CLAIMS

[Claim 1] A method for producing an etchant composition,

the etchant composition for etching a metal film that is disposed on a substrate,

the method comprising:

filling a container with the etchant composition by using a filling nozzle with a filling port through which the etchant composition is discharged,

wherein an advancing contact angle and a receding contact angle of the etchant composition with respect to a raw material of the filling port of the filling nozzle are such that the advancing contact angle is 70° or more and 95° or less, the receding contact angle is 60° or more and 85° or less, and a ratio of an advancing contact angle to a receding contact angle (advancing contact angle/receding contact angle) of the etchant composition is 1.4 or less.

[Claim 2] The method according to claim 1, wherein the etchant composition has a viscosity of 11 mPa·s or more and less than 40 mPa·s at 25°C.

[Claim 3] The method according to claim 1 or 2, wherein the etchant composition contains phosphoric acid, nitric acid, organic acid, an etching inhibitor, and water.

[Claim 4] The method according to claim 3, wherein the organic acid includes acetic acid.

[Claim 5] The method according to claim 3 or 4, wherein a blending amount of the organic acid is 11% by mass or more and 59% by mass or less.

[Claim 6] The method according to any one of claims 3 to 5, comprising:

blending a mixed acid composition containing phosphoric acid, nitric acid, and organic acid with an etching inhibitor to provide the etchant composition.

[Claim 7] The method according to any one of claims 3 to 6, wherein the etching inhibitor is at least one nitrogen-containing compound selected from the group consisting of polyalkyleneimine and polyalkylene polyamine.

[Claim 8] The method according to any one of claims 1 to 7, wherein the etchant composition does not contain an azole compound.

[Claim 9] The method according to any one of claims 1 to 8, wherein the etchant composition does not contain hydrogen peroxide.

[Claim 10] The method according to any one of claims 1 to 9, wherein the etchant composition does not contain a fluorine compound.

[Claim 11] The method according to any one of claims 1 to 10, wherein the etchant composition has a pH of 1 or less.

[Claim 12] The method according to any one of claims 1 to 11, wherein the metal film contains at least one metal selected from the group consisting of tungsten, tantalum, zirconium, hafnium, molybdenum, niobium, ruthenium, osmium, rhenium, rhodium, copper, nickel, cobalt, titanium, titanium nitride, alumina, aluminum, and iridium.

[Claim 13] The method according to any one of claims 1 to 12, wherein the substrate is at least one substrate selected from the group consisting of a semiconductor wafer, a substrate for a liquid crystal display, a substrate for a plasma display, a substrate for a field emission display, a substrate for an optical disk, a substrate for a magnetic disk, a substrate for a magneto-optical disk, a substrate for a photomask, a ceramic substrate, and a substrate for a solar cell.

[Claim 14] A mixed acid composition used for the method according to any one of claims 6 to 13, the mixed acid composition comprising phosphoric acid, nitric acid, and organic acid.

[Claim 15] An etchant composition in a container, comprising the etchant composition with which the container is filled,

the etchant composition for etching a metal film that is disposed on a substrate,

wherein the etchant composition contains phosphoric acid, nitric acid, organic acid, an etching inhibitor, and water and has a viscosity of 11 mPa·s or more and less than 40 mPa·s at 25℃, and

a receding contact angle of the etchant composition with respect to a raw material of the container is 60° or more, and a ratio of an advancing contact angle to a receding contact angle (advancing contact angle/receding contact angle) of the etchant composition is 1.4 or less.

[Claim 16] Use of a mixed acid composition containing phosphoric acid, nitric acid, and organic acid for the method according to any one of claims 6 to 13.