Claims:

1. A plasma processing system for processing at least a substrate, the plasma processing, system comprising:

a plasma processing chamber including at least a chamber wall;

an electrode disposed inside the plasma processing chamber and configured to support the substrate;

a support member disposed inside the plasma processing chamber and configured to support the electrode;

a support plate disposed outside the chamber wall;

a cantilever disposed through the chamber wall and configured to couple the support member with the support plate;

a lift plate disposed between the chamber wall and the support plate;

one or more thermally resistive coupling mechanisms configured to mechanically couple the lift plate with the support plate;

a thermally resistive polygon pin, a first end of the thermally resistive polygon pin configured to be inserted into a round hole of the support plate; and

a thermally resistive member configured to be inserted into the lift plate, a surface of the thermally resistive member configured to contact a second end of the thermally resistive polygon pin.

2. The plasma processing system of claim 1 wherein at least one of the thermally resistive polygon pin and the thermally resistive member is configured to determine a gap between the support plate and the lift plate.

3. The plasma processing system of claim 1 wherein the thermally resistive polygon pin represents at least one of a square pin and a hex pin.

4. The plasma processing system of claim 1 wherein the thermally resistive polygon pin represents a stainless steel pin, and the thermally resistive member represents a stainless steel insert.

5. The plasma processing system of claim 1 wherein the thermally resistive polygon pin and the thermally resistive member are configured to prevent direct contact between the support plate and lift plate and configured to smooth relative movement between the support plate and lift plate.

6. The plasma processing system of claim 1 further comprising:

wherein at least one of the thermally resistive polygon pin and the thermally resistive member is configured to configure a gap between the support plate and the lift plate.

7. The plasma processing system of claim 1 wherein the one or more thermally resistive coupling mechanisms include one or more thermally insulative coupling mechanisms.

8. The plasma processing system of claim 1 wherein the one or more thermally resistive coupling mechanisms include one or more coupling mechanisms made of stainless steel.

9. The plasma processing system of claim 1 wherein the one or more thermally resistive coupling mechanisms include at least a thermally resistive pivot mechanism, the thermally resistive pivot mechanism configured to facilitate the support plate to rotate with respect to the chamber wall.

10. The plasma processing system of claim 1 further comprising a fan configured to blow air toward the support plate, wherein the support plate is disposed between the chamber wall and the fan.

11. The plasma processing system of claim 10 wherein the support plate includes a plurality of ridges disposed facing the fan and configured to maximize a surface area of the support plate.

12. The plasma processing system of claim 1 further comprising one or more bearings coupled with the lift plate and coupled with the chamber wall, the one or more bearings configured to guide at least translation of at least a portion of the support plate.

13. The plasma processing system of claim 1 further comprising:
an insulative ring disposed between the support member and the electrode;
a first o-ring disposed between the insulative ring and the electrode; and
a second o-ring disposed between the insulative ring and the support member.

14. The plasma processing system of claim 13 wherein an outer diameter of the first o-ring is minimized, to maximize a vacuum interface between the insulative ring and the electrode.

15. The plasma processing system of claim 13 wherein an outer diameter of the second o-ring is minimized to maximize a vacuum interface between the insulative ring and the support member.

16. A plasma processing, system for processing at least a substrate, the plasma processing system comprising:
a plasma processing chamber including at least as chamber wall;
an electrode disposed inside the plasma processing chamber and configured to support the substrate;
a support member disposed inside the plasma processing chamber and configured to support the electrode;

a support plate;

a lift plate disposed between the chamber wall and the support plate, the support plate being disposed outside the chamber wall and pivotally connected thereto for allowing rotation of the support plate relative to the lift plate and the chamber wall;

a cantilever disposed through the chamber wall and configured to couple the support member with the support plate;

one or more thermally resistive coupling mechanisms configured to mechanically couple the lift plate with the support plate and for providing thermal isolation between the lift plate and support plate;

a thermally resistive polygon pin, a first end of the thermally resistive polygon pin configured to be inserted into a round hole of the support plate; and

a thermally resistive member configured to be inserted into the lift plate, a surface of the thermally resistive member configured to contact a second end of the thermally resistive polygon pin.

CLAIMS

What is claimed is:

1. A plasma processing system for processing at least a substrate, the plasma processing system comprising:

a plasma processing chamber including at least a chamber wall;

an electrode disposed inside the plasma processing chamber and configured to support the substrate;

a support member disposed inside the plasma processing chamber and configured to support the electrode;

a support plate disposed outside the chamber wall;

a cantilever disposed through the chamber wall and configured to couple the support member with the support plate;

a lift plate disposed between the chamber wall and the support plate; and

one or more thermally resistive coupling mechanisms configured to mechanically couple the lift plate with the support plate.

2. The plasma processing system of claim 1 further comprising:

a thermally resistive polygon pin, a first end of the thermally resistive polygon pin configured to be inserted into a round hole of the support plate; and

a thermally resistive member configured to be inserted into the lift plate, a surface of the thermally resistive member configured to contact a second end of the thermally resistive polygon pin.

3. The plasma processing system of claim 2 wherein at least one of the thermally resistive polygon pin and the thermally resistive member is configured to determine a gap between the support plate and the lift plate.

4. The plasma processing system of claim 2 wherein the thermally resistive polygon pin represents at least one of a square pin and a hex pin.

5. The plasma processing system of claim 2 wherein the thermally resistive polygon pin represents a stainless steel pin, and the thermally resistive member represents a stainless steel insert.

6. The plasma processing system of claim 2 wherein the thermally resistive polygon pin and the thermally resistive member are configured to prevent direct contact between the support plate

and lift plate and configured to smooth relative movement between the support plate and lift plate.

7. The plasma processing system of claim 1 further comprising:

a thermally resistive polygon pin, a first end of the thermally resistive polygon pin configured to be inserted into a round hole of the lift plate; and

a thermally resistive member configured to be inserted into the support plate, a surface of the thermally resistive member configured to contact a second end of the thermally resistive polygon pin,

wherein at least one of the thermally resistive polygon pin and the thermally resistive member is configured to configure a gap between the support plate and the lift plate.

8. The plasma processing system of claim 1 wherein the one or more thermally resistive coupling mechanisms include one or more thermally insulative coupling mechanisms.

9. The plasma processing system of claim 1 wherein the one or more thermally resistive coupling mechanisms include one or more coupling mechanisms made of stainless steel.

10. The plasma processing system of claim 1 wherein the one or more thermally resistive coupling mechanisms include at least a thermally resistive pivot mechanism, the thermally resistive pivot mechanism configured to facilitate the support plate to rotate with respect to the chamber wall.

11. The plasma processing system of claim 1 further comprising a fan configured to blow air toward the support plate, wherein the support plate is disposed between the chamber wall and the fan.

12. The plasma processing system of claim 11 wherein the support plate includes a plurality of ridges disposed facing the fan and configured to maximize a surface area of the support plate.

13. The plasma processing system of claim 1 further comprising one or more bearings coupled with the lift plate and coupled with the chamber wall, the one or more bearings configured to guide at least translation of at least a portion of the support plate.

14. The plasma processing system of claim 1 further comprising:

an insulative ring disposed between the support member and the electrode;

a first o-ring disposed between the insulative ring and the electrode; and

a second o-ring disposed between the insulative ring and the support member.

15. The plasma processing system of claim 14 wherein an outer diameter of the first o-ring is minimized to maximize a vacuum interface between the insulative ring and the electrode.

16. The plasma processing system of claim 14 wherein an outer diameter of the second o-ring is minimized to maximize a vacuum interface between the insulative ring and the support member.

17. A plasma processing system for processing at least a substrate, the plasma processing system comprising:

a plasma processing chamber including at least a chamber wall;

an electrode disposed inside the plasma processing chamber and configured to support the substrate;

a support member disposed inside the plasma processing chamber and configured to support the electrode;

a support plate disposed outside the chamber wall;

a cantilever disposed through the chamber wall and configured to couple the support member with the support plate;

a lift plate disposed between the chamber wall and the support plate; and

one or more thermally resistive coupling mechanisms configured to mechanically couple the lift plate with the support plate,

wherein the one or more thermally resistive coupling mechanisms include at least

a thermally resistive bar configured to be disposed in a slot of the lift plate,

a thermally resistive tube configured to be coupled with the support plate, and

a thermally resistive screw configured to pass through the thermally resistive tube and configured to thread into the thermally resistive bar.

18. The plasma processing system of claim 17 wherein

the support plate includes at least a first thread, and

the thermally resistive tube includes at least a second thread, the second thread configured to engage the first thread, turning the thermally resistive tube configured to cause first translation of a portion of the support plate relative to the thermally resistive tube, the first translation of the portion of the support plate configured to cause first rotation of the support plate relative to the chamber wall, the first rotation of the support plate configured to cause first rotation of the electrode with respect to a first axis, the first axis orthogonal to an insertion direction of the substrate.

19. The plasma processing system of claim 18 further comprising:

an index implemented on the support plate for providing visual feedback concerning the first rotation of the first electrode; and

an indicator implemented on the thermally resistive tube for cooperating with the first index to indicate an amount of the first rotation of the first electrode.

20. The plasma processing system of claim 17 further comprising a thermally resistive washer coupled with the lift plate, configured to contact an end of the thermally resistive tube, configured to receive the thermally resistive screw, and configured to define a gap between the lift plate and the support plate.