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(54) **DISPLAY DEVICE AND METHOD FOR MANUFACTURING THE SAME**

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(57) **ABSTRACT**

A display device includes a display panel including an organic light emitting diode, a sealing metal foil covering a side of the display panel on which the organic light emitting diode is disposed, and a sealant between the display panel and the sealing metal foil.

901

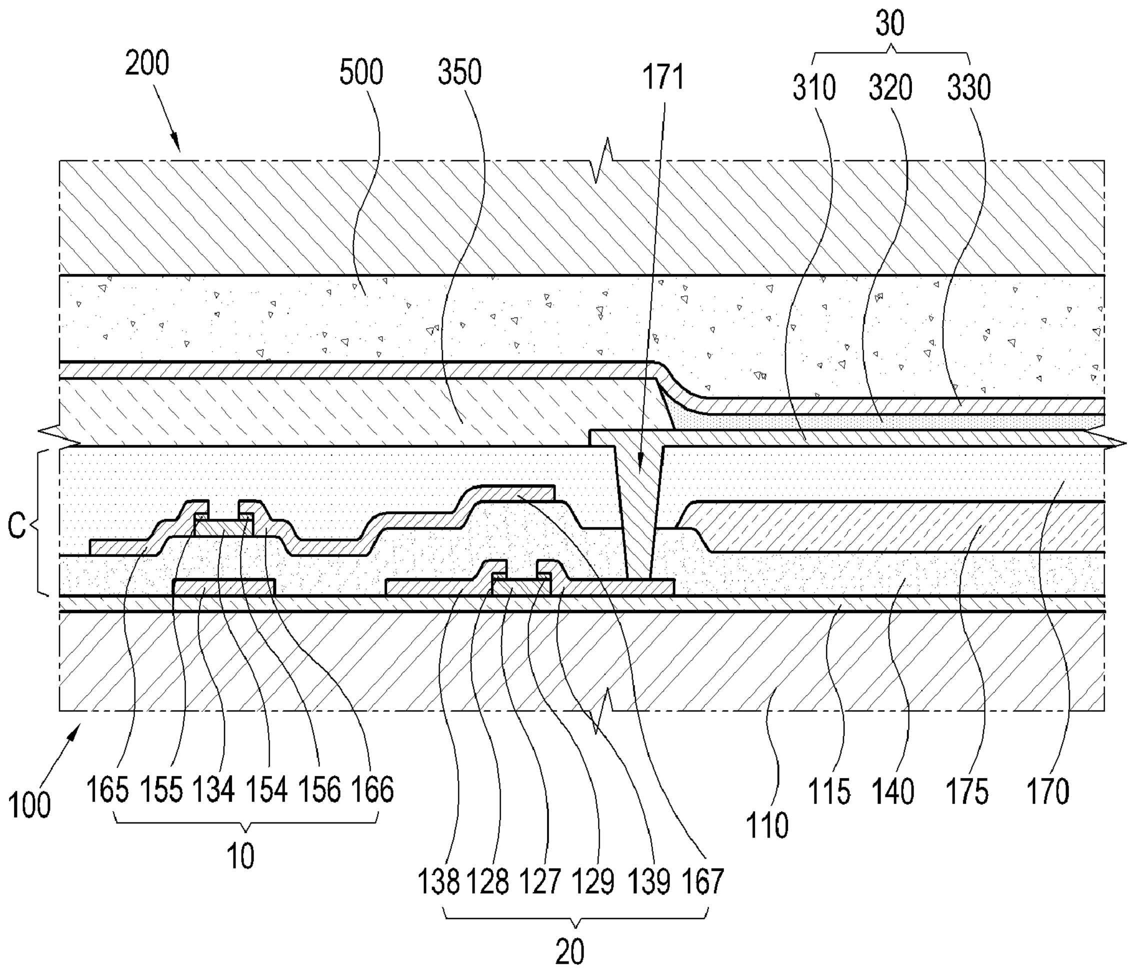


FIG. 1

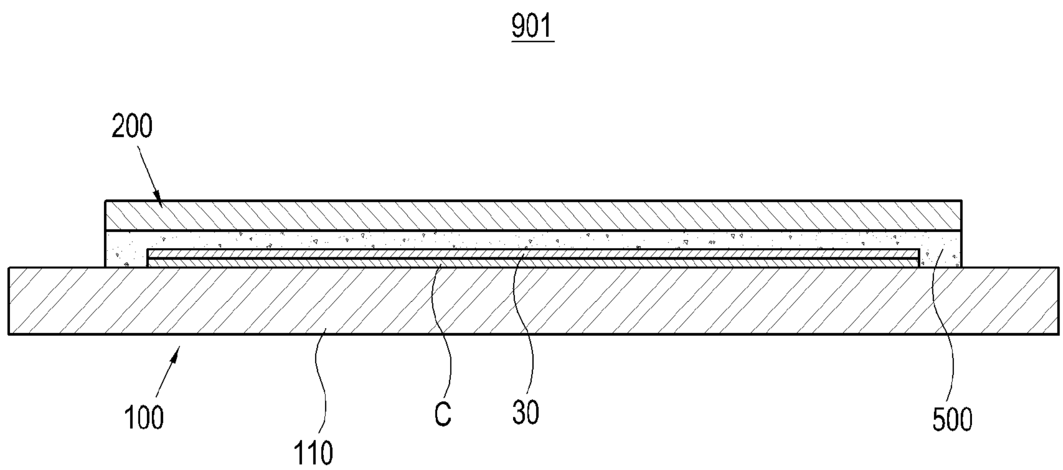


FIG. 2

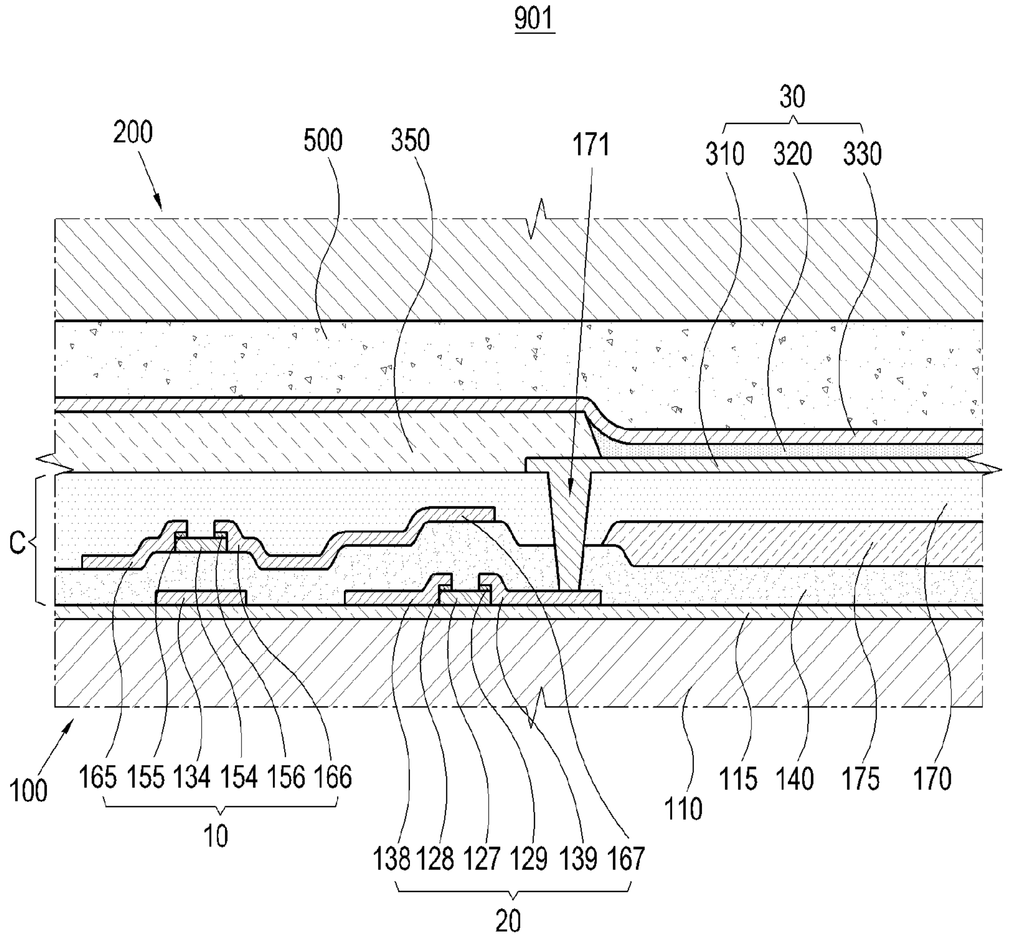

901
30
200
500
350
171
310
320
330
C
100
165
155
134
154
156
166
10
138
128
127
129
139
167
20
110
115
140
175
170

FIG. 3

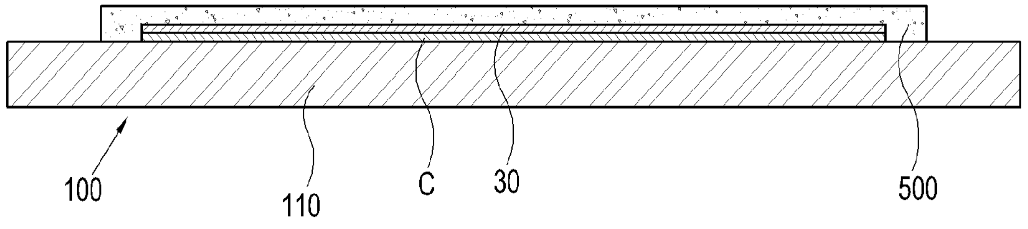


FIG. 4

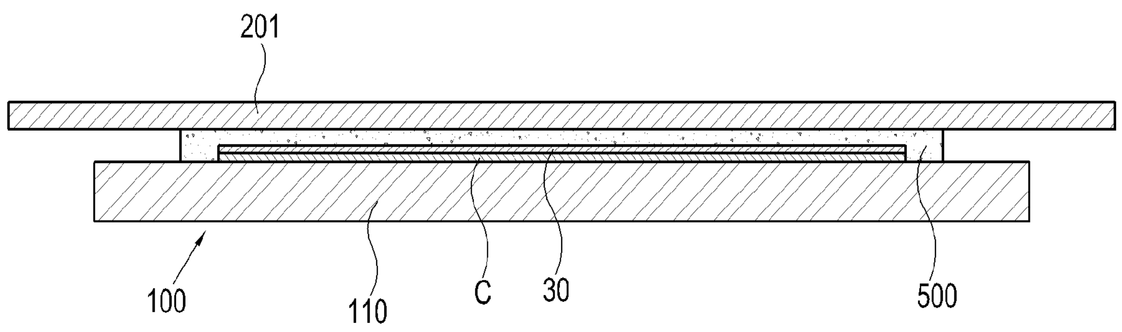


FIG. 5

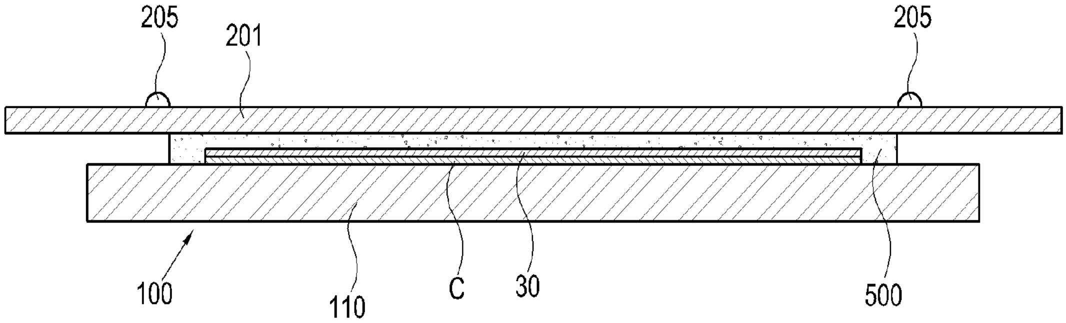


FIG. 6

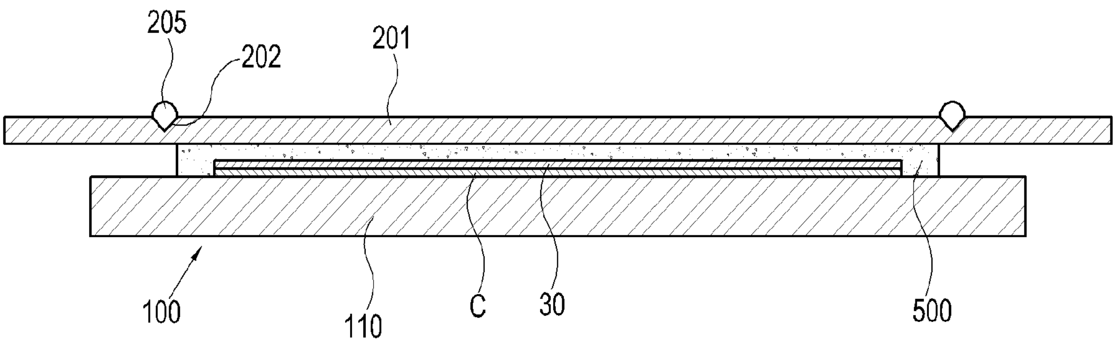


FIG. 7

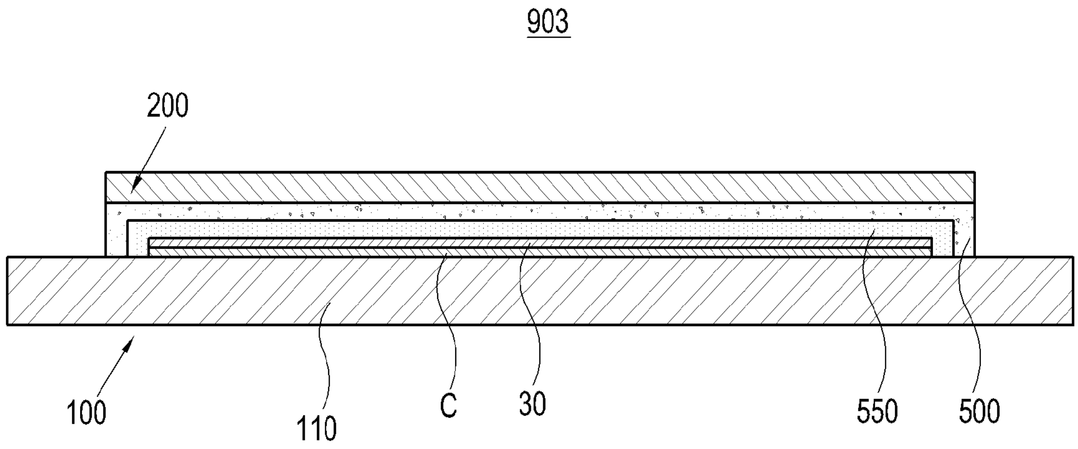


FIG. 8

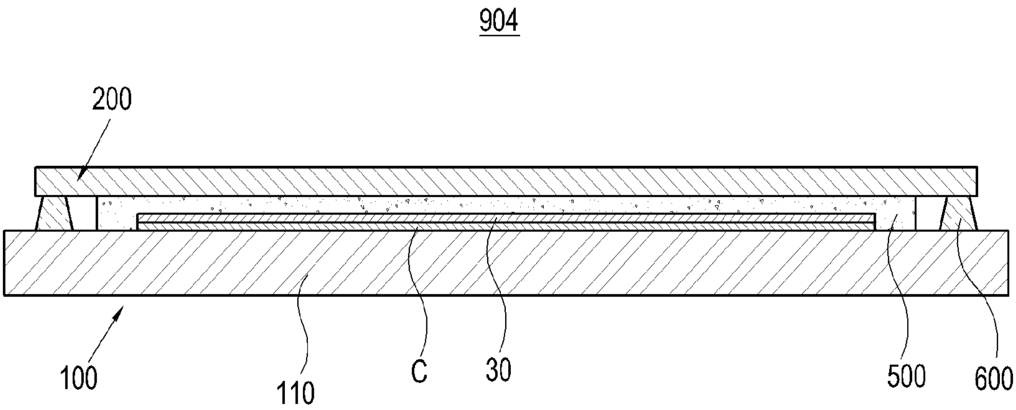


FIG. 9

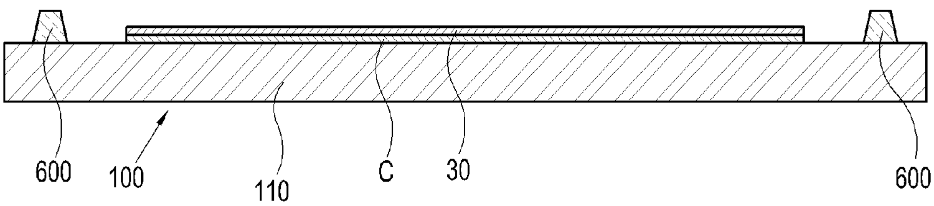


FIG. 10

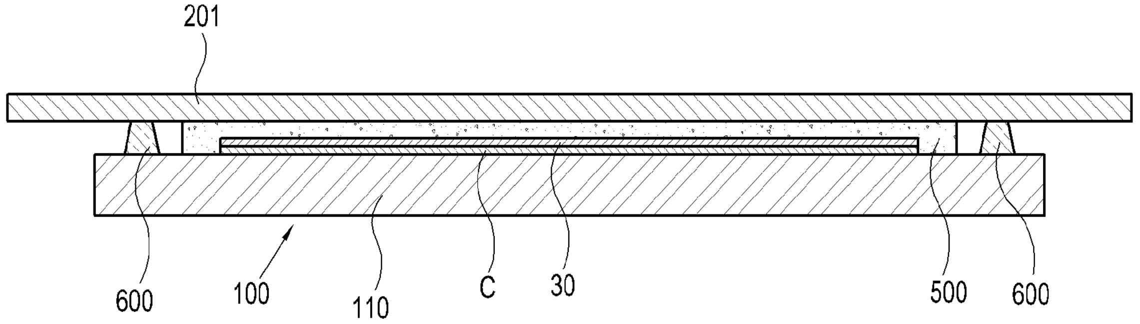
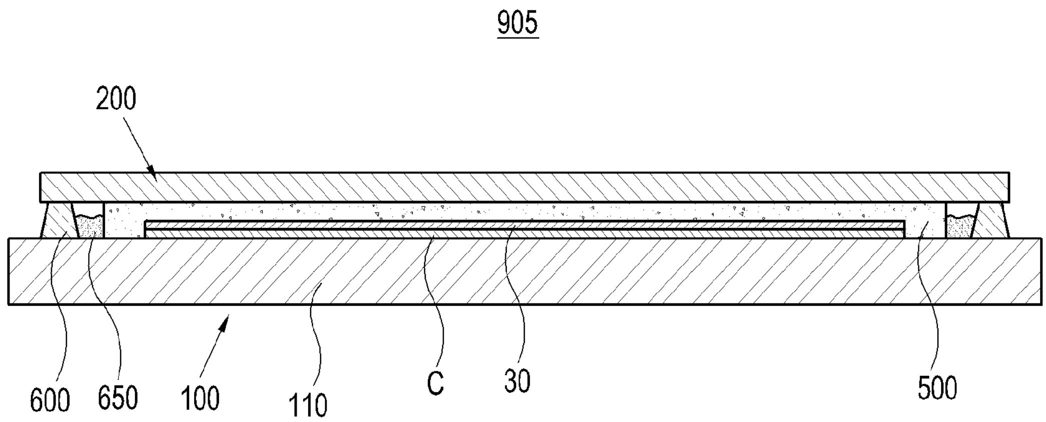


FIG. 11



DISPLAY DEVICE AND METHOD FOR MANUFACTURING THE SAME

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims priority from and the benefit of Korean Patent Application No. 10-2007-0030352, filed on Mar. 28, 2007, which is hereby incorporated by reference for all purposes as if fully set forth herein.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to a display device and a manufacturing method thereof, and more particularly, to a display device having a slim size, and a manufacturing method thereof.

[0004] 2. Discussion of the Background

[0005] Among the various types of display devices, the liquid crystal display (LCD) and the organic light emitting diode (OLED) display are small and light-weight and have improved in performance due in part to rapidly developing semiconductor technology. This is especially true of the organic light emitting diode display.

[0006] An organic light emitting diode display may include a display panel having a thin film transistor (TFT) and an organic light emitting diode and an encapsulation panel facing and covering the display panel. However, the encapsulation panel of a conventional organic light emitting diode display is made of glass. The thickness of the encapsulation panel may be about 700 μm to 1000 μm and that is very thick. Accordingly, the encapsulation panel increases the size of the organic light emitting diode display and it therefore, may be difficult to provide a slim organic light emitting diode display.

SUMMARY OF THE INVENTION

[0007] The present invention provides a slim display device.

[0008] The present invention also provides a method of manufacturing the slim display device.

[0009] Additional features of the invention will be set forth in the description which follows, and in part will be obvious from the description, or may be learned by practice of the present invention.

[0010] The present invention discloses a display device including a display panel including an organic light emitting diode, a sealing metal foil to cover a side of the display panel on which the organic light emitting diode is formed, and a sealant between the display panel and the sealing metal foil.

[0011] The present invention also discloses a method of manufacturing a display device including preparing a display panel including an organic light emitting diode (OLED), coating a sealant on the organic light emitting diode of the display panel, covering the sealant with a thin metal plate, and forming a sealing metal foil to cover the organic light emitting diode by cutting the thin metal plate.

[0012] It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory and are intended to provide further explanation of the invention as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this specification, illustrate embodiments of the invention, and together with the description serve to explain the principles of the invention.

[0014] FIG. **1** is a cross-sectional view of a display device according to a first exemplary embodiment of the present invention.

[0015] FIG. **2** is an enlarged view of a display panel in FIG. **1**.

[0016] FIG. **3**, FIG. **4**, and FIG. **5** are cross-sectional views showing a process of manufacturing the display device of FIG. **1**.

[0017] FIG. **6** is a cross-sectional view of a process of manufacturing a display device according to a second exemplary embodiment of the present invention.

[0018] FIG. **7** is a cross-sectional view of a display device according to a third exemplary embodiment of the present invention.

[0019] FIG. **8** is a cross-sectional view of a display device according to a fourth exemplary embodiment of the present invention.

[0020] FIG. **9** and FIG. **10** are cross-sectional views showing a process of manufacturing the display device of FIG. **8**.

[0021] FIG. **11** is a cross-sectional view of a display device according to a fifth exemplary embodiment of the present invention.

DETAILED DESCRIPTION OF THE ILLUSTRATED EMBODIMENTS

[0022] The invention is described more fully hereinafter with reference to the accompanying drawings, in which embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein. Rather, these embodiments are provided so that this disclosure is thorough, and will fully convey the scope of the invention to those skilled in the art. In the drawings, the size and relative sizes of layers and regions may be exaggerated for clarity. Like reference numerals in the drawings denote like elements.

[0023] It will be understood that when an element or layer is referred to as being "on" or "connected to" another element or layer, it can be directly on or directly connected to the other element or layer, or intervening elements or layers may be present. In contrast, when an element is referred to as being "directly on" or "directly connected to" another element or layer, there are no intervening elements or layers present.

[0024] The accompanying drawings show an organic light emitting diode (OLED) display as a display device.

[0025] In addition, the accompanying drawings show an active matrix (AM)-type OLED having a 2Tr-1Cap structure in which one pixel may include two thin film transistors (TFTs) and one capacitor, but it is not limited thereto. Herein, the pixel is a minimum unit used to display an image.

[0026] Therefore, in the display device, one pixel may include more than three TFTs and more than two capacitors, and additional wiring may be further provided.

[0027] Constituent elements having the same structures throughout the embodiments are denoted by the same reference numerals and are described in a first embodiment. In the other embodiments, only the constituent elements other than the same constituent elements will be described.

[0028] FIG. **1** is a cross-sectional view of a display device according to a first exemplary embodiment of the present invention.

[0029] As shown in FIG. **1**, a display device **901** includes a display panel **100**, a sealing metal foil **200**, and a sealant **500**. The sealant **500** is filled between the display panel **100** and the sealing metal foil **200** and joins the sealing metal foil **200** to the display panel **100**.

[0030] The display panel **100** includes a substrate member **110**, a circuit-forming layer C formed on the substrate member **110**, and an organic light emitting diode **30**.

[0031] The substrate member **110** may be an insulating substrate, which may be made of glass, crystal, ceramic, or plastic. When the substrate member **110** is made of a material having flexibility, the utilization range of the display device **901** may be increased so that the availability of the display device **901** may be improved.

[0032] Although it is not shown in FIG. **1**, the circuit-forming layer C may include various thin wires such as a gate line, a data line, a common line, a thin film transistor connected to the thin wire, and a capacitor.

[0033] Although it is also not shown in FIG. **1**, the organic light emitting diode **30** may include a positive electrode connected to the thin film transistor of the circuit-forming layer C, an organic layer formed on the positive electrode, and a negative electrode formed on the organic layer. The positive electrode may serve as a hole injection electrode. The negative electrode may serve as an electron injection electrode.

[0034] Holes and electrons may be injected into the organic layer from the positive electrode and the negative electrode, respectively. The injected holes and electrons form excitons. When the energy state of excitons changes from an excited state to a ground state, light is emitted.

[0035] The sealing metal foil **200** covers the display panel **100**. That is, the sealing metal foil **200** covers the organic light emitting diode **30** formed on the display panel **100**. The sealing metal foil **200** may protect the organic light emitting diode **30** of the display panel **100** and may prevent moisture from permeating the organic light emitting diode **30**. The area of the sealing metal foil **200** is substantially equal to or smaller than the area of the display panel **100** and larger than the area of the organic light emitting diode **30**.

[0036] The sealing metal foil **200** may be made of a metal containing at least one of stainless steel, aluminum (Al), copper (Cu), molybdenum (Mo), silver (Ag), tantalum (Ta), tungsten (W), and titanium (Ti). That is, the sealing metal foil **200** may be made of a metal that has excellent moisture-proofing properties and may be etched easily by etchant.

[0037] The sealing metal foil **200** may have a thickness of 5 μm to 500 μm. If the thickness of the sealing metal foil **200** is smaller than 5 μm, a part of the sealing metal foil **200** may be damaged or removed. On the other hand, if the thickness of the sealing metal foil **200** is larger than 500 μm, the total thickness and weight of the display device **901** may increase and the process of manufacturing the display device **901** may become difficult.

[0038] With the above-described configuration, the total size of the display device **901** may be minimized. That is, the thin sealing metal foil **200** may prevent moisture from permeating the organic light emitting diode **30**. Accordingly, the display device **901** may be slim. Also, the cost of the display device **901** may decrease and productivity may improve.

[0039] A conventional organic light emitting diode has an encapsulation panel which is made of glass. The encapsulation panel which is made of glass has a thickness of about 700 μm to 1000 μm. If the encapsulation panel has a thickness of less than 500 μm, the encapsulation panel may not have sufficient strength and stability. Additionally the sealing metal foil **200** is about 10 times cheaper than the encapsulation panel which is made of glass and it results in low production cost.

[0040] A structure of the display device **901** will be described in further detail with reference to FIG. **2**. FIG. **2** shows an enlarged portion of the display device **901**, which emits light to display an image.

[0041] The display panel **100** displays an image through a plurality of pixels. The pixel is a minimum unit used to display an image. A switching thin film transistor **10**, a driving thin film transistor **20**, a capacitor (not shown), and an organic light emitting diode **30** may be formed in one pixel.

[0042] Although it is not shown in the drawings, the display panel **100** may further include a gate line extending in one direction, a data line crossing the gate line, and a common power line.

[0043] The organic light emitting diode **30** may include a pixel electrode **310**, an organic layer **320** formed on the pixel electrode **310**, and a common electrode **330** formed on the organic layer **320**. Herein, the pixel electrode **310** may serve as a hole injection electrode (i.e., positive electrode) and the common electrode **330** may serve as an electron injection electrode (i.e., negative electrode).

[0044] The switching thin film transistor **10** may include a switching gate electrode **134**, a switching source electrode **165**, a switching drain electrode **166**, and a switching semiconductor layer **154**. The driving thin film transistor **20** may include a driving gate electrode **167**, a driving source electrode **138**, a driving drain electrode **139**, and a driving semiconductor layer **127**.

[0045] The switching thin film transistor **10** is used as a switching element to select a pixel to emit light. The switching gate electrode **134** is branched from the gate line. The switching source electrode **165** is branched from the data line. The switching drain electrode **166** may be independently disposed and connected to the driving gate electrode **167**.

[0046] The driving thin film transistor **20** applies a driving power to the pixel electrode **310** to emit light from a selected organic light emitting diode **30** of the organic layer **320**.

[0047] The driving source electrode **139** of the driving thin film transistor **20** may be branched from a common power line (not shown). The driving drain electrode **139** is connected to the pixel electrode **310** of the organic light emitting diode **30**. The pixel electrode **310** is connected to the driving drain electrode **139** through the contact hole **171**.

[0048] Although it is not shown in the drawings, a pair of storage electrodes may be respectively connected to the common power line and the driving gate electrode **167** and may overlap each other to form a capacitor.

[0049] With the above-described configuration, the switching thin film transistor **10** may be driven by a gate voltage supplied through the gate line and supplies a data voltage to the driving thin film transistor **20**. A voltage corresponding to the difference between the common voltage, which is supplied by the common power line to the driving thin film transistor **20**, and the data voltage, which is supplied by the switching thin film transistor **10**, is stored in the capacitor (not shown). A current corresponding to the voltage stored in the capacitor (not shown) flows into the organic light emitting diode **30** through the driving thin film transistor **20** to emit light.

[0050] Hereinafter, the display panel **100** will be described with regard to its lamination order.

[0051] A buffer layer **115** may formed on the substrate member **110**. Herein, the buffer layer **115** may prevent an impurity of the substrate member **110** from penetrating therethrough and provides a planar surface. In other exemplary embodiments, the buffer layer **115** may be omitted.

[0052] The driving semiconductor layer **127** may be formed on the buffer layer **115** and may be made of polysilicon.

[0053] The switching gate electrode **134**, the driving source electrode **138**, and the driving drain electrode **139** are formed on the buffer layer **115** and the driving semiconductor layer **127**. At least a portion of the driving source electrode **138** and at least a portion of the driving drain electrode **139** may overlap the driving semiconductor layer **127**.

[0054] Driving ohmic contact layers **128** and **129** may be interposed between the driving semiconductor layer **127** and the driving source electrode **138** and between the driving semiconductor layer **127** and the driving drain electrode **139**, respectively. The driving ohmic contact layers **128** and **129** include n+ polysilicon in which an n-type impurity is highly doped. The driving ohmic contact layers **128** and **129** may reduce the contact resistance between the driving semiconductor layer **127** and the driving source electrode **138** and between the driving semiconductor layer **127** and the driving drain electrode **139**, respectively.

[0055] An insulating layer **140** may be formed on the switching gate electrode **134**, the driving source electrode **138**, and the driving drain electrode **139**. The switching semiconductor layer **154** may be formed on the insulating layer **140** and include an amorphous silicon layer.

[0056] The switching source electrode **165** and the switching drain electrode **166** may be formed on the insulating layer **140** and the switching semiconductor layer **154**, and the driving gate electrode **167** may be formed on the insulating layer **140**. Herein, the driving gate electrode **167** may be connected to the switching drain electrode **166**. At least a portion of the switching source electrode **165** and at least a portion of the switching drain electrode **166** may overlap the switching semiconductor layer **154**.

[0057] In addition, switching ohmic contact layers **155** and **156** may be interposed between the switching semiconductor layer **154** and the switching source electrode **165** and between the switching semiconductor layer **154** and the switching drain electrode **166**, respectively. The switching ohmic contact layers **155** and **156** may include n+ amorphous silicon in which an n-type impurity is highly doped. The switching ohmic contact layers **155** and **156** may reduce the contact resistance between the switching semiconductor layer **154** and the switching source electrode **165** and between the switching semiconductor layer **154** and the switching drain electrode **166**, respectively.

[0058] A passivation layer **170** may be formed on the switching source electrode **165**, the switching drain electrode **166**, and the driving gate electrode **167**. The passivation layer **170** may act as a planarization layer.

[0059] The passivation layer **170** may be formed with a contact hole **171** exposing the driving drain electrode **139**. The insulating layer **140** may be removed in the contact hole **171**.

[0060] A pixel electrode **310** may be formed on the passivation layer **170** and may be connected to the driving drain electrode **139** through the contact hole **171**.

[0061] The pixel electrode **310** may be formed of a transparent conductive material such as indium tin oxide (ITO) or indium zinc oxide (IZO).

[0062] A pixel definition layer **350** may be formed on the pixel electrode **310**. The pixel definition layer **350** may include an opening exposing the pixel electrode **310**. That is, the pixel definition layer **350** may substantially define each pixel in the display device **100**.

[0063] An organic layer **320** may be formed on the portion of the pixel electrode **310** exposed by the opening of the pixel definition layer **350**. The common electrode **330** covers the pixel definition layer **350** and the organic layer **320**. The pixel electrode **310**, the organic layer **320**, and the common electrode **330** form the organic light emitting diode **30**.

[0064] The organic layer **320** may include a low molecular weight organic material or a polymer material. The organic layer **320** may have multiple layers including a hole-injection layer (HIL), a hole-transporting layer (HTL), an emission layer, an electron-transporting layer (ETL), and an electron-injection layer (EIL). That is, the HIL may be disposed on the pixel electrode **310**, which is a positive electrode, and the HTL, the emission layer, the ETL, and the EIL may be sequentially stacked on the HIL.

[0065] The emission layer emits light. In a first exemplary embodiment of the present invention, the display device **901** may further include a color filter **175** disposed under the passivation layer **170** and overlapping the organic layer **320**. Accordingly, the light emitted from the organic layer **320** has a color. In each pixel, a color filter **175** having one of red, blue, and green colors is disposed, but the color filter **175** is not limited thereto. Accordingly, the color filter **175** may include more than one color. Also, a white pixel may be formed if a portion of the plurality of the organic layer **320** does not overlap the color filter **175**.

[0066] In other exemplary embodiment, the color filter may be omitted, and the emission layer may emit one of white light, red light, blue light, and green light.

[0067] In the first exemplary embodiment, the pixel electrode **310** is the positive electrode and the common electrode **330** is the negative electrode, but they are not limited thereto. That is, the pixel electrode **310** may be the negative electrode and the common electrode **330** may be the positive electrode. In this case, the organic layer **320** may be formed by sequentially stacking the EIL, the ETL, the emission layer, the HTL, and the HIL on the pixel electrode **310**.

[0068] In the first exemplary embodiment, the thin film transistors **10** and **20** are not limited to above-described structure. The thin film transistors **10** and **20** may have various structures different from the above-described structure.

[0069] The sealant **500** may be coated on the common electrode **330** of the display panel **100**, and the sealing metal foil **200** may be formed on the sealant **500**.

[0070] A manufacturing method of the display device **901** according to the first exemplary embodiment of the present invention will be described in further detail with reference to FIG. **3**, FIG. **4**, and FIG. **5**.

[0071] As shown in FIG. **3**, the display panel **100** including the organic light emitting diode **30** is prepared. Then, the sealant **500** may be coated on the organic light emitting diode **30**. Herein, the sealant **500** may be an adhesive filler.

[0072] As shown in FIG. **4**, the sealant **500** may be covered with a thin metal plate **201**. The thin metal plate **201** may include a metal containing at least one of stainless steel, aluminum (Al), copper (Cu), molybdenum (Mo), silver (Ag), tantalum (Ta), tungsten (W), and titanium (Ti).

[0073] The thin metal plate **201** is larger than the display panel **100**. Accordingly, a single thin metal plate **201** may cover a plurality of display panels **100** that are evenly arranged.

[0074] As shown in FIG. **5**, the thin metal plate **201** may be cut by an etchant **205** to an adequate size to form the sealing metal foil **200**. Here, the size of the sealing metal foil **200** may be substantially equal to or smaller than the size of the display panel **100**. However, the size of the formed sealing metal foil **200** may be substantially larger than the size of the organic light emitting diode **30**. That is, the sealing metal foil **200** may stably cover the organic light emitting diode **30**. The etchant **205** may have a high etch rate for the metal of the thin metal plate **201**.

[0075] The etchant **205** may be coated along a cutting line (etching place) of the thin metal plate **201** using a dispensing method or a screen printing method. The thin metal plate **201** may be cut along the cutting line through an etching process to form the sealing metal foil **200**, and then the display device **901** is cleaned.

[0076] With the above-described manufacturing method, a slim display device **901** may be produced.

[0077] A manufacturing method of the display device according to the second exemplary embodiment of the present invention will be described in detail with reference to FIG. **6**.

[0078] As shown in FIG. **6**, a sealant **500** disposed on a display panel **100** may be covered with a thin metal plate **201**. Then, a guide groove **202** may be formed on an etching place of the thin metal plate **201**. An etchant **205** may be coated on the guide groove **202**, and the thin metal plate **201** may be cut. Accordingly, the thin metal plate **201** may be accurately cut by the etchant **205** and the sealing metal foil **200** may be effectively formed. In another exemplary embodiment, the guide groove may be formed in the thin metal plate **201** before the thin metal plate **201** covers the display panel **100**.

[0079] Referring to FIG. **7**, the third exemplary embodiment of the present invention will be described.

[0080] As shown in FIG. **7**, the display device **903** further includes an overcoat layer **550** interposed between an organic light emitting diode **30** of a display panel **100** and a sealant **500**. Herein, the overcoat layer **550** may include an inorganic material such as silicon nitride, silicon oxide, or the others.

[0081] With the above-described configuration, the overcoat layer **550** may prevent damage to the organic light emitting diode **30** during the coating of the sealant **500** on the organic emitting diode **30** and the forming of the sealing metal foil **200**. Also, the overcoat layer **550** may prevent the etchant from permeating the organic light emitting diode **30**. Accordingly, the display device **903** having a slim size may be stably made.

[0082] Referring to FIG. **8**, the fourth exemplary embodiment of the present invention will be described.

[0083] As shown in FIG. **8**, the display device **904** includes a barrier member **600** interposed between a display panel **100** and a sealing metal foil **200** and surrounding the organic light emitting diode **30**.

[0084] The barrier member **600** may include a frit. A frit refers to material that is generally used for the manufacturing of glass. In detail, the frit may include a paste that is a mixture of ceramic materials, such as silicon dioxide and an organic binder. In the first exemplary embodiment, the frit may further include a transition metal such as iron (Fe), copper (Cu), vanadium (V), manganese (Mn), cobalt (Co), nickel (Ni), chrome (Cr), and neodymium (Nd). That is, the frit may be a multicomponent-glass doped with a transition metal.

[0085] The barrier member **600** surrounds the organic light emitting diode **30** and adheres to both the display panel **100** and the sealing metal foil **200**. Accordingly, the barrier member **600** may cover the organic light emitting diode **30**. That is, the organic light emitting diode **30** may be sealed by both of the sealant **500** and the barrier member **600**.

[0086] With the above-described configuration, the display device **904** may more effectively prevent moisture from permeating the organic light emitting diode **30**.

[0087] A method of manufacturing a display device **904** according to the fourth exemplary embodiment of the present invention will be described in detail with reference to FIG. **9** to FIG. **10**.

[0088] As shown in FIG. **9**, a barrier member **600** is formed on the display panel **100** to surround an organic light emitting diode **30**.

[0089] The barrier member **600** may be formed thorough coating melted frit on the periphery of the display panel **100**. The melted frit may be incompletely hardened by heating it to a temperature ranging from 200° C. to 500° C. That is, the barrier member **600** may not be completely hardened when it is being coated on the display panel **100**, but may later harden to have a stable shape. In this process, unnecessary organic material and impurities may be removed from the barrier member **600**. The melted frit may be coated along the periphery of the display panel **100** using a dispensing method or a screen printing method.

[0090] Then, as shown in FIG. **10**, the sealant **500** covering the organic light emitting diode **30** of the display panel **100** may be formed, and a thin metal plate **201** covering the sealant **500** may be formed. Then, a sealing metal foil **200** may be formed thorough cutting the thin metal plate **201**. Here, the thin metal plate **201** may be cut using the etchant. The barrier member **600** contacts the periphery of the sealing metal foil **200**.

[0091] Then, the barrier member **600** may be completely hardened by providing an energy source. Herein, the energy source may be laser and/or heat. In this process, the barrier member **600** may adhere to the sealing metal foil **200**.

[0092] As above shown in FIG. **8**, the display device **904** according to the fourth exemplary embodiment of the present invention is formed.

[0093] With the above-described manufacturing method, the display device **904** may efficiently prevent moisture from permeating through the organic light emitting diode **30**.

[0094] Referring to FIG. **11**, the fifth exemplary embodiment of the present invention will be described.

[0095] As shown in FIG. **11**, the display device **905** further includes a desiccant member **650** disposed between a barrier member **600** and an organic light emitting diode **30**.

[0096] The desiccant member **650** may be made by coating a liquid desiccant, drying the coated liquid desiccant, and activating the dried liquid desiccant. The liquid desiccant may be dried and activated by providing an energy source. Herein, the liquid desiccant may be, for example, "DRYLOS®" of DuPont Company, U.S. The liquid desiccant may be coated through a dispensing method or a screen printing method. The energy source may be a laser and/or heat.

[0097] With the above-described configuration, the display device **905** may efficiently prevent moisture from permeating the organic light emitting diode **30**.

[0098] A method of manufacturing the display device **905** according to the fifth exemplary embodiment of the present invention further includes forming the desiccant member **650** between the barrier member **600** and the organic light emitting diode **30**.

[0099] The desiccant member **650** may be coated between the barrier member **600** and the organic light emitting diode **30** after the barrier member **600** is formed along the periphery of the display panel **100**.

[0100] In other exemplary embodiments, the desiccant member **650** may be coated between the barrier member **600** and the organic light emitting diode **30** after or before covering the organic light emitting diode **30** with the sealant **500**.

[0101] The energy source may activate the desiccant member **650** and harden the barrier member **600** at the same time.

[0102] As described above, according to exemplary embodiments of the present invention, the total size of the display device may be minimized.

[0103] That is, a thin sealing metal foil having a relatively small thickness may prevent moisture from permeating thorough the organic light emitting diode. Accordingly, the display device may be slim. Also, the cost of the display device may become low and productivity may be improved.

[0104] In addition, the display device may efficiently prevent moisture from permeating through the organic light emitting diode.

[0105] In addition, the above-described method of manufacturing the display device may be provided.

[0106] It will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing form the spirit or scope of the invention. Thus, it is intended that the present invention cover the modifications and variations of this invention provided they come within the scope of the appended claims and their equivalents

What is claimed is:

1. A display device, comprising:

a display panel comprising an organic light emitting diode;

a sealing metal foil covering a side of the display panel on which the organic light emitting diode is disposed;

a sealant between the display panel and the sealing metal foil.

2. The display device of claim **1**, wherein the sealing metal foil comprises a metal containing at least one of stainless steel, aluminum (Al), copper (Cu), molybdenum (Mo), silver (Ag), tantalum (Ta), tungsten (W), and titanium (Ti).

3. The display device of claim **2**, wherein the sealing metal foil has a thickness of about 5 μm to about 500 μm.

4. The display device of claim **3**, wherein the size of the sealing metal foil is substantially equal to or smaller than the size of the display panel.

5. The display device of claim **1**, further comprising an overcoat layer interposed between the organic light emitting diode and the sealant.

6. The display device of claim **5**, wherein the overcoat layer comprises inorganic material.

7. The display device of claim **1**, further comprising a barrier member interposed between the display panel and the sealing metal foil, the barrier member surrounding the periphery of the organic light emitting diode.

8. The display device of claim **7**, wherein the barrier member comprises frit.

9. The display device of claim **8**, further comprising a desiccant member disposed between the barrier member and the organic light emitting diode.

10. A display device manufacturing method, comprising:

preparing a display panel comprising an organic light emitting diode (OLED);

coating a sealant on the organic light emitting diode;

covering the sealant with a thin metal plate;

forming a sealing metal foil covering the organic light emitting diode by cutting the thin metal plate.

11. The display device manufacturing method of claim **10**, wherein the sealing metal foil comprises a metal containing at least one of stainless steel, aluminum (Al), copper (Cu), molybdenum (Mo), silver (Ag), tantalum (Ta), tungsten (W), and titanium (Ti).

12. The display device manufacturing method of claim **11**, wherein the sealing metal foil has a thickness of about 5 μm to about 500 μm.

13. The display device manufacturing method of claim **11**, wherein the thin metal plate is cut using an etchant.

14. The display device manufacturing method of claim **13**, wherein cutting the thin metal plate comprises spreading the etchant over an etching place of the thin metal plate.

15. The display device manufacturing method of claim **14**, wherein the etching place of the thin metal plate comprises a guide groove.

16. The display device manufacturing method of claim **10**, further comprising forming a barrier member that surrounds the periphery of the organic light emitting diode before covering the sealant with the thin metal plate.

17. The display device manufacturing method of claim **16**, further comprising forming a desiccant member between the barrier member and the organic light emitting diode.

18. The display device manufacturing method of claim **17**, further comprising activating the desiccant member using an energy source.

19. The display device manufacturing method of claim **16**, further comprising:

hardening the barrier member by providing an energy source; and

joining the barrier member to the sealing metal foil after covering the sealant with the thin metal plate.

20. The display device manufacturing method of claim **19**, wherein the energy source comprises at least one of a laser and heat.

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专利名称(译)	显示装置及其制造方法		
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[标]申请(专利权)人(译)	三星电子株式会社		
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摘要(译)

一种显示装置，包括：显示面板，包括有机发光二极管;密封金属箔，覆盖显示面板的设置有机发光二极管的一侧;以及密封剂，位于显示面板和密封金属箔之间。