

Claims:

1. A substrate support, comprising:
 - a body having a support surface;
 - an RF electrode disposed in the body proximate the support surface to receive RF current from an RF source;
 - a shaft to support the body;
 - a conductive element having an interior volume and extending through the shaft, wherein the conductive element is coupled to the RF electrode, and wherein the conductive element includes a protrusion extending into the interior volume;
 - an RF pin coupled to the RF electrode at a first end and to the protrusion at a second end opposite the first end; and
 - an RF gasket, wherein the conductive element includes features that engage the RF gasket to return the RF current to ground.
2. The substrate support of claim 1, further comprising:
 - a heat transfer body to transfer heat to or from the substrate support;
 - an adapter portion coupled between the shaft and the heat transfer body, wherein the RF gasket is disposed between the adapter portion and the conductive element;
 - a heater disposed in the substrate support proximate the support surface to provide heat to a substrate when disposed on the support surface, the heater having one or more conductive lines to provide power to the heater; and
 - a thermocouple disposed in the substrate support to measure a temperature of a substrate when disposed on the support surface.
3. The substrate support of claim 2, wherein one or more conductive lines and the thermocouple are disposed in the interior volume of the conductive element.
4. The substrate support of claim 2, further comprising:

an annular biasable element surrounding the adapter portion, wherein the annular biasable element contacts the adapter portion when the substrate support is in a processing position, wherein the annular biasable element is spaced apart from the adapter portion when the substrate support is not in the processing position, and wherein the annular biasable element is coupled to a floor of a process chamber in which the substrate support is disposed.

5. The substrate support of claim 4, wherein the annular biasable element comprises copper beryllium or nickel beryllium.

6. The substrate support of claim 1, wherein the conductive element has an electric field of about zero in the interior volume when RF current is flowed through the conductive element.

7. The substrate support of claim 1, wherein the conductive element is cylindrical.

8. The substrate support of claim 7, wherein the conductive element is formed from sheet metal.

9. A substrate processing system, comprising:
a process chamber enclosing a processing volume;
a substrate support disposed in the processing volume, the substrate support comprising:

a body having a support surface;

an RF electrode disposed in the body proximate the support surface to receive RF current from an RF source;

a shaft to support the body;

a conductive element having an interior volume and extending through the shaft, wherein the conductive element is coupled to the RF electrode; and

an RF gasket, wherein the conductive element includes features that engage the RF gasket to return the RF current to ground; and

an annular biasable element coupled to a floor of the process chamber, wherein the annular biasable element electrically couples the substrate support to the process chamber when the substrate support is in a processing position, and wherein the annular biasable element is spaced apart from the substrate support when the substrate support is not in the processing position.

10. The substrate processing system of claim 9, wherein the substrate support further comprises:

a heat transfer body to transfer heat to or from the substrate support;

an adapter portion coupled between the shaft and the heat transfer body, wherein the RF gasket is disposed between the adapter portion and the conductive element;

a heater disposed in the substrate support proximate the support surface to provide heat to a substrate when disposed on the support surface, the heater having one or more conductive lines to provide power to the heater; and

a thermocouple disposed in the substrate support to measure a temperature of a substrate when disposed on the support surface.

11. The substrate processing system of claim 10, wherein one or more conductive lines and the thermocouple are disposed in the interior volume of the conductive element.

12. The substrate processing system of claim 10, wherein the annular biasable element surrounds the adapter portion, and wherein the annular biasable element contacts the adapter portion when the substrate support is in a processing position and is spaced apart from the adapter portion when the substrate support is not in the processing position.

13. The substrate processing system of claim 9, wherein the annular biasable element comprises copper beryllium or nickel beryllium.

14. The substrate processing system of claim 9, wherein the conductive element has an electric field of about zero in the interior volume when RF current is flowed through the conductive element.

15. The substrate processing system of claim 9, wherein the conductive element includes a protrusion extending into the interior volume.

16. The substrate processing system of claim 15, wherein the substrate support further comprises:

an RF pin coupled to the RF electrode at a first end and to the protrusion at a second end opposite the first end.

17. The substrate processing system of claim 9, wherein the conductive element is cylindrical and formed from sheet metal.

18. A substrate support, comprising:

a body having a support surface;

an RF electrode disposed in the body proximate the support surface to receive RF current from an RF source;

a shaft to support the body;

a conductive element having an interior volume and extending through the shaft, wherein the conductive element is coupled to the RF electrode; and

an RF gasket, wherein the conductive element includes features that engage the RF gasket to return the RF current to ground;

a heat transfer body to transfer heat to or from the substrate support;

an adapter portion coupled between the shaft and the heat transfer body, wherein the RF gasket is disposed between the adapter portion and the conductive element;

a heater disposed in the substrate support proximate the support surface to provide heat to a substrate when disposed on the support surface, the heater having

one or more conductive lines disposed in the interior volume of the conductive element to provide power to the heater;

a thermocouple disposed in the interior volume of the conductive element to measure a temperature of a substrate when disposed on the support surface; and

an annular biasable element surrounding the adapter portion, wherein the annular biasable element contacts the adapter portion when the substrate support is in a processing position, wherein the annular biasable element is spaced apart from the adapter portion when the substrate support is not in the processing position, and wherein the annular biasable element is coupled to a floor of a process chamber in which the substrate support is disposed.