

Claims

1. An etch chamber, comprising:
 - a center assembly;
 - an electrode plate affixed to a bottom surface of the center assembly, wherein a channel is defined along an external circumference of the center assembly, above the electrode plate;
 - a first plasma source disposed within the channel and along the external circumference of the center assembly, wherein the first plasma source is configured to direct a plasma to an inner circumferential surface of a confinement ring stack disposed above the electrode plate; and
 - a second plasma source configured to perform processing operations on a substrate within the etch chamber, the second plasma source being positioned away from the first plasma source.
2. The etch chamber, as recited in claim 1, wherein, the first plasma source is a hollow cathode array including a plurality of hollow cathode units.
3. The etch chamber, as recited in claim 2, wherein, the plurality of hollow cathode units have openings with a diameter of between about 0.01 centimeters (cm) to about 0.5 cm.
4. The etch chamber, as recited in claim 1, further comprising:
 - a gas source line extending through the center assembly to the channel, the gas source line configured to supply a gas to the channel.
5. The etch chamber, as recited in claim 4, wherein the gas is heated prior to introduction into the channel.
6. The etch chamber, as recited in claim 1, wherein, the confinement ring stack is positioned so that the inner circumferential surface of the confinement ring stack is between about 0.5 millimeters (mm) to about 15 mm from the first plasma source.

7. An etch chamber, comprising:
 - a center assembly;
 - an electrode plate affixed to a surface of the center assembly, wherein a channel is defined along an external circumference of the center assembly, above the electrode plate;
 - a first plasma source configured to be disposed within the channel and along the external circumference of the center assembly, wherein the first plasma source is configured to deliver a plasma to an inner circumferential surface of a plurality of confinement rings disposed above the electrode plate;
 - a heating element configured to supply heat to the inner circumferential surface of the plurality of confinement rings; and
 - a second plasma source configured to perform processing operations on a substrate within the etch chamber, the second plasma source being positioned away from the first plasma source.
8. The etch chamber, as recited in claim 7, further comprising:
 - a shielding component positioned proximate to an outer circumferential surface of the plurality of rings and configured to provide a substantially gas tight seal.
9. The etch chamber, as recited in claim 7, wherein, the heating element is one of a convective heating component or a radiative heating element.
10. The etch chamber, as recited in claim 7, wherein, the heating element is disposed within the channel and along the external circumference of the center assembly.
11. The etch chamber, as recited in claim 7, further comprising:
 - a gas source line extending through the center assembly to the channel, the gas source line configured to supply a gas to the channel.
- ~~12. A method for cleaning a confinement ring stack in a plasma chamber, comprising:~~

moving the confinement ring stack so that an inner circumferential surface of the confinement ring stack is positioned at a distance from a first plasma source, the first plasma source being positioned away from a second plasma source;

supplying a feed gas; and

supplying a first quantity of plasma to the inner circumferential surface of the confinement ring stack using the first plasma source.

13. The method for cleaning a confinement ring stack in a plasma chamber, as recited in claim 12, further comprising:

heating the inner circumferential surface of the confinement ring stack to a temperature between about 20 degrees Celsius ($^{\circ}\text{C}$) to about 500 $^{\circ}\text{C}$.

14. The method for cleaning a confinement ring stack in a plasma chamber, as recited in claim 12, wherein, the distance is between about 0.5 millimeters (mm) to about 15 mm.

15. The method for cleaning a confinement ring stack in a plasma chamber, as recited in claim 12, further including:

supplying a second quantity of plasma to the plasma chamber using the second plasma source, the second quantity of plasma configured to substantially remove contaminants from the plasma chamber.

16. The method for cleaning a confinement ring stack in a plasma chamber, as recited in claim 15, wherein the first quantity of plasma and the second quantity of plasma is between about 100 Watts to about 2000 Watts.

17. The method for cleaning a confinement ring stack in a plasma chamber, as recited in claim 12, further including:

increasing a pressure of a space defined between the inner circumferential surface of the confinement ring stack and the first plasma source to between about 1 millitorr to about 5 torr.

18. The method for cleaning a confinement ring stack in a plasma chamber, as recited in claim 12, wherein the first plasma source is selected from a group consisting of an inductively coupled plasma device, a hollow cathode array, and a capacitively coupled electrode.