CLAIMS

1. A semiconductor processing method comprising:

performing an initiation process in a semiconductor processing chamber, wherein the initiation process comprises:

forming a plasma of a carbon-containing precursor and an inert precursor within a processing region of the semiconductor processing chamber, wherein a flow rate ratio of the inert precursor to the carbon-containing precursor is greater than or equal to 5:1; and

forming an interface on one or more chamber components of the semiconductor processing chamber for a first period of time; and

subsequent forming the interface, transitioning from the initiation process to a deposition process,

wherein the deposition process forms a carbon-containing material on a semiconductor substrate for a second period of time; and

wherein transitioning to the deposition process comprises:

increasing a flow rate of the carbon-containing precursor and a flow rate of the inert precursor, wherein the flow rate ratio of the inert precursor to the carbon-containing precursor is reduced to less than or equal to 4:1; and

increasing a plasma power at which the plasma is formed.

2. The semiconductor processing method of claim 1, wherein the deposition process comprises forming a carbon-containing hardmask film.

3. The semiconductor processing method of claim 1, wherein the carbon-containing precursor and the inert precursor are flowed through a faceplate into the processing region of the semiconductor processing chamber, and wherein the faceplate is coated with an oxide of aluminum, silicon, yttrium, hafnium, or zirconium.

4. The semiconductor processing method of claim 1, further comprising:

subsequent the first period of time, reducing a pressure within the semiconductor processing chamber.

5. The semiconductor processing method of claim 1, further comprising:

performing a chamber clean with an oxygen-containing precursor.

6. The semiconductor processing method of claim 1, wherein the plasma power is increased from a first plasma power of less than or equal to 1000 W to a second plasma power of greater than or equal to 2000 W.

7. The semiconductor processing method of claim 1, further comprising:

subsequent the first period of time, adjusting a spacing of a substrate support on which the semiconductor substrate is disposed, wherein the spacing is a distance between the substrate support and a faceplate of the semiconductor processing chamber.

8. The semiconductor processing method of claim 1, wherein the flow rate of the carbon-containing precursor is increased less than the flow rate of the inert precursor subsequent the first period of time.

9. The semiconductor processing method of claim 1, wherein the first period of time is less than or equal to 1 minute.

10. A semiconductor processing method comprising:

forming a plasma of a carbon-containing precursor and an inert precursor within a processing region of a semiconductor processing chamber at a pressure of greater than or equal to 10 Torr;

forming an interface on one or more chamber components of the semiconductor processing chamber; and

subsequent forming the interface for a first period of time:

adjusting a spacing of a substrate support on which the semiconductor substrate is disposed;

lowering the pressure within the processing region while continuing to form the plasma of the carbon-containing precursor and the inert precursor within the processing region of the semiconductor processing chamber; and

performing a deposition process on a semiconductor substrate disposed within the processing region of the semiconductor processing chamber.

11. The semiconductor processing method of claim 10, further comprising:

subsequent the first period of time, increasing a plasma power from a first plasma power less than or equal to 1000 W to a second plasma power greater than or equal to 2000 W.

12. The semiconductor processing method of claim 10, further comprising:

subsequent the first period of time, increasing a flow rate of the carbon-containing precursor and a flow rate of the inert precursor, wherein the flow rate of the carbon-containing precursor is increased less than the flow rate of the inert precursor subsequent the first period of time.

13. The semiconductor processing method of claim 10, wherein the carbon-containing precursor and the inert precursor are flowed through a faceplate into the processing region of the semiconductor processing chamber, and wherein the faceplate is coated with an oxide of aluminum, silicon, yttrium, hafnium, or zirconium.

14. The semiconductor processing method of claim 10, wherein the first period of time is less than or equal to 1 minute.

15. A semiconductor processing method comprising:

forming a plasma of a carbon-containing precursor and an inert precursor within a processing region of a semiconductor processing chamber;

forming an interface on one or more chamber components of the semiconductor processing chamber, wherein the interface is characterized by a thickness of less than or equal to 1 nm; and

subsequent forming the interface for a first period of time:

increasing a flow rate of the carbon-containing precursor and a flow rate of the inert precursor and increasing a plasma power within the processing region,

wherein the flow rate of the carbon-containing precursor is increased less than the flow rate of the inert precursor subsequent the first period of time; and

wherein the plasma power is increased from a first plasma power to a second plasma power of greater than 2200 W; and

performing a deposition process on a semiconductor substrate disposed within the processing region of the semiconductor processing chamber.

16. The semiconductor processing method of claim 15, further comprising:

subsequent the first period of time, reducing a pressure within the semiconductor processing chamber.

17. The semiconductor processing method of claim 15, wherein the first plasma power is less than 1000 W and the second plasma power is greater than 2400 W.

18. The semiconductor processing method of claim 15, wherein the carbon-containing precursor and the inert precursor are flowed through a faceplate into the processing region of the semiconductor processing chamber, and wherein the faceplate is coated with a metal oxide.

19. The semiconductor processing method of claim 15, further comprising:

subsequent the first period of time, adjusting a spacing of a substrate support on which the semiconductor substrate is disposed.