CLAIMS

1. A field-effect transistor, comprising:

a gate electrode configured to apply gate voltage;

a source electrode and a drain electrode, both of which are configured to take out electric current;

an active layer formed of a n-type oxide semiconductor, provided in contact with the source electrode and the drain electrode; and

a gate insulating layer provided between the gate electrode and the active layer,

wherein work function of the source electrode and the drain electrode is 4.90 eV or greater,

wherein an electron carrier density of the n-type oxide semiconductor is 4.0×10^{17} cm^{-3} or greater,

wherein a material of the source electrode and the drain electrode is a metal, an alloy, or both,

wherein the metal is gold, silver, palladium, nickel, iridium, or rhodium, and

wherein the alloy is an alloy of a plurality of metals selected from the group consisting of gold, silver, palladium, nickel, iridium, and rhodium.

2. The field-effect transistor according to claim 1, wherein the source electrode and the drain electrode are formed by baking metal

particles, alloy particles, an organometallic compound, or any combination thereof.

3. The field-effect transistor according to claim 2, wherein the source electrode and the drain electrode are formed by applying a coating liquid containing metal particles, alloy particles, an organometallic compound, or any combination thereof in a droplet ejecting system, and baking the metal particles, the alloy particles, the organometallic compound, or any combination thereof.

4. The field-effect transistor according to any one of claims 1 to 3, wherein the n-type oxide semiconductor contains indium, zinc, tin, gallium, titanium, or any combination thereof.

5. The field-effect transistor according to claim 4, wherein the n-type oxide semiconductor further contains an alkaline earth metal.

6. A field-effect transistor, comprising:

a gate electrode configured to apply gate voltage;

a source electrode and a drain electrode, both of which are configured to take out electric current;

an active layer formed of a n-type oxide semiconductor, provided in contact with the source electrode and the drain electrode; and

a gate insulating layer provided between the gate electrode and the active layer,

wherein work function of the source electrode and the drain electrode is 4.90 eV or greater,

wherein an electron carrier density of the n-type oxide semiconductor is 1.0×10^{18} cm^{-3} or greater.

7. The field-effect transistor according to claim 6, wherein a material of the source electrode and the drain electrode is a metal, an alloy, or both.

8. The field-effect transistor according to claim 7, wherein the metal, the alloy, or both contain gold, silver, palladium, platinum, nickel, iridium, rhodium, or any combination thereof.

9. The field-effect transistor according to any one of claims 6 to 8, wherein the source electrode and the drain electrode are formed by baking metal particles, alloy particles, an organometallic compound, or any combination thereof.

10. The field-effect transistor according to claim 9, wherein the source electrode and the drain electrode are formed by applying a coating liquid containing metal particles, alloy particles, an organometallic compound, or any combination thereof in a droplet ejecting system, and baking the metal particles, the alloy particles, the organometallic compound, or any combination thereof.

11. The field-effect transistor according to any one of claims 6 to 10, wherein the n-type oxide semiconductor contains indium, zinc, tin, gallium, titanium, or any combination thereof.

12. The field-effect transistor according to claim 11, wherein the n-type oxide semiconductor further contains an alkaline earth metal.

13. A method for producing the field-effect transistor according to any one of claims 1 to 12, the method comprising:

applying a coating liquid containing metal particles, alloy particles, an organometallic compound, or any combination thereof at least on the gate insulating layer, and baking the metal particles, the alloy particles, the organometallic compound, or any combination thereof to form the source electrode and the drain electrode.

14. A method for producing the field-effect transistor according to any one of claims 1 to 12, the method comprising:

applying a coating liquid containing metal particles, alloy particles, an organometallic compound, or any combination thereof at least on a base, and baking the metal particles, the alloy particles, the organometallic compound, or any combination thereof to form the source electrode and the drain electrode.

15. The method according to any of claim 13 or 14, wherein the metal particles, the alloy particles, the organometallic compound, or any combination thereof contain gold, silver, palladium, platinum, nickel, iridium, rhodium, or any combination thereof.

16. A method for producing a field-effect transistor,

the field-effect transistor comprising:

a gate electrode configured to apply gate voltage;

a source electrode and a drain electrode, both of which are configured to take out electric current;

an active layer formed of a n-type oxide semiconductor, provided in contact with the source electrode and the drain electrode; and

a gate insulating layer provided between the gate electrode and the active layer,

wherein work function of the source electrode and the drain electrode is 4.90 eV or greater, and

wherein an electron carrier density of the n-type oxide semiconductor is 4.0×10^{17} cm^{-3} or greater, the method comprising:

applying a coating liquid containing metal particles, alloy particles, an organometallic compound, or any combination thereof at least on the gate insulating layer, and baking the metal particles, the alloy particles, the organometallic compound, or any combination thereof to form the source electrode and the drain electrode.

17. A method for producing a field-effect transistor,

the field-effect transistor comprising:

a gate electrode configured to apply gate voltage;

a source electrode and a drain electrode, both of which are configured to take out electric current;

an active layer formed of a n-type oxide semiconductor, provided in contact with the source electrode and the drain electrode; and

a gate insulating layer provided between the gate electrode and the active layer,

wherein work function of the source electrode and the drain electrode is 4.90 eV or greater, and

wherein an electron carrier density of the n-type oxide semiconductor is 4.0×10^{17} cm^{-3} or greater, the method comprising:

applying a coating liquid containing metal particles, alloy particles, an organometallic compound, or any combination thereof at least on a base, and baking the metal particles, the alloy particles, the organometallic compound, or any combination thereof to form the source electrode and the drain electrode.

18. The method according to any of claim 16 or 17, wherein the metal particles, the alloy particles, the organometallic compound, or any combination thereof contain gold, silver, palladium, platinum, nickel, iridium, rhodium, or any combination thereof.

19. A display element, comprising:

a light control element configured to control light output according to a driving signal; and

a driving circuit, which contains the field-effect transistor according to any one of claims 1 to 12, and is configured to drive the light control element.

20. The display element according to claim 19, wherein the light control element contains an electroluminescent element or an electrochromic element.

21. The display element according to claim 19, wherein the light control element contains a liquid crystal element, or an electrophoretic element.

22. An image display device, which displays an image corresponding to image data, and which comprising:

a plurality of the display elements according to any one of claims 19 to 21, arranged in a matrix;

a plurality of lines configured to separately apply gate voltage to field-effect transistors in each of the display elements; and

a display control device configured to individually control the gate voltage of each of the field-effect transistors through the lines corresponding to the image data.

23. A system, comprising:

the image display device according to claim 22, and

an image data generating device configured to generate an image data based on image information to be displayed, and to output the generated image data to the image display device.