CLAIMS

1. In a plasma processing chamber, a method for processing a substrate comprising:

supporting said substrate in said plasma processing chamber configured with a first electrode and a second electrode;

configuring at least one power source to ignite plasma between said first electrode and said second electrode;

coupling a passive radio frequency (RF) circuit to said second electrode, said passive RF circuit being configured to adjust one or more of an RF impedance, an RF voltage potential, and a DC bias potential on said second electrode; and

coupling said second electrode to a DC ground through said passive RF circuit.

2. The method of claim 1, wherein said DC ground includes a conductive coupling member.

3. The method of claim 2, wherein said conductive coupling member is made of silicon.

4. The method of claim 2, wherein said conductive coupling member is shaped as a ring.

5. The method of claim 1, wherein said passive RF circuit includes at least one of a capacitor and an inductor.

6. The method claim of 5, wherein said capacitor is a variable capacitor.

7. The method of claim 5, wherein said inductor is a variable inductor.

8. The method of claim 1, wherein said RF coupling circuit includes an RF filter arrangement, a resistor and a switch.

9. The method of claim 8, wherein said resistor is a variable resistor.

10. A plasma processing system comprising:

a first electrode;

a second electrode;

at least one power source, said at least one power source being configured to ignite plasma between said first electrode and said second electrode;

a passive radio frequency (RF) circuit coupled to said second electrode, said passive RF circuit being configured to adjust one or more of an RF impedance, an RF voltage potential, and a DC bias potential on said second electrode; and

a DC ground coupled with said second electrode through said passive RF circuit.

11. The plasma processing system of claim 10, wherein said DC ground includes a conductive coupling member.

12. The plasma processing system of claim 11, wherein said conductive coupling member is made of silicon.

13. The plasma processing system of claim 11, wherein said conductive coupling member is shaped as a ring.

14. The plasma processing system of claim 10, wherein said passive RF circuit includes at least one of a capacitor and an inductor.

15. The plasma processing system claim of 14, wherein said capacitor is a variable capacitor.

16. The plasma processing system of claim 14, wherein said inductor is a variable inductor.

17. The plasma processing system of claim 10, wherein said RF coupling circuit includes an RF filter arrangement, a resistor and a switch.

18. The plasma processing system of claim 17, wherein said resistor is a variable resistor.

What is claimed is:

1. In a plasma processing chanter, a method for processing a substrate comprising: supporting said substrate in said plasma processing chamber configured with a first electrode and a second electrode; providing an extension ring surrounding said first electrode; configuring at least one power source coupled to said second electrode to ignite plasma between said first electrode and said second electrode; providing a DC ground which includes a conductive coupling member surrounding said first electrode and disposed above said extension ring to provide a path DC current return to ground from said second electrode through said extension ring; and coupling a passive radio frequency (RF) ground coupling circuit to said second electrode, said passive RF ground coupling circuit being configured to adjust one or more of an RF impedance, an RF voltage potential, and a DC bias potential on said second electrode to control plasma processing parameters.

2. The method of claim 1, wherein said conductive coupling member is made of silicon.

3. The method of claim 1, wherein said conductive coupling member is shaped as a ring.

4. The method of claim 1, wherein said passive RF ground coupling circuit includes at least one of a capacitor and an inductor.

5. The method claim of 4, wherein said capacitor is a variable capacitor.

6. The method of claim 4, wherein said inductor is a variable inductor.

7. The method of claim 1, wherein said RF ground coupling circuit includes an RF filter arrangement, a resistor and a switch.

8. The method of claim 7, wherein said resistor is a variable resistor.

9. A plasma processing system comprising: a first electrode; a second electrode; an extension ring surrounding, said first electrode; at least one power source coupled to said second electrode, said at least one power source being configured to ignite plasma between said first electrode and said second electrode; a DC ground which includes a conductive coupling member surrounding said first electrode and disposed above said extension ring to provide a

path DC current return to ground from said second electrode through said extension ring; and a passive radio frequency (RF) ground coupling circuit coupled to said second electrode, said passive RF ground coupling circuit being configured to adjust one or more of an RF impedance, an RF voltage potential, and a DC bias potential on said second electrode to control plasma procession parameters.

10. The plasma processing system of claim 9, wherein said conductive coupling member is made of silicon.

11. The plasma processing system of claim 9, wherein said conductive coupling member is shaped as a ring.

12. The plasma processing system of claim 9, wherein said passive RF ground coupling circuit includes at least one of a capacitor and an inductor.

13. The plasma processing system claim of 12, wherein said capacitor is a variable capacitor.

14. The plasma processing system of claim 12, wherein said inductor is a variable inductor.

15. The plasma processing system of claim 9, wherein said RF coupling ground coupling circuit includes an RF filter arrangement, a resistor and a switch.

16. The plasma processing system of claim 15, wherein said resistor is a variable resistor.