Claims:

1. A cup-shaped chuck of a substrate holding device for holding a substrate, comprising:

an inner pressure ring;

a middle frame, wherein the inner pressure ring is locked on an inner peripheral surface of the middle frame;

a sealing element, wherein the sealing element has an outer end part, a bottom part and an inner end part, wherein the outer end part of the sealing element wraps an outer peripheral surface of at least part of the middle frame, and the bottom part of the sealing element wraps the bottom of the middle frame and is exposed to the outside of the cup-shaped chuck, and the inner end part of the sealing element wraps an inner peripheral surface of at least part of the middle frame, wherein the inner end part of the sealing element is pressed between the inner pressure ring and the middle frame by the inner pressure ring;

an outer pressure ring, wherein the outer pressure ring is made of insulating material and locked on the outer peripheral surface of the middle frame, wherein the outer end part of the sealing element is pressed between the outer pressure ring and the middle frame through the outer pressure ring; and

a contact ring, comprising a mounting part and a finger part, and the mounting part is located above the sealing element and pressed between the inner pressure ring and the middle frame, and a sealing ring is disposed between the inner pressure ring and the mounting part of the contact ring.

2. The cup-shaped chuck of a substrate holding device according to claim 1, wherein the bottom of the middle frame forms a horizontal support part radially and horizontally inward, and the bottom part of the sealing element wraps the horizontal support part, wherein the end of the horizontal support part protrudes upwards to form

a sealing lip part, and the number of sealing lip part is one or two or more, and the sealing lip part is configured for sealing contact with the edge of the substrate.

3. The cup-shaped chuck of a substrate holding device according to claim 2, wherein when the number of sealing lip parts is two or more, the heights of the two or more sealing lip parts are the same.

4. The cup-shaped chuck of a substrate holding device according to claim 2, wherein when the number of sealing lip parts is two or more, there is a height difference between at least two of the sealing lip parts.

5. The cup-shaped chuck of a substrate holding device according to claim 4, wherein the height of the sealing lip parts gradually increases radially inward.

6. The cup-shaped chuck of a substrate holding device according to claim 4, wherein the height of the sealing lip parts gradually decreases radially inward.

7. The cup-shaped chuck of a substrate holding device according to claim 4, wherein the heights of the sealing lip parts are alternately arranged high and low in the radial direction.

8. The cup-shaped chuck of a substrate holding device according to claim 2, wherein when there is one sealing lip part, the radial width of the one sealing lip part is not more than 1 mm, and when there are two or more sealing lip parts, the total radial width of the two or more sealing lip parts is not more than 1mm.

9. The cup-shaped chuck of a substrate holding device according to claim 8, wherein when there is one sealing lip part, the radial width of the one sealing lip part is 0.4mm-0.8mm, and when the number of sealing lip parts is two or more, the total radial width of the two or more sealing lip parts is 0.4mm-0.8mm.

10. The cup-shaped chuck of a substrate holding device according to claim 1, wherein the sealing element as a separate accessory is detachable from the middle frame.

11. The cup-shaped chuck of a substrate holding device according to claim 10, wherein the sealing element is bonded to the middle frame by an adhesive.

12. The cup-shaped chuck of a substrate holding device according to claim 1, wherein several inner sealing protrusions are formed on the contact surface of the sealing element and the middle frame, and correspondingly, the surface of the middle frame has several sealing grooves that match the inner sealing protrusions.

13. The cup-shaped chuck of a substrate holding device according to claim 12, wherein several outer sealing protrusions are formed on the contact surface of the sealing element and the outer pressure ring.

14. The cup-shaped chuck of a substrate holding device according to claim 1, wherein the sealing element has hydrophobicity properties.

15. The cup-shaped chuck of a substrate holding device according to claim 1, wherein the outer surface of the outer pressure ring has a blocking part.

16. The cup-shaped chuck of a substrate holding device according to claim 15, wherein the blocking part comprises at least an upper blocking part and/or a lower blocking part, wherein the number of upper blocking parts is one or more, and the number of lower blocking parts is one or more, wherein the upper blocking part is a downward annular protrusion formed on the top of the outer pressure ring, and the

lower blocking part is an outward annular protrusion formed at the middle and lower part of the outer pressure ring.

17. The cup-shaped chuck of a substrate holding device according to claim 1, wherein the surface of the outer pressure ring has hydrophobicity properties.

18. The cup-shaped chuck of a substrate holding device according to claim 1, wherein several bumps are formed on the contact surface of the outer pressure ring and the sealing element, and several bumps are formed on the contact surface of the inner pressure ring and the sealing element.

19. The cup-shaped chuck of a substrate holding device according to claim 1, wherein the bottom of the outer pressure ring has several bumps.

20. The cup-shaped chuck of a substrate holding device according to claim 1, wherein the material of the inner pressure ring is a conductive and corrosion-resistant metal, and the contact ring is electrically connected to an electroplating power supply through the inner pressure ring.

21. The cup-shaped chuck of a substrate holding device according to claim 1, wherein the inner pressure ring is made of insulating material, the middle frame is made of conductive metal, and the contact ring is electrically connected to an electroplating power supply through the middle frame.

22. A substrate holding device, comprising:

a cup-shaped chuck as claimed in anyone of claims 1 to 21 for holding a substrate;

a chuck plate, wherein the chuck plate presses against the backside of the substrate so that the substrate is in pressing contact with the sealing element of the cup-shaped chuck;

a chuck plate driving device configured for driving the chuck plate against or away from the backside of the substrate;

an angle driving device configured for adjusting the angle of the substrate clamped by the cup-shaped chuck and the chuck plate;

a rotation driving device configured for driving the substrate clamped by the cup-shaped chuck and the chuck plate to rotate; and

a vertical driving device configured for driving the substrate clamped by the cup-shaped chuck and the chuck plate to ascend or descend.

23. The substrate holding device according to claim 22, wherein the chuck plate comprises a base, the base has a lower surface contacting with the backside of the substrate, the lower surface of the base has several exhaust grooves, and the periphery of the base has several exhaust holes communicating with the exhaust grooves.

24. The substrate holding device according to claim 23, wherein the lower surface of the base has contact parts protruding toward the substrate, so as to reduce the contact area between the chuck plate and the substrate.