Claims

1. A method comprising:

placing a substrate on a substrate support assembly that is at least partially positioned in a processing chamber, the substrate support assembly comprising;

a body having an outer surface, the outer surface including a top surface; and

a two-part coating disposed over the outer surface, the two-part coating comprising:

a first coating layer disposed over an entirety of the outer surface of the body, a first portion of the first coating layer being disposed over the top surface of the body, and the first coating layer including at least one of a metal-containing material or alloy; and

a second coating layer disposed over at least the first portion of the first coating layer, wherein the second coating layer comprises yttrium fluoride (YF_3); and

contacting a surface of the substrate with a process gas in the processing chamber at a process temperature that is about 40 °C or less to remove oxides from the surface.

2. The method of claim 1, wherein the process temperature is about 0 °C or less.

3. The method of claim 1, wherein the process gas comprises either fluorine or chlorine.

4. The method of claim 1, wherein the second coating layer is disposed over an entirety of the first coating layer, wherein the first coating layer has a thickness between about 5 nm and about 300 nm, and wherein the second coating layer has a thickness between about 100 nm and about 500 nm.

5. The method of claim 1, wherein the first coating layer comprises either a nickel-phosphorous alloy or aluminum oxide (Al_2O_3).

6. The method of claim 1, wherein the second coating layer consists of YF_3.

7. The method of claim 6, wherein the second coating layer has a concentration of about 25 atomic (at.) % yttrium (Y) atoms and about 75 at. % fluorine (F) atoms.

8. The method of claim 1, wherein the second coating layer has a concentration of Y atoms is in a range of from about 10 at. % to about 80 at. %.

9. The method of claim 1, further comprising growing one or more epitaxial layers on the surface of the substrate by use of the processing chamber after the contacting the surface with the process .

10. A support body for supporting a substrate in a processing chamber, comprising:

a body having an outer surface, the outer surface including a top surface; and

a two-part coating disposed over the outer surface of the body, the two-part coating comprising:

a first coating layer disposed over an entirety of the outer surface of the body, the first coating layer including at least one of a metal-containing material or alloy; and

a second coating layer disposed over the first coating layer, the second coating layer disposed over at least a portion of the first coating layer disposed over the top surface of the body and extending a radial distance from a center of the body, wherein the second coating layer is a non-metal or reduced-metal coating.

11. The support body of claim 10, wherein the second coating layer is disposed over an entirety of the first coating layer.

12. The support body of claim 10, wherein the second coating layer is disposed over a substrate contact surface on the top surface of the body.

13. The support body of claim 10, wherein the first coating layer comprises electroless nickel plating, and wherein the second coating layer comprises a material selected from the group consisting of yttrium oxyfluoride (YOF), yttrium fluroride (YF_3),and yttrium oxide (Y_2O_3).

14. The support body of claim 10, wherein the first coating layer comprises Al_2O_3, and wherein the second coating layer comprises a material selected from the group consisting of YOF, YF_3, and Y_2O_3.

15. The support body of claim 10, wherein the first coating layer comprises SiO_2, and wherein the second coating layer comprises a material selected from the group consisting of YOF, YF_3, and Y_2O_3.

16. The support body of claim 10, wherein the body comprises aluminum, aluminum oxide, aluminum nitride, or combinations thereof.

17. A system comprising:

a processing chamber configured to clean a substrate, the processing chamber comprising:

a chamber body;

a lid assembly disposed at an upper end of the chamber body, the lid assembly comprising:

a dual channel showerhead having a first set of channels providing fluid communication above and below a plane of the showerhead; and

a second set of channels providing fluid communication with a side port of the chamber body; and

a substrate support assembly at least partially disposed within the chamber body, the substrate support assembly configured to support the substrate in the processing chamber, the substrate support assembly comprising:

a support body having an outer surface, the outer surface including a substrate supporting surface on a top surface of the support body, the substrate supporting surface extending a first radial distance from a center of the support body;

a stem coupled to the support body; and

a coating disposed over the support body, the coating comprising:

a first coating layer disposed over an entirety of the outer surface of the support body; and

a second coating layer disposed over the first coating layer, the second coating layer extending over at least the substrate supporting surface of the support body.

18. The system of claim 17, wherein the second coating layer is disposed over an entirety of the first coating layer.

19. The system of claim 17, wherein the first coating layer comprises one of an electroless nickel plating or Al_2O_3, and wherein the second coating layer comprises a material selected from the group consisting of YOF, YF_3, and Y_2O_3.

20. The system of claim 17, further comprising an epitaxy chamber to grow an epitaxial layer on the substrate after the substrate is cleaned by the processing chamber.