202 to protect an outer sidewall of the insulator plate 202 from an unintentional plasma discharge. For example, the third edge ring 208 is made of a ceramic material such as aluminum oxide (Al_2O_3). In some embodiments, the first lift pins 162 extend through the dielectric plate 152 and one or more of the base plate 132, the insulator plate 202, or the cooling plate 220 to support the substrate 122. In some embodiments, the second lift pins 166 extend through one or more of the base plate 132, the third edge ring 208, the second edge ring 204, or the edge ring 206 to support the shadow ring 134.

[0036] Each of the plurality of first lift pin assemblies 138 include the first lift pins 162 disposed on or coupled to a first bellows assembly 164. In some embodiments, the first bellows assembly 164 includes a bellows 230 disposed between a first upper flange 232 and a first lower flange 234. In some embodiments, the first lower flange 234 is coupled to the first lifter 210. In some embodiments, portions (*e.g.,* lower portion of first lift pins 162 and upper portion of first bellows assembly 164) of each of the first lift pin assemblies 138 extend through a first mounting assembly 238 that is coupled to the base plate 132 of the substrate support 124. In some embodiments, the first mounting assembly 238 comprises a hollow tube configured to slidingly engage the first upper flange 232 therein.

[0037] Each of the first lift pins 162 may be coupled to or disposed on the first upper flange 232 such that vertical movement of the first upper flange 232 translates into corresponding vertical movement of each of the first lift pins 162. In some embodiments, one or more first bushings 256 (only one shown in insulator plate 202 of Figure 2) may be disposed in the pedestal 150 about the first lift pins 162 to guide the first lift pins 162 as the bellows 230 are actuated or retracted. For example, the one or more first bushings 256 may extend through the insulator plate 202, the cooling plate 220, and the dielectric plate 152.

[0038] Each of the plurality of second lift pin assemblies 148 include the second lift pins 166 disposed on or coupled to a second bellows assembly 168. In some embodiments, the second bellows assembly 168 includes a bellows 240 disposed between a second upper flange 242 and a second lower flange 244. In some embodiments, portions of each of the plurality of second lift pin assemblies 148

Claims:

1. A lift apparatus for use in a substrate processing chamber, comprising:

a plurality of first lift pin assemblies configured to raise or lower a substrate having a given diameter when disposed thereon, wherein each of the first lift pin assemblies includes a first lift pin disposed on a first bellows assembly;

a plurality of second lift pin assemblies arranged in a circle having a diameter greater than the given diameter and configured to raise or lower an annular chamber component, wherein each of the second lift pin assemblies includes a second lift pin disposed on a second bellows assembly;

an actuator; and

a lift assembly coupled to the actuator and configured to raise or lower each of the first lift pin assemblies and the second lift pin assemblies by movement of the actuator.

2. The lift apparatus of claim 1, wherein the lift assembly includes a first lifter coupled to the first lift pin assemblies and the second lift pin assemblies.

3. The lift apparatus of claim 2, wherein the first lifter includes a base having an opening, and a shaft of the actuator extends into the opening of the base.

4. The lift apparatus of claim 2, wherein the first lifter includes a base and a plurality of branches extending from the base to the first lift pin assemblies and the second lift pin assemblies.

5. The lift apparatus of claim 4, wherein one or more of the plurality of branches include a fork, wherein a first prong of the fork is coupled to one of the first lift pin assemblies, and wherein a second prong of the fork is coupled to one of the second lift pin assemblies.

6. The lift apparatus of claim 4, wherein one or more of the plurality of branches extend from the base to one of the plurality of first lift pin assemblies to one of the plurality of second lift pin assemblies.

7. The lift apparatus of claim 4, wherein one of the plurality of first lift pin assemblies is coupled to the base of the first lifter.

8. The lift apparatus of claim 4, wherein the plurality of branches include two branches that are each coupled to one of the first lift pins assemblies and one of the second lift pin assemblies, and a third branch that is coupled to a third one of the plurality of second lift pin assemblies.

9. The lift apparatus of any of claims 2 to 8, wherein the lift assembly includes a second lifter disposed above the first lifter and coupled to each of the first lift pin assemblies, wherein there is a gap between the first lifter and the second lifter when the lift assembly is in a lower position, and wherein the first lifter is configured to raise the second lifter when the first lifter is moved to an upper position.

10. The lift apparatus of any of claims 1 to 8, further comprising a linear guide bracket coupled to the actuator, and wherein the lift assembly is configured to engage with the linear guide bracket to facilitate linear vertical motion of the lift assembly.

11. A substrate support for use in a substrate processing chamber, comprising:

a base plate;

a dielectric plate coupled to the base plate and having a support surface for supporting a substrate and having one or more chucking electrodes disposed therein; and

the lift apparatus of any of claims 2 to 8, wherein the first lift pin extends through the base plate and the dielectric plate, and wherein the second lift pin extends through the base plate and the dielectric plate.

12. The substrate support of claim 11, wherein the lift assembly includes a second lifter disposed above the first lifter and having a second base disposed about

the actuator and a plurality of second branches coupled to the plurality of first lift pin assemblies.

13. The substrate support of claim 12, wherein there is a gap between the first lifter and the second lifter when the first lifter is in a lower position, and wherein the first lifter is configured to raise the second lifter when the first lifter is moved to an upper position.

14. The substrate support of claim 11, wherein the plurality of second lift pins are configured to extend above the dielectric plate beyond the plurality of first lift pins.

15. The substrate support of claim 11, further comprising a cooling plate disposed between the dielectric plate and the base plate.

16. A process chamber for processing a substrate, comprising:

a chamber body defining an interior volume therein;

a substrate support disposed in the interior volume of the chamber body, wherein the substrate support comprises:

a pedestal for supporting the substrate; and

the lift apparatus of any of claims 2 to 8, wherein the first lift pin extends through the pedestal, and the second lift pin extends through the pedestal radially outward of the first lift pin; and

a shadow ring disposed on each second lift pin.

17. The process chamber of claim 16, wherein each second lift pin is configured to support the shadow ring above a support surface of the pedestal.

18. The process chamber of claim 16, wherein each first lift pin is configured to be recessed into the pedestal by a distance of about 10 mm to about 30 mm when each first lift pin is fully retracted.

19. The process chamber of claim 16, wherein the lift assembly includes a second lifter coupled to the plurality of first lift pin assemblies.

20. The process chamber of claim 16, wherein the actuator is a pneumatic actuator.