C L A I MS

1. A confinement ring for use in a plasma processing chamber, including,

an upper horizontal section extending between an upper inner radius and an outer radius of the confinement ring;

a lower horizontal section extending between a lower inner radius and the outer radius of the confinement ring, a top surface of the lower horizontal section provides for an angle down from near an inside radius of the confinement ring toward the lower inner radius, the lower horizontal section having an extension section that extends to the lower inner radius; and

a vertical section disposed between the outer radius and an inside radius of the confinement ring, the vertical section connects the upper horizontal section to the lower horizontal section of the confinement ring.

2. The confinement ring of claim 1, wherein a bottom surface of the lower horizontal section is flat, such that a first thickness of the lower horizontal section near the inside radius is greater than a second thickness of the lower horizontal section at the lower inner radius.

3. The confinement ring of claim 2, wherein the first thickness is greater than the second thickness from 10% to 40%.

4. The confinement ring of claim 1, wherein the angle defines a slope along the top surface of the lower horizontal section**,** the slope is between 0.20^{o} and 1° measured from a horizontal x-axis.

5. The confinement ring of claim 1, wherein a bottom surface of the lower horizontal section provides for a second angle down toward the lower inner radius, the second angle defines a second slope along the bottom surface of the lower horizontal section, the second angle of the second slope along the bottom surface being equal to the angle of the slope along the top surface of the lower horizontal section, and

wherein a first thickness of the lower horizontal section defined near the inside radius is equal to a second thickness of the lower horizontal section defined at the lower inner radius.

6. The confinement ring of claim 1, wherein a first height defined between a bottom surface of the upper horizontal section and the top surface of the lower horizontal section near the inside radius is less than a second height defined between the bottom surface of the upper horizontal

section and the top surface of the lower horizontal section at the lower inner radius of the confinement ring.

7. The confinement ring of claim 1, wherein the lower horizontal section, the vertical section and the upper horizontal section are integrally connected to define a C-shaped structure.

8. The confinement ring of claim 1, the lower horizontal section further includes a plurality of slots, wherein each slot extends radially from an inner diameter to an outer diameter along the lower horizontal section, an inner slot radius of each slot at the inner diameter is equal to an outer slot radius of each slot at the outer diameter.

9. The confinement ring of claim 8, wherein the inner diameter of the slot is greater than an inner ring diameter of the confinement ring defined by the lower inner radius and the outer diameter of the slot is less than an outer ring diameter of the confinement ring defined by the outer radius.

10. The confinement ring of claim 1, the lower horizontal section further includes a plurality of slots, wherein each slot extends radially from an inner diameter to an outer diameter along the lower horizontal section, an inner slot radius of each slot at the inner diameter is less than an outer slot radius of each slot at the outer diameter.

11. The confinement ring of claim 10, wherein a difference in the inner slot radius and the outer slot radius of each slot defines a slot taper, each slot tapers down from the outer diameter to the inner diameter, wherein the inner slot radius and the outer slot radius influencing the slot taper are defined to be an inverse of a wear rate at the corresponding inner diameter and the outer diameter of the slot, and

wherein a ratio of the inner slot radius to the outer slot radius is between 1 : 1.1 and 1 : 1.5.

12. The confinement ring of claim 1, wherein the upper inner radius is greater than the lower inner radius.

13. The confinement ring of claim 1, wherein the extension section extends vertically downward at the lower inner radius.

14. The confinement ring of claim 1, wherein the extension section includes an angled top section and a vertical bottom section, the angled top section provides a third angle down at a downward incline point defined on the top surface at the lower inner radius of the lower horizontal section and the vertical bottom section is defined to extend downward from a bottom portion of the angled top section.

15. The confinement ring of claim 1, wherein a top surface of the upper horizontal section includes a plurality of holes, each hole of the plurality of holes is configured to receive a portion of a fastener means defined on a bottom surface of the upper electrode for coupling the confinement ring to the upper electrode of the plasma processing chamber.

16. The confinement ring of claim 1, wherein the extension section of the lower horizontal section is configured to rest on a radio frequency gasket defined on a top surface of a lower electrode of the plasma processing chamber.

17. A confinement ring for use in a plasma processing chamber, including,

an upper horizontal section extending between an upper inner radius and an outer radius of the confinement ring;

a lower horizontal section extending between a lower inner radius and the outer radius of the confinement ring, a top surface of the lower horizontal section provides for a first angle down toward the lower inner radius to define a first slope along the top surface and a bottom surface of the lower horizontal section provides for a second angle down toward the lower inner radius to define a second slope along the bottom surface, the lower horizontal section having an extension section that extends downward along the lower inner radius, wherein the extension section extends below the bottom surface of the lower horizontal section; and

a vertical section disposed between the outer radius and an inside radius of the confinement ring, the vertical section connects the upper horizontal section to the lower horizontal section of the confinement ring.

18. The confinement ring of claim 17, wherein the first angle of the first slope is equal to the second angle of the second slope.

19. The confinement ring of claim 17, wherein a first thickness of the lower horizontal section near the inside radius is equal to a second thickness of the lower horizontal section at the lower inner radius, and

wherein a first height defined between the bottom surface of the upper horizontal section and the top surface of the lower horizontal section near the inside radius is less than a second height defined between the bottom surface of the upper horizontal section and the top surface of the lower horizontal section at the lower inner radius.

20. The confinement ring of claim 17, wherein the lower horizontal section further includes a plurality of slots, wherein each slot extends radially from an inner diameter to an outer diameter along the lower horizontal section, an inner slot radius of each slot at the inner diameter is equal to an outer slot radius of each slot at the outer diameter, and

wherein the inner diameter of each slot is greater than an inner ring diameter of the confinement ring defined by the lower inner radius and the outer diameter of each slot is less than an outer ring diameter of the confinement ring defined by the outer radius.

21. The confinement ring of claim 17, wherein the lower horizontal section further includes a plurality of slots, wherein each slot extends radially from an inner diameter to an outer diameter along the lower horizontal section, an inner slot radius of each slot at the inner diameter is less than an outer slot radius of each slot at the outer diameter.

22. A plasma processing chamber for confining plasma within, the plasma processing chamber includes a lower electrode for supporting a substrate and an upper electrode disposed over the lower electrode, the plasma processing chamber comprising,

a confinement ring disposed between the lower electrode and the upper electrode, the confinement ring including,

an upper horizontal section extending between an upper inner radius and an outer radius of the confinement ring;

a lower horizontal section extending between a lower inner radius and the outer radius of the confinement ring, a top surface of the lower horizontal section provides for an angle down from near an inside radius of the confinement ring toward the lower inner radius, the angle defining a slope along the top surface, the lower horizontal section having an extension section that extends downward along the lower inner radius; and

a vertical section disposed between the outer radius and an inside radius of the confinement ring, the vertical section connects the upper horizontal section to the lower horizontal section of the confinement ring.

23. The plasma processing chamber of claim 22, wherein a bottom surface of the lower horizontal section provides a second angle down toward the lower inner radius, the second angle defining a second slope along the bottom surface, the second angle of the second slope along the bottom surface being equal to the angle of the slope along the top surface of the lower horizontal section.

24. The plasma processing chamber of claim 22, wherein the lower horizontal section further includes a plurality of slots disposed along the lower horizontal section, each slot extends radially from an inner diameter to an outer diameter along the lower horizontal section, an inner slot radius of each slot at the inner diameter is less than an outer slot radius of each slot at the outer diameter, and

wherein the inner diameter is greater than an inner ring diameter of the confinement ring defined by the lower inner radius and the outer diameter is less than an outer ring diameter of the confinement ring defined by the outer radius.

25. The plasma processing chamber of claim 22, wherein the upper inner radius is greater than the lower inner radius of the confinement ring.

26. The plasma processing chamber of claim 22, wherein the confinement ring defined by the lower horizontal section, the upper horizontal section and the vertical section defines a contiguous C-shaped structure for confining plasma generated in the plasma processing chamber to a plasma region, the confinement ring is made from one of silicon, or polysilicon, or silicon carbide, or boron carbide, or ceramic, or aluminum.

27. The plasma processing chamber of claim 22, wherein the extension section is integral with the lower horizontal section, the vertical section and the upper horizontal section of the confinement ring, the extension section configured to extend vertically below a bottom surface of the lower horizontal section.

28. The plasma processing chamber of claim 22, wherein the upper electrode is electrically grounded and the lower electrode is connected to a radio frequency power source through a corresponding match network.