Claims

1. A processing chamber comprising:

a plurality of plasma sources disposed horizontally over a process chamber top of the processing chamber, wherein each one of the plurality of plasma sources has a ring shaped chamber that is a closed loop that includes a top chamber surface, side chamber surfaces and a bottom chamber surface, such that a primary winding is wrapped around an outer circumference of the ring shaped chamber and a plurality of ferrites encircle the ring shaped chamber, wherein both the primary winding and the ring shaped chamber of each of the plurality of plasma sources pass through a respective set of said plurality of ferrites, wherein the plurality of plasma sources includes at least an inner plasma source and an outer plasma source, the ring shaped chamber of the outer plasma source surrounds the ring shaped chamber of the inner plasma source; and

a plurality of plasma chamber outlets coupling the ring shaped chamber of each one of the plurality of plasma sources to the processing chamber, the ring shaped chambers of plurality of plasma sources being arranged in a concentric arrangement,

wherein each of said plurality of ferrites encircle the ring shaped chamber of respective one of each of the plasma sources at discrete cross-sections, such that at each discrete cross-section a ferrite includes a bottom region, side regions and a top region, and the bottom region of each ferrite is disposed adjacent to said bottom chamber surface of the respective ring shaped chamber, the side regions of each ferrite is disposed adjacent to said side chamber surfaces of the respective ring shaped chamber, the top region of each ferrite is disposed adjacent to said top chamber surface of the respective ring shaped chamber, for said encircling of the ring shaped chamber.

2. The processing chamber of claim 1, wherein at least a portion of the plurality of plasma chamber outlets are coupled to a ground potential.

3. The processing chamber of claim 1, further comprising at least one process gas inlet coupling a process gas source to each one of the ring shaped chambers of the plurality of plasma sources.

4. The processing chamber of claim 1, wherein the plurality of ferrites of each of the plurality of plasma sources are substantially evenly distributed around a circumference of each of the ring shaped chambers.

5. The processing chamber of claim 1, wherein each one of the plurality of the plasma sources is separated from the remaining ones of the plurality of the plasma sources by a separation distance.

6. The processing chamber of claim 5, wherein each one of the plurality of the plasma sources is separated from the remaining ones of the plurality of the plasma sources by a substantially equal separation distance.

7. The processing chamber of claim 1, wherein the primary winding of each one of the plurality of the plasma sources is coupled to a primary current source that is controlled by a controller.

8. The processing chamber of claim 1, wherein each of the plurality of ferrites are spaced apart from adjacent respective ones of the plurality of ferrites, and the plurality of plasma chamber outlets are located between respective ones of the plurality of ferrites.

9. An apparatus, comprising:

a process chamber;

a chamber top of the process chamber;

a first plasma source disposed horizontally over the chamber top;

a second plasma source disposed horizontally over the chamber top, the second plasma source is oriented concentrically around the first plasma source, each of the first plasma source and second plasma source includes a top chamber surface, side chamber surfaces and a bottom chamber surface; and

a plurality of ferrites disposed around a ring chamber that is a closed loop of each of the first and second plasma sources and each ring chamber passes through a respective plurality of ferrites, and the plurality of ferrites of each of the first and second plasma sources are substantially evenly distributed around the ring chamber of each of the first and second plasma sources, and each of said plurality of ferrites encircle the ring chamber of respective

one of each of the plasma sources at discrete cross-sections, such that at each discrete cross-section a ferrite includes a bottom region, side regions and a top region, and the bottom region of each ferrite is disposed adjacent to said bottom chamber surface of the respective ring shaped chamber, the side regions of each ferrite is disposed adjacent to said side chamber surfaces of the respective ring shaped chamber, the top region of each ferrite is disposed adjacent to said top chamber surface of the respective ring shaped chamber, for said encircling of the ring chamber;

a first primary winding disposed around an outer circumference of the ring chamber of the first plasma source;

a second primary winding disposed around an outer circumference of the ring chamber of the second plasma source, such that the first and second primary windings and the ring chambers pass through the respective plurality of ferrites; and

a plurality of outlets disposed on a lower portion of the ring chambers of each one of the first and second plasma sources.

10. The apparatus of claim 9, wherein the plurality of outlets connect each of the ring chambers through the chamber top and into the processing chamber.

11. The apparatus of claim 9, wherein the ring chambers of the first and second plasma sources are substantially round.

12. The apparatus of claim 9, wherein each of the first and second primary winding is coupled to a respective primary current source controlled by a controller.

13. The apparatus of claim 9, wherein each of the plurality of ferrites are spaced apart from adjacent respective ones of the plurality of ferrites, and the plurality of outlets are located between respective ones of the plurality of ferrites.

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

a substrate support disposed in the process chamber;

a chamber top of the process chamber, the chamber top is disposed over the substrate support;

a first plasma source disposed horizontally over the chamber top;

a second plasma source disposed horizontally over the chamber top, the second plasma source is oriented concentrically around the first plasma source, each of the first plasma source and second plasma source includes a top chamber surface, side chamber surfaces and a bottom chamber surface; and

a plurality of ferrites disposed around a ring chamber that is a closed loop of each of the first and second plasma sources and each ring chamber passes through a respective plurality of ferrites, and the plurality of ferrites of each of the first and second plasma sources are substantially evenly distributed around the ring chamber of each of first and second plasma sources, and each of said plurality of ferrites encircle the ring chamber of respective one of each of the plasma sources at discrete cross-sections, such that at each discrete cross-section a ferrite includes a bottom region, side regions and a top region, and the bottom region of each ferrite is disposed adjacent to said bottom chamber surface of the respective ring shaped chamber, the side regions of each ferrite is disposed adjacent to said side chamber surfaces of the respective ring shaped chamber, the top region of each ferrite is disposed adjacent to said top chamber surface of the respective ring shaped chamber, for said encircling of the ring chamber;

a first primary winding disposed around an outer circumference of the ring chamber of the first plasma source;

and

a second primary winding disposed around an outer circumference of the ring chamber of the second plasma source, such that the first and second primary windings and the ring chambers pass through the respective plurality of ferrites;

a plurality of outlets disposed on a lower portion of the ring chambers of each one of the first and second plasma sources.

15. The process chamber of claim 14, wherein the plurality of outlets connect each of the ring chambers through the chamber top and into the processing chamber.

16. The process chamber of claim 14, wherein the ring chambers of the first and second plasma sources are substantially round.

17. The process chamber of claim 14, wherein each of the first and second primary winding is coupled to a respective primary current source controlled by a controller.

18. The process chamber of claim 14, wherein each of the plurality of ferrites are spaced apart from adjacent respective ones of the plurality of ferrites, and the plurality of outlets are located between respective ones of the plurality of ferrites.