CLAIMS

1. A method for manufacturing a display device, comprising the steps of:

forming a plurality of projected portions each having an area including one panel in a first substrate by etching the first substrate;

implanting an ion into the first substrate to form a plurality of single-crystalline semiconductor layers each having an area including one panel in the plurality of projected portions, respectively;

bonding the plurality of single-crystalline semiconductor layers to a second substrate with an insulating layer interposed therebetween;

exposing a first single-crystalline semiconductor layer and a second single-crystalline semiconductor layer each selected from the plurality of single-crystalline semiconductor layers at a time, wherein each of the first single-crystalline semiconductor layer and a second single-crystalline semiconductor layer has an area including one panel;

forming a first display portion over the second substrate by using the first single-crystalline semiconductor layer and a second display portion over the second substrate by using the second single-crystalline semiconductor layer.

2. The method for manufacturing a display device according to claim 1, wherein the insulating layer is a silicon oxide layer formed by a chemical vapor deposition method using an organic silane as a source gas.

3. The method for manufacturing a display device according to claim 2, wherein the organic silane is one selected from the group consisting of tetraethoxysilane, trimethylsilane, tetramethylsilane, tetramethylcyclotetrasiloxane, octamethylcyclotetrasiloxane, hexamethyldisilazane, triethoxysilane, and trisdimethylaminosilane.

4. The method for manufacturing a display device according to claim 1, wherein the first and second single-crystalline semiconductor layers are provided in a range exposed one time with a light exposure apparatus.

5. The method for manufacturing a display device according to claim 1, wherein the first substrate is a semiconductor substrate.

6. The method for manufacturing a display device according to claim 1, wherein the second substrate is one selected from the group consisting of an aluminosilicate glass, an aluminoborosilicate

glass, a barium borosilicate glass, a quartz substrate, a sapphire substrate, and a ceramic substrate.

7. The method for manufacturing a display device according to claim 1, wherein the area including one panel is less than 10 inches in diagonal line.

8. The method for manufacturing a display device according to claim 1, further comprising the step of:

patterning the first single-crystalline semiconductor layer and the second single-crystalline semiconductor layer before the step of forming the first display portion and the second display portion,

wherein the step of patterning is performed after the step of bonding.

9. A method for manufacturing a display device, comprising the steps of:

forming a plurality of projected portions each having an area including one panel in a first substrate by etching the first substrate;

implanting an ion into the first substrate to form a plurality of single-crystalline semiconductor layers each having an area including one panel in the plurality of projected portions, respectively;

bonding the plurality of single-crystalline semiconductor layers to a second substrate with an insulating layer interposed therebetween; and

forming a plurality of display portions over the second substrate by using each of the plurality of single-crystalline semiconductor layers.

10. The method for manufacturing a display device according to claim 9, wherein the insulating layer is a silicon oxide layer formed by a chemical vapor deposition method using an organic silane as a source gas.

11. The method for manufacturing a display device according to claim 10, wherein the organic silane is one selected from the group consisting of tetraethoxysilane, trimethylsilane, tetramethylsilane, tetramethylcyclotetrasiloxane, octamethylcyclotetrasiloxane, hexamethyldisilazane, triethoxysilane, and trisdimethylaminosilane.

12. The method for manufacturing a display device according to claim 9, wherein the first substrate is a semiconductor substrate.

13. The method for manufacturing a display device according to claim 9, wherein the second substrate is one selected from the group consisting of an aluminosilicate glass, an aluminoborosilicate

glass, a barium borosilicate glass, a quartz substrate, a sapphire substrate, and a ceramic substrate.

14. The method for manufacturing a display device according to claim 9, wherein the area including one panel is less than 10 inches in diagonal line.

15. The method for manufacturing a display device according to claim 9, further comprising the step of:

patterning the plurality of single-crystalline semiconductor layers before the step of forming the plurality of display portions,

wherein the step of patterning is performed after the step of bonding.

16. The method for manufacturing a display device according to claim 9, wherein the plurality of single-crystalline semiconductor layers including at least a first single-crystalline semiconductor layer, a second single-crystalline semiconductor layer, a third single-crystalline semiconductor layer, and a fourth single-crystalline semiconductor layer each having the area including one panel.

17. The method for manufacturing a display device according to claim 16, further comprising the steps of:

exposing a first group including at least the first single-crystalline semiconductor layer and the second single-crystalline semiconductor layer after bonding the plurality of single-crystalline semiconductor layers to the second substrate; and

exposing a second group including at least the third single-crystalline semiconductor layer and the fourth single-crystalline semiconductor layer after exposing the first group and before patterning the plurality of single-crystalline semiconductor layers.

18. A method for manufacturing a display device, comprising the steps of:

forming a plurality of projected portions each having an area including one panel in a semiconductor substrate by etching the semiconductor substrate

implanting an ion into the semiconductor substrate to form an ion-doped layer in each of the plurality of projected portions, respectively;

bonding the plurality of projected portions to a base substrate with an insulating layer interposed therebetween;

forming a plurality of semiconductor layers over the base substrate by separating the plurality of projected portions each along the part of the ion-doped layer, wherein the plurality of semiconductor layers including at least a first semiconductor layer and a second semiconductor layer

each having the area including one panel;

exposing a group including at least the first semiconductor layer and the second semiconductor layer; and

patterning at least the first semiconductor layer and the second semiconductor layer to form a first display portion using the patterned first semiconductor layer and to form a second display portion using the patterned second semiconductor layer,

wherein the step of patterning is performed after the step of bonding.

19. The method for manufacturing a display device according to claim 18, wherein the insulating layer is a silicon oxide layer formed by a chemical vapor deposition method using an organic silane as a source gas.

20. The method for manufacturing a display device according to claim 19, wherein the organic silane is one selected from the group consisting of tetraethoxysilane, trimethylsilane, tetramethylsilane, tetramethylcyclotetrasiloxane, octamethylcyclotetrasiloxane, hexamethyldisilazane, triethoxysilane, and trisdimethylaminosilane.

21. The method for manufacturing a display device according to claim 18, wherein the group including at least the first semiconductor layer and the second semiconductor layer is provided in a range exposed one time with a light exposure apparatus.

22. The method for manufacturing a display device according to claim 18, wherein the semiconductor substrate is a single-crystalline semiconductor substrate.

23. The method for manufacturing a display device according to claim 18, wherein the base substrate is one selected from the group consisting of an aluminosilicate glass, an aluminoborosilicate glass, a barium borosilicate glass, a quartz substrate, a sapphire substrate, and a ceramic substrate.

24. The method for manufacturing a display device according to claim 18, wherein the area including one panel is less than 10 inches in diagonal line.

CLAIMS

1. A method for manufacturing a display device, comprising the steps of:

forming a plurality of projected portions each having an area including one panel in a first substrate by etching the first substrate;

implanting an ion into the first substrate to form a plurality of single-crystalline semiconductor layers each having an area including one panel in the plurality of projected portions, respectively;

bonding the plurality of single-crystalline semiconductor layers to a second substrate with an insulating layer interposed therebetween;

exposing a first single-crystalline semiconductor layer and a second single-crystalline semiconductor layer each selected from the plurality of single-crystalline semiconductor layers at a time, wherein each of the first single-crystalline semiconductor layer and the second single-crystalline semiconductor layer has an area including one panel; and

patterning the first single-crystalline semiconductor layer and the second single-crystalline semiconductor layer to form a first display portion over the second substrate by using a patterned first single-crystalline semiconductor layer and a second display portion over the second substrate by using a patterned second single-crystalline semiconductor layer,

wherein the insulating layer is a silicon oxide layer formed by a chemical vapor deposition method using an organic silane as a source gas.

2. The method for manufacturing a display device according to claim 1, wherein the organic silane is one selected from the group consisting of tetraethoxysilane, trimethylsilane, tetramethylsilane, tetramethylcyclotetrasiloxane, octamethylcyclotetrasiloxane, hexamethyldisilazane, triethoxysilane, and trisdimethylaminosilane.

3. The method for manufacturing a display device according to claim 1, wherein the first single-crystalline semiconductor layer and the second single-crystalline semiconductor layer are provided in a range exposed one time with a light exposure apparatus.

4. The method for manufacturing a display device according to claim 1, wherein the first substrate is a semiconductor substrate.

5. The method for manufacturing a display device according to claim 1, wherein the second substrate is one selected from the group consisting of an aluminosilicate glass, an aluminoborosilicate glass, a barium borosilicate glass, a quartz substrate, a sapphire substrate, and a ceramic substrate.

6. The method for manufacturing a display device according to claim 1, wherein the area including one panel is less than 10 inches in diagonal line.

7. A method for manufacturing a display device, comprising the steps of:

forming a plurality of projected portions each having an area including one panel in a first substrate by etching the first substrate;

implanting an ion into the first substrate to form a plurality of single-crystalline semiconductor layers each having an area including one panel in the plurality of projected portions, respectively;

bonding the plurality of single-crystalline semiconductor layers to a second substrate with an insulating layer interposed therebetween; and

patterning the plurality of single-crystalline semiconductor layers to form a plurality of display portions over the second substrate by using each of a plurality of patterned single-crystalline semiconductor layers,

wherein the insulating layer is a silicon oxide layer formed by a chemical vapor deposition method using an organic silane as a source gas.

8. The method for manufacturing a display device according to claim 7, wherein the organic silane is one selected from the group consisting of tetraethoxysilane, trimethylsilane, tetramethylsilane, tetramethylcyclotetrasiloxane, octamethylcyclotetrasiloxane, hexamethyldisilazane, triethoxysilane, and trisdimethylaminosilane.

9. The method for manufacturing a display device according to claim 7, wherein the first substrate is a semiconductor substrate.

10. The method for manufacturing a display device according to claim 7, wherein the second substrate is one selected from the group consisting of an aluminosilicate glass, an aluminoborosilicate glass, a barium borosilicate glass, a quartz substrate, a sapphire substrate, and a ceramic substrate.

11. The method for manufacturing a display device according to claim 7, wherein the area including one panel is less than 10 inches in diagonal line.

12. The method for manufacturing a display device according to claim 7, wherein the plurality of single-crystalline semiconductor layers including at least a first single-crystalline semiconductor layer, a second single-crystalline semiconductor layer, a third single-crystalline semiconductor layer, and a fourth single-crystalline semiconductor layer each having the area including one panel.

13. The method for manufacturing a display device according to claim 12, further comprising the steps of:

exposing a first group including at least the first single-crystalline semiconductor layer and the second single-crystalline semiconductor layer after bonding the plurality of single-crystalline semiconductor layers to the second substrate; and

exposing a second group including at least the third single-crystalline semiconductor layer and the fourth single-crystalline semiconductor layer after exposing the first group and before patterning the plurality of single-crystalline semiconductor layers.

14. A method for manufacturing a display device, comprising the steps of:

forming a plurality of projected portions each having an area including one panel in a semiconductor substrate by etching the semiconductor substrate;

implanting an ion into the semiconductor substrate to form an ion-doped layer in each of the plurality of projected portions, respectively;

bonding the plurality of projected portions to a base substrate with an insulating layer interposed therebetween;

forming a plurality of semiconductor layers over the base substrate by separating the plurality of projected portions each along a part of the ion-doped layer, wherein the plurality of semiconductor layers including at least a first semiconductor layer and a second semiconductor layer each having the area including one panel;

exposing a group including at least the first semiconductor layer and the second semiconductor layer; and

patterning at least the first semiconductor layer and the second semiconductor layer to form a first display portion using a patterned first semiconductor layer and to

form a second display portion using a patterned second semiconductor layer,

wherein the step of patterning is performed after the step of bonding, and

wherein the insulating layer is a silicon oxide layer formed by a chemical vapor deposition method using an organic silane as a source gas.

15. The method for manufacturing a display device according to claim 14, wherein the organic silane is one selected from the group consisting of tetraethoxysilane, trimethylsilane, tetramethylsilane, tetramethylcyclotetrasiloxane, octamethylcyclotetrasiloxane, hexamethyldisilazane, triethoxysilane, and trisdimethylaminosilane.

16. The method for manufacturing a display device according to claim 14, wherein the group including at least the first semiconductor layer and the second semiconductor layer is provided in a range exposed one time with a light exposure apparatus.

17. The method for manufacturing a display device according to claim 14, wherein the semiconductor substrate is a single-crystalline semiconductor substrate.

18. The method for manufacturing a display device according to claim 14, wherein the base substrate is one selected from the group consisting of an aluminosilicate glass, an aluminoborosilicate glass, a barium borosilicate glass, a quartz substrate, a sapphire substrate, and a ceramic substrate.

19. The method for manufacturing a display device according to claim 14, wherein the area including one panel is less than 10 inches in diagonal line.