by using it is limited, this also becomes an important factor of limiting reduction of the size of the sub-pixel (or limiting increase of the resolution). However, according to the above solution, since one opening in the fine metal mask plate can form light emitting layers in a plurality of sub-pixels simultaneously, the size of each sub-pixel can be reduced correspondingly (because it only corresponds to a part of the opening) in the case that the size of the opening is invariable, thereby increasing the resolution.

[0036] Of course, although the light emitting layers in part of the above sub-pixels can be manufactured through an opening in the mask plate, the driving electrodes of the organic light emitting diodes in respective sub-pixels are still separated, and each sub-pixel is also provided with a pixel definition layer, so each sub-pixel can still display the required contents independently.

[0037] More specifically, in the above repeating units, two first color sub-pixels are arranged adjacently along the first direction, the other two first color sub-pixels are arranged adjacently along the second direction; the two second color sub-pixels whose long sides are parallel to the first direction are arranged adjacently along the first direction, the two second color sub-pixels whose long sides are parallel to the second direction are arranged adjacently along the second direction; the two third color sub-pixels whose long sides are parallel to the first direction are arranged adjacently along the first direction, the two third color sub-pixels whose long sides are parallel to the second direction are arranged adjacently along the second direction.

[0038] That is to say, the sub-pixels of the same color in the repeating unit are divided into "two pairs", each "pair" contains two continuously arranged sub-pixels, then these "pairs" of sub-pixels constitute the repeating unit. Such a design facilitates increase of the number of the adjacent sub-pixels of the same color, so as to manufacture more light emitting layers in a plurality of sub-pixels using one opening in the mask plate.

[0039] Further preferably, as shown in Fig. 1, in the above repeating unit, the two second color sub-pixels arranged adjacently along the first direction and the two first color sub-pixels arranged adjacently along the first direction are arranged in a first column (the four sub-pixels in the upper left side of the figure); one end of the two second color sub-pixels (the two sub-pixels in the lower left side of the figure) arranged adjacently along the second direction coincides with a side of the first color sub-pixel at the end of the first column; a side of the two third color sub-pixels (the two third color sub-pixels in the lower part of the figure) arranged adjacently along the second direction coincides with a side of the two second color sub-pixels arranged adjacently along the second direction; a side of the two third color sub-pixels (the two third color sub-pixels in the upper part of the figure) arranged adjacently along the first direction coincides with a side of two second color sub-pixels in the first column, and one end of the two third color sub-pixels arranged adjacently along the first direction is in contact with a side of the other two third color sub-pixels; one end of the two first color sub-pixels (the two sub-pixels in the lower right corner of the figure) arranged adjacently along the second direction coincides with one end of the two third color sub-pixels arranged adjacently along the second direction.

[0040] That is to say, the respective sub-pixels are preferably arranged in the form as shown in Fig. 1 ac-

cording to the above depiction, such a form can achieve a better effect in the aspects of increasing the resolution, improving the display effect and prolonging the life time of the array substrate, which is the optimal solution of the present invention.

[0041] Of course, it should be understood that the arrangement manner described above only represents the relative positional relationship among the respective sub-pixels in the repeating unit, rather than the absolute position, so its equivalent variation is also the protection scope of the present invention. For example, if the repeating unit is overturned horizontally or vertically (correspondingly the first direction and the second direction are also overturned), the obtained arrangement is essentially the same as the above arrangement. Or, if a different part in the array substrate is chosen as the repeating unit, as long as the arrangement manner of the sub-pixels in the whole array substrate is unchanged, the repeating unit is still the same essentially; for example, the repeating unit in Fig. 3 seems different from that in Fig. 1, however, from Fig. 4 it can be seen that the arrangement manner of the sub-pixels in the array substrate constituted by it (except for individual sub-pixels at the edge indeed) is actually the same as the arrangement manner of the sub-pixels of the array substrate in Fig. 2, therefore, the two are essentially the same repeating unit.

[0042] Wherein, the driving method (display method) of the array substrate of this embodiment is various, for example, each three adjacent sub-pixels of different colors therein can be taken as one "pixel", and the luminance of the three sub-pixels can be calculated based on the contents that need to be displayed by this pixel; or, the array substrate can be divided into a plurality of zones, the display contents and the like of each sub-pixel can be calculated based on the area proportion of the sub-pixels of different colors in each zone; anyway, the driving method thereof will be not described in detail here.

Embodiment 3:

[0043] This embodiment provides a display device comprising an array substrate of any of the above. The display device is an organic light emitting diode (OLED) display device, which may specifically be any product or component with the display function such as electronic paper, a mobile phone, a panel computer, a television, a display, a laptop, a digital photo frame, a navigator.

It could be understood that the above embodiments are only exemplary embodiments used for explaining the principle of the present invention, however, the present invention is not limited to this. For the ordinary skilled person in the art, various modifications and improvements can be made without departing from the scope of the invention as defined in the appended claims.

Claims

1. An organic light emitting diode array substrate, comprising a plurality of sub-pixels having light emitting layers, the sub-pixels being divided into three different colors comprising first color sub-pixels, second color sub-pixels and third color sub-pixels with a number of the first color sub-pixels being the same as a number of the second color sub-pixels and the same as a number of the third color sub-pixels,
wherein the first color sub-pixels are in a diamond shape,
wherein the second color sub-pixels and the third color sub-pixels are in a parallelogram shape, and lengths of short sides of the second color sub-pixels and the third color sub-pixels are equal to a side length of the first color sub-pixels, lengths of long sides of the second color sub-pixels and the third color sub-pixels are both greater than the side length of the first color sub-pixels,
wherein each of the sub-pixels comprises one group of opposite sides parallel to a first direction and another group of opposite sides parallel to a second direction,
wherein the lengths of the long sides of the second color sub-pixels and the third color sub-pixels are both 1.5 times of the side length of the first color sub-pixels,
wherein the array substrate comprises a plurality of repeating units, each of the repeating units comprising four first color sub-pixels, four second color sub-pixels and four third color sub-pixels,
characterized in,
that in each of the repeating units, the long sides of two second color sub-pixels are parallel to the first direction, and the long sides of the other two second color sub-pixels are parallel to the second direction and
that the long sides of two third color sub-pixels are parallel to the first direction, and the long sides of the other two third color sub-pixels are parallel to the second direction.

2. The organic light emitting diode array substrate according to claim 1, wherein, in each of the repeating units,
two first color sub-pixels are arranged adjacently along the first direction, the other two first color sub-pixels are arranged adjacently along the second direction;
the two second color sub-pixels whose long sides are parallel to the first direction are arranged adjacently along the first direction, the two second color sub-pixels whose long sides are parallel to the second direction are arranged adjacently along the second direction;
the two third color sub-pixels whose long sides are parallel to the first direction are arranged adjacently

along the first direction, the two third color sub-pixels whose long sides are parallel to the second direction are arranged adjacently along the second direction.

3. The organic light emitting diode array substrate according to claim 2, wherein, in each of the repeating units,
the two second color sub-pixels arranged adjacently along the first direction and the two first color sub-pixels arranged adjacently along the first direction are arranged in a first column;
one end of the two second color sub-pixels arranged adjacently along the second direction coincides with a side of the first color sub-pixel at the end of the first column;
a side of the two third color sub-pixels arranged adjacently along the second direction coincides with a side of the two second color sub-pixels arranged adjacently along the second direction;
a side of the two third color sub-pixels arranged adjacently along the first direction coincides with a side of two second color sub-pixels in the first column, and one end of the two third color sub-pixels arranged adjacently along the first direction is in contact with a side of the other two third color sub-pixels;
one end of the two first color sub-pixels arranged adjacently along the second direction coincides with one end of the two third color sub-pixels arranged adjacently along the second direction.

4. The organic light emitting diode array substrate according to any of claims 1 to 3, wherein
the first color is green;
one of the second color and the third color is red, the other is blue.

5. A display device comprising:
an organic light emitting diode array substrate according to any of claims 1 to 4.

Patentansprüche

1. Substrat mit einem Array von organischen Leuchtdioden, umfassend eine Mehrzahl von Subpixeln mit Licht emittierenden Schichten, wobei die Subpixel in drei verschiedene Farben unterteilt sind, die Subpixel einer ersten Farbe, Subpixel einer zweiten Farbe und Subpixel einer dritten Farbe umfassen, wobei eine Anzahl der Subpixel der ersten Farbe gleich einer Anzahl der Subpixel der zweiten Farbe und gleich einer Anzahl der Subpixel der dritten Farbe ist, wobei die Subpixel der ersten Farbe die Form eines Diamanten aufweisen,
wobei die Subpixel der zweiten Farbe und die Subpixel der dritten Farbe die Form eines Parallelogramms aufweisen, und Längen von kurzen Seiten der Subpixel der zweiten Farbe und der Subpixel der dritten Farbe gleich einer Seitenlänge der Subpixel der ersten Farbe sind, und Längen von langen Seiten der Subpixel der zweiten Farbe und der Subpixel der dritten Farbe jeweils größer als die Seitenlänge der Subpixel der ersten Farbe sind,
wobei jedes der Subpixel eine Gruppe von gegenüberliegenden Seiten parallel zu einer ersten Richtung und eine andere Gruppe von gegenüberliegenden Seiten parallel zu einer zweiten Richtung umfasst,
wobei die Längen der langen Seiten der Subpixel der zweiten Farbe und der Subpixel der dritten Farbe jeweils das 1,5-fache der Seitenlänge der Subpixel der ersten Farbe sind,
wobei das Array-Substrat eine Mehrzahl von Wiederholungseinheiten umfasst, und jede der Wiederholungseinheiten vier Subpixel der ersten Farbe, vier Subpixel der zweiten Farbe und vier Subpixel der dritten Farbe umfasst,
dadurch gekennzeichnet, dass
in jeder der Wiederholungseinheiten die langen Seiten von zwei Subpixeln der zweiten Farbe parallel zur ersten Richtung sind, und die langen Seiten der anderen zwei Subpixel der zweiten Farbe parallel zur zweiten Richtung sind, und
die langen Seiten von zwei Subpixeln der dritten Farbe parallel zur ersten Richtung sind, und die langen Seiten der anderen zwei Subpixel der dritten Farbe parallel zur zweiten Richtung sind.

2. Substrat mit einem Array von organischen Leuchtdioden nach Anspruch 1,
wobei in jeder der Wiederholungseinheiten
zwei Subpixel der ersten Farbe entlang der ersten Richtung benachbart angeordnet sind, und die anderen zwei Subpixel der ersten Farbe entlang der zweiten Richtung benachbart angeordnet sind;
die zwei Subpixel der zweiten Farbe, deren lange Seiten parallel zur ersten Richtung sind, entlang der ersten Richtung benachbart angeordnet sind, und die zwei Subpixel der zweiten Farbe, deren lange Seiten parallel zur zweiten Richtung sind, entlang der zweiten Richtung benachbart angeordnet sind,
die zwei Subpixel der dritten Farbe, deren lange Seiten parallel zur ersten Richtung sind, entlang der ersten Richtung benachbart angeordnet sind, und die zwei Subpixel der dritten Farbe, deren lange Seiten parallel zur zweiten Richtung sind, entlang der zweiten Richtung benachbart angeordnet sind.

3. Substrat mit einem Array von organischen Leuchtdioden nach Anspruch 2, wobei in jeder der Wiederholungseinheiten
die zwei Subpixel der zweiten Farbe, die entlang der ersten Richtung benachbart angeordnet sind, und die zwei Subpixel der ersten Farbe, die entlang der ersten Richtung benachbart angeordnet sind, in einer ersten Spalte angeordnet sind;

ein Ende der zwei Subpixel der zweiten Farbe, die entlang der zweiten Richtung benachbart angeordnet sind, mit einer Seite des Subpixels der ersten Farbe am Ende der ersten Spalte zusammentrifft;
eine Seite der zwei Subpixel der dritten Farbe, die entlang der zweiten Richtung benachbart angeordnet sind, mit einer Seite der zwei Subpixel der zweiten Farbe zusammentrifft, die entlang der zweiten Richtung benachbart angeordnet sind;
eine Seite der zwei Subpixel der dritten Farbe, die entlang der ersten Richtung benachbart angeordnet sind, mit einer Seite der zwei Subpixel der zweiten Farbe in der ersten Spalte zusammentrifft, und ein Ende der zwei Subpixel der dritten Farbe, die entlang der ersten Richtung benachbart angeordnet sind, mit einer Seite der anderen zwei Subpixel der dritten Farbe in Kontakt ist;
ein Ende der zwei Subpixel der ersten Farbe, die entlang der zweiten Richtung benachbart angeordnet sind, mit einem Ende der zwei Subpixel der dritten Farbe zusammentrifft, die entlang der zweiten Richtung benachbart angeordnet sind.

4. Substrat mit einem Array von organischen Leuchtdioden nach einem der Ansprüche 1 bis 3, wobei
die erste Farbe Grün ist;
eine der zweiten Farbe und der dritten Farbe Rot ist, und die andere Blau ist.

5. Anzeigevorrichtung, umfassend:
ein Substrat mit einem Array von organischen Leuchtdioden nach einem der Ansprüche 1 bis 4.

Revendications

1. Substrat à réseau de diodes électroluminescentes organiques, comprenant une pluralité de sous-pixels ayant des couches d'émission de lumière, les sous-pixels étant divisés en trois couleurs différentes comprenant des sous-pixels d'une première couleur, des sous-pixels d'une deuxième couleur et des sous-pixels d'une troisième couleur avec un nombre des sous-pixels de la première couleur qui est le même qu'un nombre des sous-pixels de la deuxième couleur et le même qu'un nombre des sous-pixels de la troisième couleur,
dans lequel les sous-pixels de la première couleur sont en forme de losange,
dans lequel les sous-pixels de la deuxième couleur et les sous-pixels de la troisième couleur sont en forme de parallélogramme, et des longueurs de côtés courts des sous-pixels de la deuxième couleur et des sous-pixels de la troisième couleur sont égales à une longueur du côté des sous-pixels de la première couleur, des longueurs de côtés longs des sous-pixels de la deuxième couleur et des sous-pixels de la troisième couleur sont toutes deux supérieures à la longueur du côté des sous-pixels de la première couleur,
dans lequel chacun des sous-pixels comprend un groupe de côtés opposés parallèles à une première direction et un autre groupe de côtés opposés parallèles à une deuxième direction,
dans lequel les longueurs des côtés longs des sous-pixels de la deuxième couleur et des sous-pixels de la troisième couleur sont toutes deux égales à 1,5 fois la longueur du côté des sous-pixels de la première couleur,
dans lequel le substrat à réseau comprend une pluralité d'unités répétitives, chacune des unités répétitives comprenant quatre sous-pixels de la première couleur, quatre sous-pixels de la deuxième couleur et quatre sous-pixels de la troisième couleur,
caractérisé
en ce que, dans chacune des unités répétitives, les côtés longs de deux sous-pixels de la deuxième couleur sont parallèles à la première direction, et les côtés longs des deux autres sous-pixels de la deuxième couleur sont parallèles à la deuxième direction et
en ce que les côtés longs de deux sous-pixels de la troisième couleur sont parallèles à la première direction, et les côtés longs des deux autres sous-pixels de la troisième couleur sont parallèles à la deuxième direction.

2. Substrat à réseau de diodes électroluminescentes organiques selon la revendication 1, dans lequel, dans chacune des unités répétitives,
deux sous-pixels de la première couleur sont disposés de façon adjacente le long de la première direction, les deux autres sous-pixels de la première couleur sont disposés de façon adjacente le long de la deuxième direction ;
les deux sous-pixels de la deuxième couleur dont les côtés longs sont parallèles à la première direction sont disposés de façon adjacente le long de la première direction, les deux sous-pixels de la deuxième couleur dont les côtés longs sont parallèles à la deuxième direction sont disposés de façon adjacente le long de la deuxième direction ;
les deux sous-pixels de la troisième couleur dont les côtés longs sont parallèles à la première direction sont disposés de façon adjacente le long de la première direction, les deux sous-pixels de la troisième couleur dont les côtés longs sont parallèles à la deuxième direction sont disposés de façon adjacente le long de la deuxième direction.

3. Substrat à réseau de diodes électroluminescentes organiques selon la revendication 2, dans lequel, dans chacune des unités répétitives,
les deux sous-pixels de la deuxième couleur disposés de façon adjacente le long de la première direction et les deux sous-pixels de la première couleur

disposés de façon adjacente le long de la première direction sont disposés dans une première colonne ;
une extrémité des deux sous-pixels de la deuxième couleur disposés de façon adjacente le long de la deuxième direction coïncide avec un côté du sous-pixel de la première couleur à l'extrémité de la première colonne ;
un côté des deux sous-pixels de la troisième couleur disposés de façon adjacente le long de la deuxième direction coïncide avec un côté des deux sous-pixels de la deuxième couleur disposés de façon adjacente le long de la deuxième direction ;
un côté des deux sous-pixels de la troisième couleur disposés de façon adjacente le long de la première direction coïncide avec un côté des deux sous-pixels de la deuxième couleur dans la première colonne, et une extrémité des deux sous-pixels de la troisième couleur disposés de façon adjacente le long de la première direction est en contact avec un côté des deux autres sous-pixels de la troisième couleur ;
une extrémité des deux sous-pixels de la première couleur disposés de façon adjacente le long de la deuxième direction coïncide avec une extrémité des deux sous-pixels de la troisième couleur disposés de façon adjacente le long de la deuxième direction.

4. Substrat à réseau de diodes électroluminescentes organiques selon l'une quelconque des revendications 1 à 3, dans lequel
la première couleur est le vert ;
l'une de la deuxième couleur et la troisième couleur est le rouge, l'autre est le bleu.

5. Dispositif d'affichage comprenant :
un substrat à réseau de diodes électroluminescentes organiques selon l'une quelconque des revendications 1 à 4.

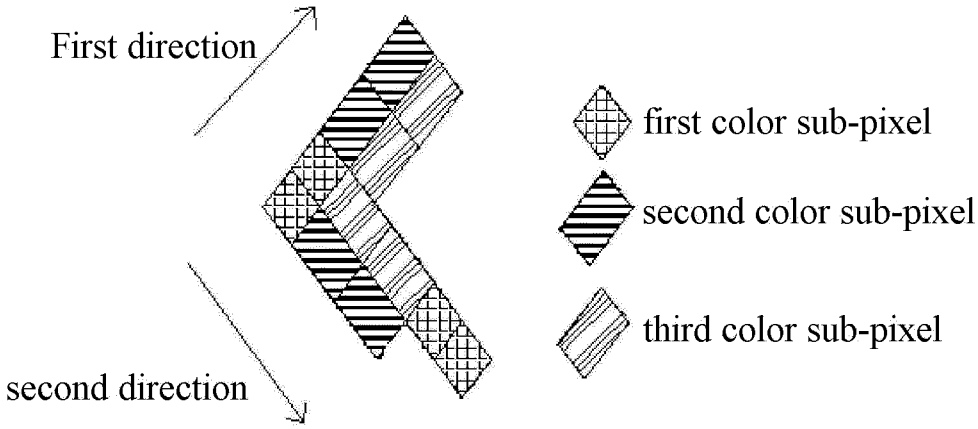
First direction
second direction
first color sub-pixel
second color sub-pixel
third color sub-pixel

Fig. 1

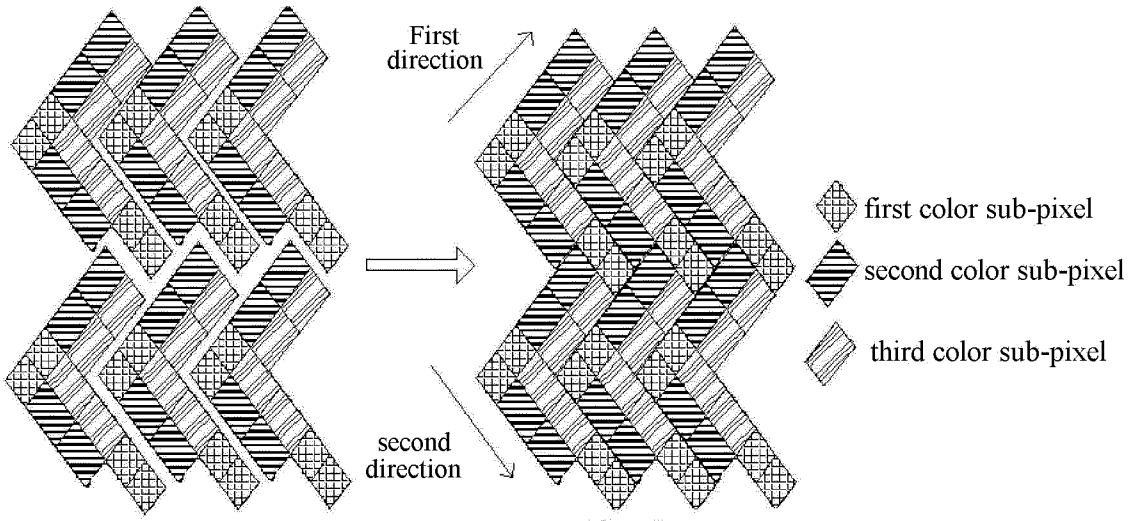
First direction
second direction
first color sub-pixel
second color sub-pixel
third color sub-pixel

Fig. 2

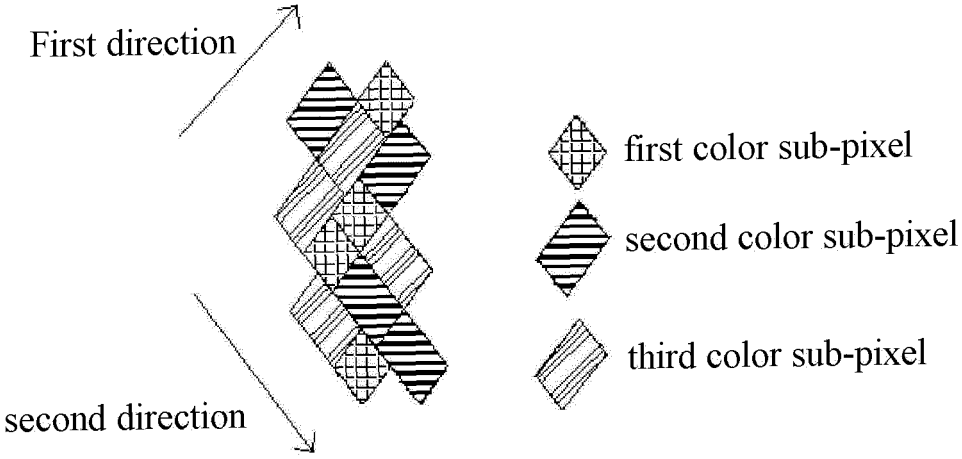
First direction
second direction
first color sub-pixel
second color sub-pixel
third color sub-pixel

Fig. 3

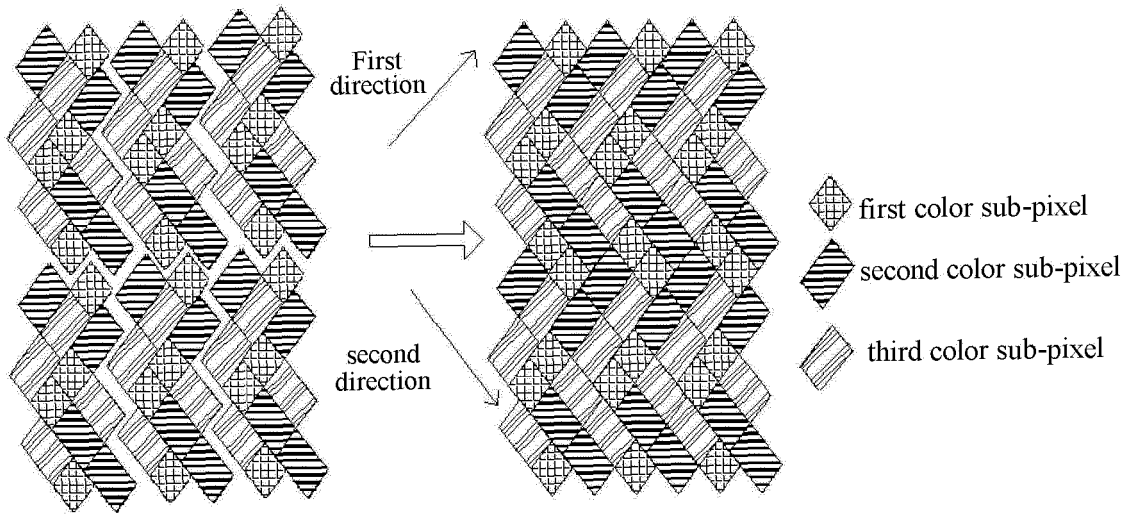
First direction
second direction
first color sub-pixel
second color sub-pixel
third color sub-pixel

Fig. 4

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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- US 2006017375 A1 **[0005]**
- JP 2005129505 A **[0006]**

专利名称(译)	有机LED阵列基板和显示装置		
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优先权	201410521023.7 2014-09-30 CN		
其他公开文献	EP3203520A4 EP3203520A1		
外部链接	Espacenet		

摘要(译)

本发明提供了一种有机发光二极管阵列基板及显示装置，属于显示技术领域，能够解决现有有机发光二极管阵列基板中不同颜色的子像素不同的问题。 生活时间。 本发明的有机发光二极管阵列基板包括具有发光层的多个子像素，所述子像素包括相同数量的第一颜色子像素，第二颜色子像素和第三颜色子像素， 第一颜色子像素为菱形。 第二颜色子像素和第三颜色子像素为平行四边形，其短边的长度等于第一颜色子像素的边长，其长边的长度均大于边长。 第一颜色子像素的长度。

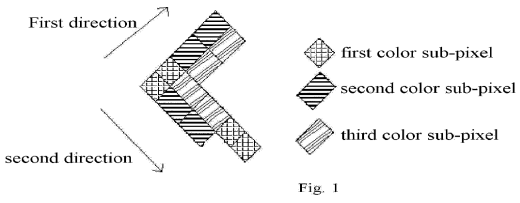

Fig. 1

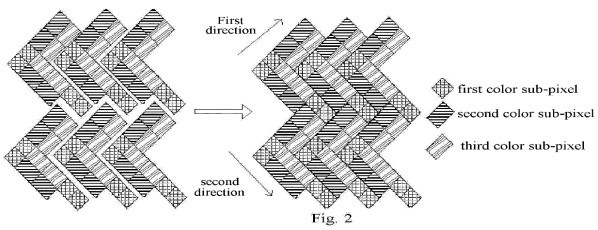

Fig. 2