

CLAIMS

1. A load lock device comprising a load lock chamber, and a substrate holding structure configured to hold a substrate in the load lock chamber, characterized in that the substrate holding structure includes a contact portion (124) configured to contact the substrate (S) so as to support the substrate(S), and a first member (125) having a facing surface facing the substrate and arranged such that the facing surface (OS) does not contact the substrate(S), the substrate holding structure (120) being configured to allow a gas to flow through a space between the substrate and the facing surface, and

in a state in which the substrate is held by the substrate holding structure, a distance between the substrate and a portion located inside an outer edge of the facing surface is larger than a distance between the substrate and the outer edge of the facing surface,

the outer edge (EE) of the facing surface (OS) is defined by an outer exposed side surface of the first member (125).

2. The load lock device according to claim 1, characterized in that the substrate holding structure includes a first member with the facing surface, and a second member with an upper surface facing a lower surface of the first member.

3. The load lock device according to claim 2, characterized in that the substrate holding structure further includes a plurality of contact portions configured to contact the substrate so as to support the substrate, and the second member supports the first member and the plurality of contact portions.

4. The load lock device according to claim 3, characterized in that the upper surface of the second member has a shape along the lower surface of the first member.

5. The load lock device according to claim 3, characterized in that the first member has a corrugated plane shape.

6. The load lock device according to claim 3, characterized in that

the portion is located inside the outer edge of the facing surface concerning a predetermined direction, and

the first member is divided into a plurality of portions concerning a direction orthogonal to the predetermined direction.

7. The load lock device according to any one of claims 1 to 6, characterized in that

the load lock chamber includes 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, and

the load lock device further comprises:

a gas introducing portion arranged above a path between the substrate holding structure and the transfer chamber in a state in which the substrate is conveyed to the transfer chamber via the first conveyance port; and

a gas discharge portion arranged to discharge the gas via a space below the substrate holding structure.

8. The load lock device according to claim 7, characterized in that a height of the first conveyance port is lower than a height of the second conveyance port.

9. The load lock device according to claim 7 or 8, 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.

10. The load lock device according to claim 9, characterized in that

the gas dispersing portion has a pillar-shaped portion, and an inner side surface of the load lock chamber is apart from the pillar-shaped portion, and includes a curved surface along the pillar-shaped portion.

11. The load lock device according to claim 10, characterized in that the pillar-

shaped portion has a columnar shape, and the curved surface forms a part of a cylindrical surface.

12. The load lock device according to any one of claims 9 to 11, characterized in that the gas introducing portion and the gas discharge portion are controlled to execute an operation of lowering a pressure in the load lock chamber in a state in which the substrate held by the substrate holding structure is arranged at a position higher than a center axis of the gas dispersing portion, and an operation of lowering the pressure in the load lock chamber in a state in which the substrate held by the substrate holding structure is arranged at a position lower than the center axis of the gas dispersing portion.

13. The load lock device according to any one of claims 7 to 12, characterized by further comprising a gas discharge line arranged to discharge the gas from a space near the second conveyance port.

14. The load lock device according to any one of claims 1 to 13, characterized in that the substrate holding structure holds the substrate such that at least a part of a side surface of the substrate faces the inner surface of the load lock chamber.

15. The load lock device according to any one of claims 1 to 8 and 13, characterized by further comprising a gas dispersing portion configured to disperse the gas in an internal space of the load lock chamber,

wherein the substrate holding structure holds the substrate such that at least a part of a side surface of the substrate faces an inner surface of the load lock chamber, and

a position where the substrate holding structure can be arranged includes a position where a part of the side surface of the substrate held by the substrate holding structure faces the gas dispersing portion.

16. The load lock device according to any one of claims 1 to 15, characterized in that the substrate holding structure is configured to hold a substrate having a size larger

than a size of the facing surface in a surface direction along a surface of the substrate.

17. The load lock device according to any one of claims 1 to 16, characterized in that

the portion is located inside the outer edge of the facing surface concerning a predetermined direction in a horizontal plane, and

cross sections of the facing surface cut along at least three planes that are apparent from each other perpendicular to the horizontal plane and parallel to the predetermined direction have shapes identical to each other.

18. The load lock device according to any one of claims 1 to 17, characterized in that the substrate holding structure is configured to hold a substrate having a rectangular shape.

19. The load lock device according to any one of claims 1 to 17, characterized in that the substrate holding structure is configured to hold a substrate having a circular shape with a notch portion indicating a reference direction.

20. The load lock device according to claim 1, wherein the facing surface does not contact a peripheral portion of the substrate.

21. A load lock device comprising a load lock chamber, and a substrate holding structure configured to hold a substrate in the load lock chamber, characterized in that

the substrate holding structure includes a facing surface facing the substrate, and is configured to allow a gas to flow through a space between the substrate and the facing surface,

in a state in which the substrate is held by the substrate holding structure, a distance between the substrate and a portion located inside an outer edge of the facing surface is larger than a distance between the substrate and the outer edge of the facing surface, the portion is located inside the outer edge of the facing surface concerning a predetermined direction in a horizontal plane, and

cross sections of the facing surface cut along at least three planes that are

apparent from each other and perpendicular to the horizontal plane and parallel to the predetermined direction have shapes identical to each other.