CLAIMS

1. A liquid processing apparatus configured to process an object to be processed including a body part and a plurality of projecting-shape parts disposed on the body part, with an inorganic film and a metal film being laminated to each other,

the liquid processing apparatus comprising:

a support part configured to support the body part of the object to be processed;

a hydrophobic-liquid supply mechanism configured to supply a hydrophobic liquid to the object to be processed supported by the support part; and

a rinse-liquid supply part configured to supply a rinse liquid to the object to be processed to which the hydrophobic liquid has been supplied by the hydrophobic-liquid supply mechanism;

wherein the hydrophobic-liquid supply mechanism has: a first hydrophobic-liquid supply part configured to supply, to the object to be processed, a first hydrophobic liquid for making hydrophobic the inorganic film; and a second hydrophobic-liquid supply part configured to supply, to the object to be processed, a second hydrophobic liquid for making hydrophobic the metal film.

2. The liquid processing apparatus according to claim 1, further comprising a control part configured to control at least the hydrophobic-liquid supply mechanism,

wherein the control part makes the second hydrophobic-liquid supply part supply the second hydrophobic liquid to the object to be processed, after the control part makes the first hydrophobic-liquid supply part supply the first hydrophobic liquid to the object to be processed.

3. The liquid processing apparatus according to claim 1, wherein

the second hydrophobic liquid supplied from the second hydrophobic-liquid supply part contains a surface active agent.

4. The liquid processing apparatus according to any one of claims 1 to 3, wherein

the first hydrophobic liquid supplied from the first hydrophobic-liquid supply part contains a sylilating agent or a fluorine polymer chemical liquid.

5. The liquid processing apparatus according to any one of claims 1 to 4, further comprising a control part configured to control at least the hydrophobic-liquid supply mechanism,

wherein the control part makes the rinse-liquid supply part supply the rinse liquid to the object to be processed, before or after the control part makes the second hydrophobic-liquid supply part supply the second hydrophobic liquid to the object to be processed.

6. The liquid processing apparatus according to any one of claims 1 to 5, further comprising:

a control part configured to control at least the hydrophobic-liquid supply mechanism; and

a substitute-liquid supply part configured to supply a substitute liquid,

wherein the control part makes the substitute-liquid supply part supply the substitute liquid to the object to be processed, before or after the control part makes the first hydrophobic-liquid supply part supply the first hydrophobic liquid to the object to be processed.

7. A liquid processing method configured to process an object to be processed including a body part and a plurality of projecting-shape parts disposed on the body part, with an inorganic film and a metal film being laminated to each other,

the liquid processing method comprising:

supporting the body part of the object to be processed by a support part;

supplying a first hydrophobic liquid for making hydrophobic the inorganic film, to the object to be processed supported by the support part;

supplying a second hydrophobic liquid for making hydrophobic

the metal film, to the object to be processed supported by the support part; and

supplying a rinse liquid to the object to be processes to which the first hydrophobic liquid and the second hydrophobic liquid have been supplied.

8. The liquid processing method according to claim 7, wherein

the second hydrophobic liquid is supplied to the object to be processed, after the first hydrophobic liquid is supplied to the object to be processed.

9. A storage medium storing a computer program executable by a liquid processing apparatus to perform a liquid processing method,

the liquid processing method configured to process an object to be processed including a body part and a plurality of projecting-shape parts disposed on the body part, with an inorganic film and a metal film being laminated to each other,

the liquid processing method comprising:

supporting the body part of the object to be processed by a support part;

supplying a first hydrophobic liquid for making hydrophobic the inorganic film, to the object to be processed supported by the support part;

supplying a second hydrophobic liquid for making hydrophobic the metal film, to the object to be processed supported by the support part; and

supplying a rinse liquid to the object to be processes to which the first hydrophobic liquid and the second hydrophobic liquid have been supplied.

10. The storage medium according to claim 9,

wherein the liquid processing method is configured such that the liquid processing method supplies the second hydrophobic liquid to the object to be processed, after the liquid processing method supplies the first hydrophobic liquid to the object to be processed.

CLAIMS

1. A liquid processing apparatus configured to process an object to be processed including a body part and a plurality of projecting-shape parts disposed on the body part, with an inorganic film and a different film, which is different from the inorganic film in properties, being laminated to each other,

the liquid processing apparatus comprising:

a support part configured to support the body part of the object to be processed;

a hydrophobic-liquid supply mechanism configured to supply a hydrophobic liquid to the object to be processed supported by the support part; and

a rinse-liquid supply part configured to supply a rinse liquid to the object to be processed to which the hydrophobic liquid has been supplied by the hydrophobic-liquid supply mechanism;

wherein the hydrophobic-liquid supply mechanism has: a first hydrophobic-liquid supply part configured to supply, to the object to be processed, a first hydrophobic liquid for making hydrophobic the inorganic film; and a second hydrophobic-liquid supply part configured to supply, to the object to be processed, a second hydrophobic liquid for making hydrophobic the different film.

2. The liquid processing apparatus according to claim 1, further comprising a control part configured to control at least the hydrophobic-liquid supply mechanism,

wherein the control part makes the second hydrophobic-liquid supply part supply the second hydrophobic liquid to the object to be processed, after the control part makes the first hydrophobic-liquid supply part supply the first hydrophobic liquid to the object to be processed.

3. The liquid processing apparatus according to claim 1, wherein

the different film contains a metal film, and

the second hydrophobic liquid supplied from the second hydrophobic-liquid supply part contains a surface active agent.

4. The liquid processing apparatus according to claim 1, wherein

the different film contains an organic film, and

the second hydrophobic liquid supplied from the second hydrophobic-liquid supply part contains a surface active agent.

5. The liquid processing apparatus according to claim 1, wherein

the first hydrophobic liquid supplied from the first hydrophobic-liquid supply part contains a sylilating agent or a fluorine polymer chemical liquid.

6. The liquid processing apparatus according to claim 1, further comprising a control part configured to control at least the hydrophobic-liquid supply mechanism,

wherein the control part makes the rinse-liquid supply part supply the rinse liquid to the object to be processed, before or after the control part makes the second hydrophobic-liquid supply part supply the second hydrophobic liquid to the object to be processed.

7. The liquid processing apparatus according to claim 1, further comprising:

a control part configured to control at least the hydrophobic-liquid supply mechanism; and

a substitute-liquid supply part configured to supply a substitute liquid,

wherein the control part makes the substitute-liquid supply part supply the substitute liquid to the object to be processed, before or after the control part makes the first hydrophobic-liquid supply part supply the first hydrophobic liquid to the object to be processed.

8. The liquid processing apparatus according to claim 1, further comprising:

a rotary drive mechanism configured to rotate the object to be processed supported by the support part;

wherein the rotary drive mechanism rotates the object to be processed so as to dry the object to be processed, at least after the first hydrophobic liquid, the second hydrophobic liquid and the rinse liquid are supplied to the object to be processed.

9. The liquid processing apparatus according to claim 7, further comprising:

a rotary drive mechanism configured to rotate the object to be processed supported by the support part;

wherein the control part makes the substitute-liquid supply part supply the substitute liquid to the object to be processed,

then, the control part makes the first hydrophobic-liquid supply part supply the first hydrophobic liquid to the object to be processed,

then, the control part makes the substitute-liquid supply part supply the substitute liquid to the object to be processed,

then, the control part makes the rinse-liquid supply part supply the rinse liquid to the object to be processed,

then, the control part makes the second hydrophobic-liquid supply part supply the second hydrophobic liquid to the object to be processed,

then, the control part makes the rinse-liquid supply part supply the rinse liquid to the object to be processed,

then, the rotary drive mechanism rotates the object to be processed so as to dry the object to be processed.

10. A liquid processing method configured to process an object to be processed including a body part and a plurality of projecting-shape parts disposed on the body part, with an inorganic film and a different film, which is different from the inorganic film in properties, being laminated to each other,

the liquid processing method comprising:

supporting the body part of the object to be processed by a support part;

supplying a first hydrophobic liquid for making hydrophobic the inorganic film, to the object to be processed supported by the support part;

supplying a second hydrophobic liquid for making hydrophobic the different film, to the object to be processed supported by the support part; and

supplying a rinse liquid to the object to be processes to which the first hydrophobic liquid and the second hydrophobic liquid have been supplied.

11. The liquid processing method according to claim 10, wherein

the second hydrophobic liquid is supplied to the object to be processed, after the first hydrophobic liquid is supplied to the object to be processed.

12. The liquid processing method according to claim 10, further comprising:

rotating the object to be processed so as to dry the object to be processed, at least after the first hydrophobic liquid, the second hydrophobic liquid and the rinse liquid are supplied to the object to be processed.

13. The liquid processing method according to claim 12, wherein

the projecting-shape parts of the object to be processed are not exposed from a liquid surface of the first hydrophobic liquid, the second hydrophobic liquid and the rinse liquid, while the first hydrophobic liquid, the second hydrophobic liquid and the rinse liquid are supplied to the object to be processed, and

the projecting-shape parts of the object to be processed begin to be exposed from the liquid surface, when the object to be processed is rotated so as to dry the object to be processed.

14. The liquid processing method according to claim 11, further comprising:

supplying a substitute liquid; and

rotating the object to be processed so as to dry the object to be processed,

wherein the substitute liquid is supplied to the object to be processed,

then, the first hydrophobic liquid is supplied to the object to be processed,

then, the substitute liquid is supplied to the object to be processed,

then, the rinse liquid is supplied to the object to be processed,

then, the second hydrophobic liquid is supplied to the object to be processed,

then, the rinse liquid is supplied to the object to be processed,

then, the object to be processed is rotated so as to dry the object to be processed.

15. A storage medium storing a computer program executable by a liquid processing apparatus to perform a liquid processing method comprising:

supporting the body part of the object to be processed by a support part;

supplying a first hydrophobic liquid for making hydrophobic the inorganic film, to the object to be processed supported by the support part;

supplying a second hydrophobic liquid for making hydrophobic the different film, to the object to be processed supported by the support part; and

supplying a rinse liquid to the object to be processes to which the first hydrophobic liquid and the second hydrophobic liquid have been supplied.

16. The storage medium according to claim 15,

wherein the liquid processing method is configured such that the liquid processing method supplies the second hydrophobic liquid to the object to be processed, after the liquid processing method supplies the first hydrophobic liquid to the object to be processed.

17. The storage medium according to claim 15,

wherein the liquid processing method further comprises

rotating the object to be processed so as to dry the object to be processed, at least after the first hydrophobic liquid, the second hydrophobic liquid and the rinse liquid are supplied to the object to be processed.

18. The storage medium according to claim 17,

wherein the liquid processing method is configured such that

the projecting-shape parts of the object to be processed are not exposed from a liquid surface of the first hydrophobic liquid, the second hydrophobic liquid and the rinse liquid, while the first hydrophobic liquid, the second hydrophobic liquid and the rinse liquid are supplied to the object to be processed, and

the projecting-shape parts of the object to be processed begin to be exposed from the liquid surface, when the object to be processed is rotated so as to dry the object to be processed.

19. The storage medium according to claim 16,

wherein the liquid processing method further comprises

supplying a substitute liquid; and

rotating the object to be processed so as to dry the object to be processed, and

wherein the liquid processing method is configured such that the substitute liquid is supplied to the object to be processed,

then, the first hydrophobic liquid is supplied to the object to be processed,

then, the substitute liquid is supplied to the object to be

processed,

then, the rinse liquid is supplied to the object to be processed,

then, the second hydrophobic liquid is supplied to the object to be processed,

then, the rinse liquid is supplied to the object to be processed,

then, the object to be processed is rotated so as to dry the object to be processed.