CLAIMS

1. A metal oxide film comprising indium, gallium, and zinc,

wherein:

the metal oxide film comprises a crystal part;

a size of the crystal part is less than or equal to 10 nm;

the metal oxide film comprises a region where a peak due to the crystal part is not observed in XRD measurement; and

a nanobeam electron diffraction pattern before the metal oxide film is irradiated with an electron beam that is converged to 1 nmϕ and a nanobeam electron diffraction pattern after the metal oxide film is irradiated the electron beam for 1 minute is similar to each other.

2. A metal oxide film comprising indium, gallium, and zinc,

wherein:

the metal oxide film comprises a crystal part;

a size of the crystal part is less than or equal to 10 nm;

the metal oxide film comprises a region where a peak due to the crystal part is not observed in XRD measurement;

the metal oxide film comprises a region where a plurality of spots are observed circumferentially in a nanobeam electron diffraction pattern; and

a nanobeam electron diffraction pattern before the metal oxide film is irradiated with an electron beam that is converged to 1 nmϕ and a nanobeam electron diffraction pattern after the metal oxide film is irradiated the electron beam for 1 minute is similar to each other.

3. A metal oxide film comprising indium, gallium, and zinc,

wherein:

the metal oxide film comprises a crystal part;

a size of the crystal part is less than or equal to 10 nm;

the metal oxide film comprises a region where a peak due to the crystal part is

not observed in XRD measurement;

the metal oxide film comprises a region where a plurality of spots are observed circumferentially in a nanobeam electron diffraction pattern;

the metal oxide film comprises a region where a halo pattern is observed in a selected-area electron beam diffraction pattern; and

a nanobeam electron diffraction pattern before the metal oxide film is irradiated with an electron beam that is converged to 1 nmϕ and a nanobeam electron diffraction pattern after the metal oxide film is irradiated the electron beam for 1 minute is similar to each other.

4. The metal oxide film according to claim 2 or claim 3,

wherein a measurement range in the nanobeam electron diffraction pattern is less than or equal to 10 nmϕ.

5. The metal oxide film according to any one of claim 1 to claim 4,

wherein the size of the crystal part is less than or equal to 5 nm.

6. The metal oxide film according to any one of claim 1 to claim 5,

wherein the size of the crystal part is greater than or equal to 1 nm.

7. The metal oxide film according to any one of claim 1 to claim 6,

wherein an out-of-plane method is used in the XRD measurement.