

CLAIMS

1. A load lock device characterized by comprising:
 - a load lock chamber including an internal space, a first conveyance port capable of being connected to a transfer chamber connected to a reduced-pressure processing device, and a second conveyance port capable of being connected to a loader chamber;
 - a substrate holder configured to hold a substrate in the internal space of the load lock chamber;
 - a driving mechanism arranged below the load lock chamber to move the substrate holder up and down and connected to the substrate holder via a connecting member;
 - an extension chamber extended from a lower portion of the load lock chamber to a side;
 - a pump arranged below the extension chamber and configured to discharge a gas in the load lock chamber via the extension chamber; and
 - a gas introducing portion configured to introduce, when the substrate is conveyed from the loader chamber into the internal space of the load lock chamber via the second conveyance port, a gas into the internal space of the load lock chamber such that the gas introduced into the internal space by the gas introducing portion is discharged via the second conveyance port to the loader chamber, (0025, 0026)
 - wherein the extension chamber includes a bottom surface with an opening at a position deviated from a vertically lower position of the substrate holder, and the pump is connected to the opening.
2. The load lock device according to claim 1, wherein the gas introducing portion is arranged above a path between the substrate holder and the transfer chamber in a state in which the substrate is conveyed to the transfer chamber via the first conveyance port.
3. The load lock device according to claim 2, characterized in that a height of the

first conveyance port is lower than a height of the second conveyance port.

4. The load lock device according to any one of claims 1 to 3, characterized in that

the gas introducing portion includes a gas dispersing portion configured to disperse the gas, and

the gas dispersing portion is arranged at a position facing the second conveyance port.

5. The load lock device according to any one of claims 2 to 4, characterized in that an area of a gap between a side surface of the substrate holder and an inner side surface of the load lock chamber is smaller than a sectional area of the second conveyance port.

6. The load lock device according to any one of claims 2 to 4, characterized in that an area of a gap between a side surface of the substrate holder and an inner side surface of the load lock chamber is smaller than 1/2 a sectional area of the second conveyance port.

7. The load lock device according to any one of claims 1 to 4, characterized in that an area of a gap between a side surface of the substrate holder and an inner side surface of the load lock chamber is smaller than a sectional area of the opening.

8. The load lock device according to any one of claims 1 to 4, characterized in that an area of a gap between a side surface of the substrate holder and an inner side surface of the load lock chamber is smaller than a sectional area of a connection portion between the load lock chamber and the extension chamber.

9. The load lock device according to any one of claims 1 to 8, characterized in that a size of the substrate holder in a height direction is larger than a size of the gap between a side surface of the substrate holder and an inner side surface of the load lock chamber.

10. The load lock device according to any one of claims 1 to 8, characterized in

that a size of the substrate holder in a height direction is not less than three times and not more than 115 times a maximum size of the gap between a side surface of the substrate holder and an inner side surface of the load lock chamber.

11. The load lock device according to any one of claims 1 to 10, characterized in that a size of the extension chamber in the height direction is larger than the size of the substrate holder in the height direction.

12. The load lock device according to any one of claims 1 to 11, characterized in that in a state in which the substrate moves between the load lock chamber and the transfer chamber via the first conveyance port, a height of a lower end of the substrate holder is higher than a height of a ceiling surface of the extension chamber.

13. The load lock device according to any one of claims 1 to 12, characterized in that at least a part of the second conveyance port is arranged above the extension chamber.

14. The load lock device according to any one of claims 1 to 12, characterized in that at least a part of the extension chamber is arranged between the second conveyance port and the pump.

15. The load lock device according to any one of claims 1 to 12, characterized in that at least a part of the loader chamber is arranged above the extension chamber.

16. The load lock device according to any one of claims 1 to 12, characterized in that at least a part of the extension chamber is arranged between the loader chamber and the pump.

17. The load lock device according to claim 1, wherein the gas introducing portion includes a gas dispersing portion configured to disperse the gas in the internal space of the load lock chamber,

wherein the gas dispersing portion is arranged to face the second conveyance port, and

at least a part of the second conveyance port is arranged above the extension

chamber.

18. The load lock device according to claim 1, wherein the gas introducing portion includes a gas dispersing portion configured to disperse the gas in the internal space of the load lock chamber,

wherein the gas dispersing portion is arranged to face the second conveyance port, and

at least a part of the extension chamber is arranged between the second conveyance port and the pump.

19. The load lock device according to claim 1, wherein the gas introducing portion includes gas dispersing portion configured to disperse the gas in an internal space of the load lock chamber,

wherein the gas dispersing portion is arranged to face the second conveyance port, and

at least a part of the loader chamber is arranged above the extension chamber.

20. The load lock device according to claim 1, wherein the gas introducing portion includes a gas dispersing portion configured to disperse the gas in an internal space of the load lock chamber,

wherein the gas dispersing portion is arranged to face the second conveyance port, and

at least a part of the extension chamber is arranged between the loader chamber and the pump.

21. The load lock device according to any one of claims 17 to 20, characterized in that a position where the substrate holder can be arranged includes a position where a part of a side surface of the substrate held by the substrate holder faces the gas dispersing portion.

22. The load lock device according to claim 1, wherein the gas introducing portion includes a gas dispersing portion configured to disperse the gas in an internal space of

the load lock chamber,

wherein in an orthogonal projection to a floor on which the load lock device is arranged, the substrate holder is located between the gas dispersing portion and the extension chamber.

23. The load lock device according to claim 1, wherein the gas introducing portion includes a gas dispersing portion configured to disperse the gas in an internal space of the load lock chamber,

wherein in an orthogonal projection to a floor on which the load lock device is arranged, the substrate holder is located between the gas dispersing portion and the opening.

24. The load lock device according to claim 1, wherein in a state in which the substrate is transferred between the load lock chamber and the transfer chamber via the first conveyance port, a height of a lower end of the substrate holder is higher than a height of a ceiling surface of the extension chamber.

25. The load lock device according to claim 1, wherein the extension chamber is arranged at a height lower than a height where the first conveyance port is arranged.

26. The load lock device according to claim 1, wherein a ceiling surface of the extension chamber is arranged at a height lower than a height where the first conveyance port is arranged.

27. The load lock device according to claim 1, wherein a ceiling surface of the extension chamber is arranged at a height lower than a height where a lower end of the first conveyance port is arranged.

28. The load lock device according to claim 4, wherein when the substrate is conveyed from the loader chamber to an internal space of the load lock chamber via the second conveyance port, the gas introduced from the gas dispersing portion to the internal space of the load lock chamber is discharged via the second conveyance port to the loader chamber.

29. The load lock device according to claim 28, further comprising a conveyance robot arranged in the loader chamber, wherein the conveyance robot is configured to convey the substrate from the loader chamber to the load lock chamber via the second conveyance port.