

CLAIMS

1. A coater with automatic cleaning function, comprising:
a coater chamber capable of being filled up with cleaning solution;
a substrate chuck holding and positioning a substrate;
at least one shroud capable of moving up for preventing photoresist from splashing out of the coater chamber, or moving down and immersing into the cleaning solution for cleaning, wherein the shroud is driven to vibrate at high speed when the shroud is immersed into the cleaning solution for cleaning.
2. The coater as claimed in claim 1, wherein the coater chamber has a solution trough for being filled up with the cleaning solution, the solution trough is formed between a side wall of the coater chamber and a protecting wall which is positioned in the coater chamber.
3. The coater as claimed in claim 2, wherein the protecting wall extends to approach the top surface of the substrate chuck for protecting the substrate chuck from being coated with the photoresist.
4. The coater as claimed in claim 1, further comprising a level sensor installed on the coater chamber for detecting the level of the cleaning solution in the coater chamber.
5. The coater as claimed in claim 1, further comprising at least two driving mechanisms and every driving mechanism connecting with a supporting shaft, the shroud fixed on top ends of the supporting shafts, the driving mechanisms driving the supporting shafts to move up or move down, which makes the shroud move up for preventing the photoresist from splashing out of the coater chamber, or move down and immerse into the cleaning solution for cleaning.

6. The coater as claimed in claim 5, wherein every supporting shaft is sealed into a bellows.

7. The coater as claimed in claim 2, wherein the coater chamber further comprises an exhaust port for venting gas out of the coater chamber.

8. The coater as claimed in claim 7, wherein the exhaust port connects to the solution trough.

9. The coater as claimed in claim 8, further comprising an exhaust pipe connected to the exhaust port, and a switch valve installed on the exhaust pipe.

10. The coater as claimed in claim 1, further comprising a liquid inlet pipe connected to the coater chamber for supplying the cleaning solution to the coater chamber, a liquid inlet valve installed on the liquid inlet pipe, a liquid outlet pipe connected to the coater chamber for draining the cleaning solution out of the coater chamber, a liquid outlet valve installed on the liquid outlet pipe.

11. The coater as claimed in claim 1, wherein the substrate chuck is a vacuum chuck or a magnetic suspension chuck.

12. The coater as claimed in claim 1, wherein the substrate chuck is connected to a rotating actuator used for driving the substrate chuck to rotate.

13. The coater as claimed in claim 2, wherein the height of the liquid level in the solution trough is lower than the height of the substrate chuck.

14. The coater as claimed in claim 1, wherein the substrate chuck is capable of being immersed into the cleaning solution for cleaning.

15. The coater as claimed in claim 1, further comprising a vertical actuator connected with the substrate chuck and used for driving the substrate chuck to move up or move down.

16. The coater as claimed in claim 15, further comprising two position sensors disposed on a shaft which is vertically fixed at the outer bottom of the coater chamber, the vertical actuator moving along the shaft, for coating photoresist, the vertical actuator driving the substrate chuck to move up until the position sensor located at the top of the shaft detects the vertical actuator, for coater cleaning, the vertical actuator driving the substrate chuck to move down until the position sensor located at the bottom of the shaft detects the vertical actuator.

17. The coater as claimed in claim 15, further comprising two magnets respectively positioned at the top surface of the substrate chuck and the bottom surface of the substrate chuck, the polarity of the two magnets' surfaces which are opposite being the same, an elastic protecting wall positioned in the coater chamber, one end of the elastic protecting wall connected with the inner bottom of the coater chamber and the other end of the elastic protecting wall connected with a sealing member, the sealing member having a sealing ring settled on the bottom of the sealing member and a magnet body settled at the top of the sealing member, the magnet body located between the two magnets, the polarity of the both sides of the magnet body being the same as the polarity of the two magnets' surfaces which are opposite.

18. The coater as claimed in claim 17, further comprising a drain opening defined at the bottom of the sealing member.

19. The coater as claimed in claim 17, further comprising a bearing wall positioned in the coater chamber and surrounded by the elastic protecting wall.

20. The coater as claimed in claim 17, wherein the elastic protecting wall is a bellows.

21. The coater as claimed in claim 17, wherein for coating photoresist, the vertical actuator drives the substrate chuck to move up, the magnet body abuts on the magnet positioned at the bottom surface of the substrate chuck, making the sealing member move up along with the substrate chuck, when the substrate chuck moves up to the process position, the substrate chuck stops moving up and the magnet body is located between the two magnets and does not contact with the two magnets under the action of magnetic force between the magnet body and the two magnets, the substrate chuck either does not contact with the sealing ring.

22. The coater as claimed in claim 17, wherein for coater cleaning, the vertical actuator drives the substrate chuck to move down, the bottom of the substrate chuck is pressed against the sealing ring for seal, then the coater chamber is filled up with the cleaning solution and the substrate chuck is immersed into the cleaning solution for cleaning.

23. The coater as claimed in claim 1, further comprising another shroud, when one of the shrouds moves up for preventing the photoresist from splashing out of the coater chamber, the other shroud is immersed into the cleaning solution.

24. The coater as claimed in claim 23, further comprising a chamber cover supported above the coater chamber by the two shrouds.

25. The coater as claimed in claim 24, wherein the chamber cover moves down and immerses into the cleaning solution along with the two shrouds when the two shrouds move down and immerse into the cleaning solution.

26. The coater as claimed in claim 23, wherein every shroud is supported by at least two driving mechanisms, every driving mechanism connects with a supporting shaft, the shroud is fixed on top ends of the supporting shafts, the driving mechanisms drive the supporting shafts to move up or move down, which makes the shroud move up for preventing the photoresist from splashing out of the coater chamber, or move down and immerse into the cleaning solution for cleaning.

27. The coater as claimed in claim 26, wherein every supporting shaft is sealed into a bellows.

28. The coater as claimed in claim 2, wherein the solution trough is divided into two individual solution troughs by a partition wall, each solution trough receives a shroud.

29. The coater as claimed in claim 28, wherein every individual solution trough connects with a liquid inlet pipe and a liquid outlet pipe, the liquid inlet pipe is connected to the solution trough for supplying the cleaning solution to the solution trough, a liquid inlet valve is installed on the liquid inlet pipe, the liquid outlet pipe is connected to the solution trough for draining the cleaning solution out of the solution trough, a liquid outlet valve is installed on the liquid outlet pipe.

30. The coater as claimed in claim 28, further comprising two level sensors for detecting the level of the cleaning solution in the two individual solution troughs.

31. The coater as claimed in claim 1, further comprising a shielding plate supported around the substrate chuck for protecting the substrate chuck from being coated with the photoresist.

32. The coater as claimed in claim 31, wherein the coater chamber has a solution trough for being filled up with cleaning solution for cleaning the shielding plate.

33. The coater as claimed in claim 32, further comprising a level sensor used for detecting the level of the cleaning solution in the solution trough.

34. The coater as claimed in claim 32, further comprising a liquid inlet pipe connected to the solution trough for supplying the cleaning solution to the solution trough, a liquid inlet valve installed on the liquid inlet pipe, a liquid outlet pipe connected to the solution trough for draining the cleaning solution out of the solution trough, a liquid outlet valve installed on the liquid outlet pipe.

35. The coater as claimed in claim 32, wherein the shielding plate is supported around the substrate chuck by at least two driving mechanisms, every driving mechanism connects with a supporting shaft which is vertically disposed in the solution trough, the shielding plate is fixed on top ends of the supporting shafts, the driving mechanisms drive the supporting shafts to move up or move down, which makes the shielding plate move up and around the substrate chuck, or move down and immerse into the cleaning solution of the solution trough for cleaning.

36. The coater as claimed in claim 35, wherein the driving mechanisms drive the supporting shafts to vibrate at high speed when the shielding plate is immersed into the cleaning solution for cleaning.

37. The coater as claimed in claim 35, wherein every supporting shaft is sealed into a bellows.

38. A coater with automatic cleaning function, comprising:
a coater chamber capable of being filled up with cleaning solution;
a substrate chuck holding and positioning a substrate;
a vertical actuator connecting with the substrate chuck for driving the substrate chuck to move up or move down; and

two magnets respectively positioned at the top surface of the substrate chuck and the bottom surface of the substrate chuck, the polarity of the two magnets' surfaces which are opposite being the same, an elastic protecting wall positioned in the coater chamber, the bottom end of the elastic protecting wall connected with the inner bottom of the coater chamber, a magnet body settled at the top end of the elastic protecting wall, the magnet body located between the two magnets, the polarity of the both sides of the magnet body being the same as the polarity of the two magnets' surfaces which are opposite.

39. The coater as claimed in claim 38, further comprising two position sensors disposed on a shaft which is vertically fixed at the outer bottom of the coater chamber, the vertical actuator moving along the shaft, the vertical actuator moving down along the shaft and stopping at a position of the position sensor located at the bottom of the shaft, the vertical actuator moving up along the shaft and stopping at a position of the other position sensor located at the top of the shaft.

40. The coater as claimed in claim 38, wherein for coating photoresist, the vertical actuator drives the substrate chuck to move down, the substrate chuck is received in the coater chamber, the magnet body moves along with the substrate chuck,. after the substrate chuck stops moving, the magnet body is located between

the two magnets and does not contact with the two magnets under the action of magnetic force between the magnet body and the two magnets.

41. The coater as claimed in claim 38, wherein for coater cleaning, the vertical actuator drives the substrate chuck to move up and stretch out of the coater chamber, the magnet body abuts on the magnet positioned at the bottom surface of the substrate chuck and the magnet body moves up along with the substrate chuck.

42. The coater as claimed in claim 38, further comprising a shielding wall positioned in the coater chamber and surrounding the elastic protecting wall, the top of the shielding wall extending to approach the top surface of the substrate chuck when coating the photoresist.

43. The coater as claimed in claim 42, wherein the bottom of the shielding wall defines a gap for the cleaning solution in the space between the protecting wall and the shielding wall draining out.

44. The coater as claimed in claim 38, further comprising a level sensor installed on the coater chamber for detecting the level of the cleaning solution in the coater chamber.

45. The coater as claimed in claim 38, wherein the coater chamber further comprises an exhaust port for venting gas out of the coater chamber.

46. The coater as claimed in claim 45, further comprising an exhaust pipe connected to the exhaust port, and a switch valve installed on the exhaust pipe.

47. The coater as claimed in claim 38, further comprising a liquid inlet pipe connected to the coater chamber for supplying the cleaning solution to the coater

chamber, a liquid inlet valve installed on the liquid inlet pipe, a liquid outlet pipe connected to the coater chamber for draining the cleaning solution out of the coater chamber, a liquid outlet valve installed on the liquid outlet pipe.

48. The coater as claimed in claim 38, wherein the substrate chuck is a vacuum chuck or a magnetic suspension chuck.

49. The coater as claimed in claim 38, wherein the substrate chuck is connected to a rotating actuator used for driving the substrate chuck to rotate.

50. The coater as claimed in claim 38, further comprising two magnets respectively positioned at the top surface of the substrate chuck and the bottom surface of the substrate chuck, the polarity of the two magnets' surfaces which are opposite being the same, an elastic protecting wall positioned in the coater chamber, one end of the elastic protecting wall connected with the inner bottom of the coater chamber and the other end of the elastic protecting wall connected with a sealing member, the sealing member having a sealing ring settled on the bottom of the sealing member and a magnet body settled at the top of the sealing member, the magnet body located between the two magnets, the polarity of the both sides of the magnet body being the same as the polarity of the two magnets' surfaces which are opposite.

51. The coater as claimed in claim 51, further comprising a drain opening defined at the bottom of the sealing member.

52. The coater as claimed in claim 51, further comprising a bearing wall positioned in the coater chamber and surrounded by the elastic protecting wall.

53. The coater as claimed in claim 51, wherein the elastic protecting wall is a bellows.

54. The coater as claimed in claim 51, wherein for coating photoresist, the vertical actuator drives the substrate chuck to move up, the substrate chuck is received in the coater chamber, the magnet body is located between the two magnets and does not contact with the two magnets under the action of magnetic force between the magnet body and the two magnets, the substrate chuck either does not contact with the sealing ring.

55. The coater as claimed in claim 51, wherein for coater cleaning, the vertical actuator drives the substrate chuck to move down, the bottom of the substrate chuck is pressed against the sealing ring for seal, then the coater chamber is filled up with the cleaning solution and the substrate chuck is immersed into the cleaning solution for cleaning.

56. The coater as claimed in claim 39, further comprising another position sensor, the vertical actuator driving the substrate chuck to move up until the another position sensor detects the vertical actuator, the substrate chuck stretching out of the coater chamber for loading the substrate on the substrate chuck or unloading the substrate from the substrate chuck.