

Claims

- [Claim 1] A field-effect transistor comprising:
a source electrode and a drain electrode;
a gate electrode;
a semiconductor layer; and
a gate insulating layer,
wherein the gate insulating layer is an oxide insulator film including A element and B element, the A element being one or more selected from the group consisting of Zr and Hf and the B element being one or more selected from the group consisting of Be and Mg.
- [Claim 2] The field-effect transistor according to claim 1,
wherein the semiconductor layer is an oxide semiconductor.
- [Claim 3] The field-effect transistor according to claim 1 or 2,
wherein the oxide insulator film further includes C element that is one or more selected from the group consisting of Sc, Y, and Ln (lanthanoid).
- [Claim 4] The field-effect transistor according to any one of claims 1 to 3,
wherein an electron configuration of d orbital of a metal ion included in the oxide insulator film is d^0 or d^{10} .
- [Claim 5] An oxide insulator film comprising:
A element that is one or more selected from the group consisting of Zr and Hf; and
B element that is one or more selected from the group consisting of Be and Mg.
- [Claim 6] The oxide insulator film according to claim 5, further comprising
C element that is one or more selected from the group consisting of Sc, Y, and Ln (lanthanoid).
- [Claim 7] A coating liquid for forming a metal oxide film, the coating liquid comprising:
A element that is one or more selected from the group consisting of Zr and Hf; and
B element that is one or more selected from the group consisting of Be and Mg.
- [Claim 8] The coating liquid for forming a metal oxide film according to claim 7, further comprising
C element that is one or more selected from the group consisting of Sc, Y, and Ln (lanthanoid).

- [Claim 9] The coating liquid for forming a metal oxide film according to claim 7 or 8, further comprising a solvent.
- [Claim 10] A display element comprising:
an optical control element configured to control light output according to a driving signal; and
a driving circuit that includes the field-effect transistor according to any one of claims 1 to 4 and is configured to drive the optical control element.
- [Claim 11] The display element according to claim 10,
wherein the optical control element includes an electroluminescent element, an electrochromic element, a liquid crystal element, an electrophoretic element, or an electrowetting element.
- [Claim 12] An image display device configured to display an image corresponding to image data, the image display device comprising:
a plurality of display elements arranged in a form of matrix, each of the plurality of display elements being the display element according to claim 10 or 11;
a plurality of wired lines configured to individually apply gate voltage to field-effect transistors in the plurality of display elements; and
a display control device configured to individually control the gate voltage of the field-effect transistors via the plurality of wired lines correspondingly to the image data.
- [Claim 13] A system comprising:
the image display device according to claim 12; and
an image-data-generating device configured to generate image data based on image information to be displayed and to output the image data to the image display device.
- [Claim 14] A method for producing an oxide insulator film, the method comprising:
coating the coating liquid for forming a metal oxide film according to any one of claims 7 to 9 on an object to be coated, and drying the coating liquid, followed by baking.
- [Claim 15] A method for producing a field-effect transistor including a source electrode and a drain electrode, a gate electrode, a semiconductor layer, and a gate insulating layer, the method comprising:
coating the coating liquid for forming a metal oxide film according to any one of claims 7 to 9 to form the gate insulating layer.