Claims

1. A focus ring for use in a plasma process chamber, comprising:

a ring structure having an inner surface oriented to be in exposure to plasma process byproduct material when the ring structure is placed within the plasma process chamber to circumscribe a substrate support structure during operation of the plasma process chamber, the inner surface of the ring structure having a controlled surface topographical variation that promotes adherence of the plasma process byproduct material to the ring structure; and

three radial extension structures configured to extend radially outward from an outer surface of the ring structure, the three radial extension structures spaced apart along an outer perimeter of the ring structure, the three radial extension structures configured to engage with three respective lifting components to enable raising and lowering of the ring structure relative to the substrate support structure.

2. The focus ring for use in the plasma process chamber as recited in claim 1, wherein the ring structure is formed of aluminum oxide.

3. The focus ring for use in the plasma process chamber as recited in claim 1, wherein the inner surface of the ring structure has a surface roughness average within a range extending from 150 microinches to 500 microinches.

4. The focus ring for use in the plasma process chamber as recited in claim 1, wherein the ring structure is formed of a ceramic material, and wherein a bare ceramic material of which the ring structure is formed is exposed over the inner surface of the ring structure.

5. The focus ring for use in the plasma process chamber as recited in claim 1, wherein top surfaces of the three radial extension structures are roughened by a media blasting process.

6. The focus ring for use in the plasma process chamber as recited in claim 5, wherein the media blasting process impacts the top surfaces of the three radial extension structures with media including one or more of aluminum oxide, silicon carbide, crushed glass grit, glass beads, ceramic, glass, walnut shell, pumice, steel grit, steel shot, aluminum shot, zinc shot, copper shot, cut wire, garnet, silica sand, and staurolite.

7. The focus ring for use in the plasma process chamber as recited in claim 5, wherein the top surfaces of the three radial extension structures have a surface roughness average within a range extending from 150 microinches to 500 microinches.

8. The focus ring for use in the plasma process chamber as recited in claim 1, wherein the three radial extension structures are configured to engage a substrate access port shield, wherein vertical movement of the three radial extension structures causes corresponding

vertical movement of the substrate access port shield, the substrate access port shield configured to at least partially cover a substrate access port opening of the plasma process chamber when the three radial extension structures are in a lowered vertical position, the substrate access port shield configured to uncover the substrate access port opening of the plasma process chamber when the three radial extension structures are in a raised vertical position.

9. The focus ring for use in the plasma process chamber as recited in claim 1, wherein the controlled surface topographical variation includes a lattice of convex structures that extend inward toward an area circumscribed by the ring structure.

10. The focus ring for use in the plasma process chamber as recited in claim 9, wherein the lattice of convex structures is one or more of a square lattice, a hexagonal lattice, a rectangular lattice, a parallelogrammic lattice, and a rhombic lattice.

11. The focus ring for use in the plasma process chamber as recited in claim 9, wherein each convex structure has a dome shape.

12. The focus ring for use in the plasma process chamber as recited in claim 9, wherein a spacing between adjacent convex structures is within a range extending from 0.5 millimeter to 2 millimeters.

13. The focus ring for use in the plasma process chamber as recited in claim 9, wherein a spacing between adjacent convex structures is 1 millimeter.

14. The focus ring for use in the plasma process chamber as recited in claim 9, wherein each convex structure extends inward toward a region circumscribed by the ring structure by a distance within a range extending from 0.5 millimeter to 2 millimeters.

15. The focus ring for use in the plasma process chamber as recited in claim 9, wherein each convex structure extends inward toward a region circumscribed by the ring structure by a distance within a range extending from 1 millimeter to 2 millimeters.

16. The focus ring for use in the plasma process chamber as recited in claim 9, wherein each convex structure extends inward toward a region circumscribed by the ring structure by a distance of 1 millimeter.

17. The focus ring for use in the plasma process chamber as recited in claim 9, wherein each convex structure has a base width within a range extending from 1 millimeter to 3 millimeters.

18. The focus ring for use in the plasma process chamber as recited in claim 9, wherein each convex structure has a base width within a range extending from 2 millimeters to 3 millimeters.

19. The focus ring for use in the plasma process chamber as recited in claim 9,

wherein each convex structure has a base width of 2.5 millimeters.

20. A method for converting a coated focus ring according to claim 1 for use within a plasma process chamber into a surface-roughened focus ring structure for use within the plasma process chamber, comprising:

stripping a coating from a ceramic focus ring structure down to a bare ceramic material of which the ceramic focus ring structure is formed, the ceramic focus ring structure configured for installation within a plasma process chamber, the ceramic focus ring structure having at least one process-exposed surface; and

roughening the at least one process-exposed surface to have a surface roughness average within a range extending from 150 microinches to 500 microinches.

21. The method as recited in claim 20, wherein roughening the at least one process-exposed surface is done by a media blasting process.

22. The method as recited in claim 21, wherein the media blasting process impacts the at least one process-exposed surface with media including one or more of aluminum oxide, silicon carbide, crushed glass grit, glass beads, ceramic, glass, walnut shell, pumice, steel grit, steel shot, aluminum shot, zinc shot, copper shot, cut wire, garnet, silica sand, and staurolite.

23. The method as recited in claim 20, wherein the ceramic focus ring structure is formed of aluminum oxide.

24. The method as recited in claim 20, wherein the bare ceramic material of which the ceramic focus ring structure is formed is exposed at the at least one process-exposed surface after roughening of the at least one process-exposed surface.