CLAIMS:

1. A processing method comprising:

forming a plasma of a silicon-containing precursor;

depositing a flowable film on a semiconductor substrate with plasma effluents of the silicon-containing precursor, wherein the semiconductor substrate is housed in a processing region of a semiconductor processing chamber, wherein the semiconductor substrate defines a feature within the semiconductor substrate, and wherein the processing region is at least partially defined between a faceplate and a substrate support on which the semiconductor substrate is seated;

forming a treatment plasma within the processing region of the semiconductor processing chamber, wherein the treatment plasma is formed at a first power level from a first power source, and wherein a second power level is applied to the substrate support from a second power source; and

densifying the flowable film within the feature defined within the semiconductor substrate with plasma effluents of the treatment plasma,

wherein the semiconductor processing chamber is part of a semiconductor processing system comprising:

a chamber body;

a pedestal configured to support a semiconductor substrate, wherein the pedestal comprises an electrostatic chuck;

a DC power supply coupled with the pedestal, wherein the DC power supply is configured for chucking the semiconductor substrate to the pedestal;

a faceplate, wherein the chamber body, the pedestal, and the faceplate define the processing region;

a high-frequency plasma source coupled with the faceplate, wherein the high-frequency plasma source is the first power source; and

a low-frequency plasma source coupled with the pedestal, wherein the low-frequency plasma source is the second power source and the second power source is operated in a pulsing mode at a pulsing frequency of less than or equal to 1 kHz.

2. The processing method of claim 1, further comprising:

a first L-C filter coupled with the pedestal and configured to virtually ground the high-frequency plasma source through the pedestal, and

a second L-C filter coupled with the faceplate and configured to virtually ground the low-frequency plasma source to the chamber body.

3. The processing method of claim 1, wherein the first power source is operated in a continuous wave mode during the treatment plasma while the second power source is operated in the pulsing mode.

4. The processing method of claim 1, wherein the second power source is operated at a duty cycle of less than or equal to 50%.

5. The processing method of claim 1, wherein the first power source is operated to produce a power spike within a first period of time during the depositing.

6. The processing method of claim 5, wherein, subsequent the first period of time, the first power source is operated for a second period of time during the depositing.

7. The processing method of claim 6, wherein the first period of time is less than or equal to one second, and wherein the second period of time is greater than or equal to one second.

8. The processing method of claim 7, wherein the first power source is operated at a pulsing frequency of less than or equal to 200 kHz at a duty cycle of less than or equal to 20% to produce an effective plasma power of less than or equal to 10 W.

9. The processing method of claim 1, wherein the method is repeated in a second cycle.

10. The processing method of claim 1, wherein a temperature of the semiconductor substrate is maintained at a temperature of less than or equal to 0 °C during the method.

11. A semiconductor processing system comprising:

a chamber body;

a pedestal configured to support a semiconductor substrate, wherein the pedestal comprises an electrostatic chuck;

a DC power supply coupled with the pedestal, wherein the DC power supply is configured for chucking the semiconductor substrate to the pedestal;

a faceplate, wherein the chamber body, the pedestal, and the faceplate define a processing region;

a high-frequency plasma source coupled with the faceplate; and

a low-frequency plasma source coupled with the pedestal, wherein the low-frequency plasma source is operated in a pulsing mode at a pulsing frequency of less than or equal to 1 kHz.

12. The semiconductor processing system of claim 11, wherein the high-frequency plasma source is configured to operate at greater than or equal to 13.56 MHz at a pulsing frequency of less than or equal to 200 kHz.

13. The semiconductor processing system of claim 12, wherein the high-frequency plasma source is configured to operate at a pulsing frequency of less than or equal to 20 kHz at a duty cycle of less than or equal to 20%.

14. The semiconductor processing system of claim 13, wherein the high-frequency plasma source is configured to generate a plasma at an effective power of less than or equal to 5 W.

15. The semiconductor processing system of claim 11, further comprising:

a first L-C filter coupled with the pedestal and configured to virtually ground the high-frequency plasma source through the pedestal.

16. The semiconductor processing system of claim 15, further comprising

a second L-C filter coupled with the faceplate and configured to virtually ground the low-frequency plasma source to the chamber body.