CLAIMS

1. An apparatus for substrate processing comprising:

a chamber body having a lower chamber body and an upper chamber body;

a substrate support pedestal disposed within the chamber body;

a lower liner disposed within the lower chamber body;

an upper liner disposed on top of the lower liner and within the upper chamber body;

a liner door configured to open and close an opening disposed through the upper liner and the upper chamber body, wherein each of the lower liner, the upper liner, and the liner door further comprises a spray-coated yttrium zirconium oxide layer disposed thereon;

a chamber lid disposed on top of the upper chamber body;

a gas nozzle disposed through the chamber lid, wherein the gas nozzle comprises a bulk ceramic gas nozzle; and

one or more fasteners disposed through a bottom portion of the substrate support pedestal, the lower chamber body, and the lower liner to secure the substrate support pedestal, the lower chamber body, and the lower liner together,

wherein a bulk yttrium zirconium oxide ceramic fastener cover is disposed over a portion of each of the one or more fasteners disposed within the chamber body.

2. The apparatus of claim 1, further comprising:

an electrostatic chuck disposed within the chamber body; and

a plasma screen ring disposed on top of the electrostatic chuck, wherein the plasma screen ring is a bulk yttrium zirconium oxide ceramic plasma screen ring.

3. The apparatus of claim 1, wherein the one or more fasteners and the bulk yttrium zirconium oxide ceramic fastener covers are disposed about an outer radius of a base of the substrate support pedestal.

4. The apparatus of claim 1, wherein the chamber lid comprises an Al_2O_3 lid and a Y_2O_3 coating.

5. The apparatus of claim 1, wherein the chamber lid comprises an Al_2O_3-Y_2O_3 ceramic composite and a Y_2O_3 coating.

6. The apparatus of claim 1, wherein the chamber lid further comprises quartz.

7. The apparatus of claim 1, wherein the chamber lid further comprises either:

an aluminum oxide body having a laminated or sintered yttrium zirconium oxide coating; or

an Al_2O_3-Y_2O_3 ceramic-composite body having a laminated or sintered yttrium zirconium oxide coating.

8. The apparatus of claim 1, wherein each spray-coated yttrium zirconium oxide layer comprises a single-phase Y_2O_3-ZrO_2 solid solution.

9. The apparatus of claim 1, wherein one or more gaskets are disposed between the lower chamber body and the upper chamber body.

10. The apparatus of claim 9, wherein the one or more gaskets are configured to maintain a seal and provide an electrically conductive path between the upper chamber body and the lower chamber body.

11. The apparatus of claim 9, wherein each of the one or more gaskets comprises a nickel-plated copper gasket or a stainless-steel gasket.

12. The apparatus of claim 11, wherein at least one of the one or more gaskets is a nickel-plated copper gasket having a nickel-plating thickness of 25 μm to 100 μm.

13. An apparatus for substrate processing comprising:

a chamber body having a lower chamber body and an upper chamber body;

a substrate support pedestal disposed within the chamber body;

a lower liner disposed within the lower chamber body;

an upper liner disposed within the upper chamber body and on top of the lower liner;

a liner door configured to open and close an opening disposed through the upper liner and the upper chamber body,

wherein each of the lower liner, the upper liner, and the liner door further comprises a spray-coated yttrium zirconium oxide layer disposed thereon; and

wherein each spray-coated yttrium zirconium oxide layer further comprises a Y_2O_3-ZrO_2 solid solution;

a chamber lid disposed on top of the upper chamber body;

a gas nozzle disposed through the chamber lid, wherein the gas nozzle comprises a bulk ceramic gas nozzle;

one or more nickel-plated copper or stainless-steel gaskets disposed between the lower chamber body and the upper chamber body, between the upper chamber body and the chamber lid, and between the lower chamber body and the substrate support pedestal; and

one or more fasteners disposed through a bottom portion of the substrate support pedestal, the lower chamber body, and the lower liner to secure the substrate support pedestal, the lower chamber body, and the lower liner together, wherein a bulk yttrium zirconium oxide ceramic fastener cover is disposed over a portion of each of the one or more fasteners disposed within the chamber body.

14. The apparatus of claim 13, wherein the thickness of each spray-coated yttrium zirconium oxide layer is 25 microns to 300 microns.

15. The apparatus of claim 13,

wherein the chamber lid further comprises an aluminum oxide lid body and a PVD-coated yttrium zirconium oxide layer disposed on the aluminum oxide lid body; and

wherein the PVD-coated yttrium zirconium oxide layer has a thickness of 0.5 microns to 10 microns.

16. The apparatus of claim 13, wherein each spray-coated yttrium zirconium oxide layer comprises a purified Y_2O_3-ZrO_2 coating having a combined concentration of Y_2O_3 and ZrO_2 of 99% or more.

17. The apparatus of claim 16, wherein the bulk ceramic gas nozzle is a yttrium zirconium oxide ceramic gas nozzle with a porosity of 0.2% or less.

18. The apparatus of claim 13, further comprising:

an electrostatic chuck disposed within the chamber body; and

a plasma screen ring disposed on top of the electrostatic chuck, wherein the plasma screen ring is a bulk yttrium zirconium oxide ceramic ring or an alumina ring coated with Y_2O_3-ZrO_2.

19. An apparatus for substrate processing comprising:

a chamber body having a lower chamber body and an upper chamber body;

a substrate support pedestal disposed within the chamber body;

a lower liner disposed within the lower chamber body;

an upper liner disposed within the upper chamber body and on top of the lower liner;

a liner door configured to open and close an opening disposed through the upper liner and the upper chamber body, wherein each of the lower liner, the upper liner, and the liner door further comprises a spray-coated yttrium zirconium oxide layer disposed thereon;

a chamber lid disposed on top of the upper chamber body;

a gas nozzle disposed through the chamber lid, wherein the gas nozzle further comprises a bulk ceramic gas nozzle;

an induction coil disposed above the chamber lid;

a shielding electrode disposed between the induction coil and the chamber lid; and

one or more fasteners disposed through a bottom portion of the substrate support pedestal, the lower chamber body, and the lower liner to secure the substrate support pedestal, the lower chamber body, and the lower liner together,

wherein a bulk yttrium zirconium oxide ceramic fastener cover is disposed over a portion of each of the one or more fasteners disposed within the chamber body;

wherein the thickness of each spray-coated yttrium zirconium oxide layer is 25 microns to 300 microns; and

wherein each spray-coated yttrium zirconium oxide layer comprises a purified Y_2O_3-ZrO_2 coating having a combined concentration of Y_2O_3 and ZrO_2 of 99% or more.

20. The apparatus of claim 19, wherein the chamber lid further comprises an aluminum oxide body and a PVD-coated yttrium zirconium oxide coating disposed on the aluminum oxide body.