CLAIMS

1. A method for processing a substrate within a process chamber, comprising:

applying a direct current to an electrode disposed within a pedestal on which the substrate is disposed within the process chamber;

flowing one or more first process gases comprising helium into the process chamber subsequent to applying the direct current to the electrode;

applying radio frequency (RF) power at a first RF power level to a showerhead within the process chamber, subsequent to flowing the one or more first process gases into the process chamber through the showerhead;

flowing one or more second process gases into the process chamber while removing the one or more first process gases from the process chamber;

processing the substrate subsequent to the applying RF power at the first RF power level, wherein processing the substrate comprises applying a plasma generated from at least one of the one or more first process gases and the one or more second process gases to the substrate;

increasing the RF power to a second RF power level prior to, during, or both prior to and during the processing the substrate;

flowing the one or more first process gases into the process chamber while removing the one or more second process gases from the process chamber subsequent to the increasing the RF power to the second RF power level;

stopping the application of the RF power subsequent to processing the substrate;

removing the one or more first process gases from the process chamber subsequent to the stopping the application of the RF power; and

stopping the application of the direct current subsequent to removing the one or more first process gases and subsequent to the stopping the application of RF power.

2. The method of claim 1, wherein applying the direct current to the electrode further comprises applying a DC voltage of 300 volts to 500 volts and applying the RF power to the showerhead further comprises applying power of 100 watts to 6000 watts.

3. The method of claim 2, wherein the one or more second process gases comprises either argon, propene, or both argon and propene.

4. The method of claim 2, wherein during the processing the substrate the pressure within the process chamber is 5 Torr to 15 Torr and the spacing between the showerhead and the pedestal is 450 mils to 750 mils.

5. A method for processing a substrate, comprising sequential operations of:

(a) positioning the substrate on a surface of a pedestal within a process chamber, wherein the pedestal is at a first spacing from a showerhead;

(b) applying a DC voltage at a first DC voltage level to an electrode disposed within the pedestal to chuck the substrate;

(c) flowing one or more first process gases into the process chamber through the showerhead;

(d) applying an RF power at a first RF power level to the showerhead within the process chamber;

(e) flowing one or more second process gases into the process chamber while removing the one or more first process gases from the process chamber;

(f) increasing the DC voltage and the RF power to a second DC voltage level and a second RF power level either prior to, during, or both prior to and during processing of the substrate;

(g) flowing the one or more first process gases into the process chamber while removing the one or more second process gases from the process chamber;

(h) decreasing the DC voltage and the RF power to a third DC voltage level and a third RF power level after processing of the substrate;

(i) moving the pedestal within the process chamber to a second spacing from the showerhead;

(j) stopping the application of RF power to the showerhead;

(k) removing the one or more first process gases from the process chamber; and

(l) stopping the application of the DC voltage to the electrode.

6. The method of claim 5, wherein the first spacing is 450 mils to 750 mils.

7. The method of claim 5, wherein the second spacing is 200 mils to 400 mils.

8. The method of claim 5, wherein the first DC voltage level is 300 volts to 500 volts.

9. The method of claim 5, wherein the one or more first process gases comprise helium and wherein processing the substrate comprises applying a plasma generated from at least one of the one or more first process gases and the one or more second process gases to the substrate.

10. The method of claim 5, wherein the first RF power level is greater than 100 watts to 6000 watts.

11. The method of claim 5, wherein the second DC voltage level is 800 volts to 1100 volts.

12. The method of claim 5, wherein the second RF power level is greater than 1000 watts to 4000 watts.

13. The method of claim 5, wherein the pressure within the process chamber during the substrate processing is 5 Torr to 15 Torr.

14. The method of claim 5, wherein the third DC voltage level is 300 volts to 500 volts.

15. A method for processing a substrate, comprising the sequential operations of:

positioning the substrate on a surface of a pedestal, wherein the pedestal is at a first spacing from a showerhead within a process chamber;

applying a DC voltage at a first DC voltage to an electrode disposed within the pedestal;

flowing a first process gas into the process chamber through the showerhead after the application of the DC voltage at a first DC voltage level;

applying radio frequency (RF) power to the showerhead within the process chamber at a first RF power level;

moving the pedestal to a second spacing from the showerhead, wherein the second spacing is closer to the showerhead than the first spacing;

flowing a second process gas into the process chamber through the showerhead;

increasing the DC voltage and the RF power to a second DC voltage level and a second RF power level to either prior to, during, or both prior to and during the performance of a process on the substrate;

decreasing the DC voltage and the RF power after performing the process on the substrate to a third DC voltage level and a third RF power level;

flowing the first process gas into the process chamber through the showerhead while removing the second process gas from the process chamber after performing the process on the substrate;

moving the pedestal within the process chamber to a third spacing from the showerhead;

stopping the application of the RF power;

removing the first process gas from the process chamber after stopping the application of the RF power; and

stopping the application of the DC voltage after removing the first process gas from the process chamber.

16. The method of claim 15, wherein the pedestal is spaced apart from the showerhead between 450 and 750 mils at the first spacing.

17. The method of claim 16, wherein the first DC voltage level is 300 volts to 500 volts.

18. The method of claim 17, wherein the first process gas is helium.

19. The method of claim 18, wherein a pressure within the process chamber during the substrate processing is 5 Torr to 15 Torr subsequent to flowing the first process gas into the process chamber.

20. The method of claim 15, wherein the second DC voltage level is 800 volts to 1100 volts, the second process gas comprises either argon, propene, or both argon and propene.

21. The method of claim 15, further comprising:

removing the first process gas from the process chamber while flowing the second process gas into the process chamber through the showerhead,

wherein stopping the application of the DC voltage after removing the first process gas from the process chamber occurs subsequent to stopping the application of the RF power,

wherein the performance of the process comprises applying a plasma generated from at least one of the first process gas and the second process gas to the substrate; and

wherein the first process gas comprises helium.