

WHAT IS CLAIMED IS: CLAIMS

1. A plasma processing system, comprising:
a vacuum chamber defining a sidewall;
a vacuum seal coupling the sidewall of the vacuum chamber to a heat sink;
and
a thermally conductive bridge coupled between the sidewall and the heat sink;
wherein the thermally conductive bridge is positioned relative to the vacuum seal such that the thermally conductive bridge redirects a conductive heat path from a heat source to the heat sink so that the heat path bypasses the vacuum seal.
2. The plasma processing system of claim 1, wherein the bridge is flexible and conformable to the shape of the vacuum seal and vacuum chamber.
3. The plasma processing system of claim 2, wherein the bridge is elastic so that a contact to the heat source and to the heat sink can be made by compressing the bridge in at least one direction.
4. The plasma processing system of claim 3, wherein the bridge comprises a first component for making contact with the heat source and a second component for making contact with the heat sink.
5. The plasma processing system of claim 1, wherein the bridge comprises a heat conducting component and elastic component coupled to the heat conducting component.
6. The plasma processing system of claim 1, wherein the heat path conducts through at least a portion of the sidewall.
7. The plasma processing system of claim 1, wherein the thermally conductive bridge is positioned so that the heat path bypasses a portion of the sidewall abutting the vacuum seal.
8. The plasma processing system of claim 1, where the sidewall is mechanically connected to the top cap of the vacuum chamber by the vacuum seal and the bridge.
9. The plasma processing system of claim 1, wherein the heat sink is a top cap of the plasma chamber.
10. The plasma processing system of claim 1, wherein the heat sink is a top plate of a plasma processing chamber in communication with the vacuum chamber.
11. The plasma processing system of claim 1, wherein the sidewall comprises a quartz material.
12. The plasma processing system of claim 1, wherein the plasma processing system comprises a plasma screen proximate to the vacuum seal.

~~12~~13. The plasma processing system of claim 1, wherein the plasma processing system comprises an inductive coil located about the sidewall of the plasma chamber.

~~13~~14. The plasma processing system of claim ~~12~~13, wherein the bridge is located between the inductive coil and the vacuum seal.

~~14~~15. The plasma processing system of claim 1, wherein the bridge is separated from the vacuum seal by a washer.

~~15~~16. The plasma processing system of claim 1, wherein the bridge is made of metal or graphite foam.

~~16~~17. The plasma processing system of claim 1, wherein the bridge comprises a heat conducting component and a flexible component coupled to the heat conducting component.

~~17~~18. The plasma processing system of claim 1, wherein the bridge comprises a spiral gasket.

~~18~~19. The plasma processing system of claim 1, wherein the bridge comprises a metal sleeve with an O-ring disposed inside the metal sleeve.

~~19~~20. The plasma processing system of claim 1, wherein the bridge comprises a spring loaded C-clamp.

~~20~~21. The plasma processing system of claim 20, wherein the spring loaded C-clamp has a plurality of cuts.

~~21~~22. A plasma processing system, comprising:
a vacuum chamber comprising a sidewall;
an inductive coil wrapped around at least a portion of the sidewall;
a top cap coupled to the sidewall via a first vacuum seal;
a first thermally conductive bridge coupled between the sidewall and the top cap;

wherein the thermally conductive bridge is located between the inductive coil and the first vacuum seal such that the thermally conductive bridge redirects a heat path from the portion of the sidewall adjacent to the inductive coil to the top cap so that the heat path bypasses the first vacuum seal.

~~22~~23. The plasma processing system of claim 22, wherein the sidewall of the vacuum chamber is coupled to a top plate of a plasma processing chamber via a second vacuum seal.

~~23~~24. The plasma processing system of claim 23, wherein the system further comprises a second thermally conductive bridge coupled between the sidewall and the top plate of the plasma processing chamber, wherein the second thermally conductive bridge is

located between the inductive coil and the second vacuum seal such that the thermally conductive bridge redirects a heat path from the portion of the sidewall adjacent to the inductive coil so that the heat path bypasses the second vacuum seal.

| 2425. A method of protecting a seal from overheating in a plasma processing system, comprising:

 coupling a sidewall of the plasma processing system to a heat sink using a vacuum seal; and

 separating the vacuum seal from a heat source with a thermally conductive bridge that redirects a conductive heat path from the heat source to the heat sink such that the heat path bypasses the vacuum seal.