CLAIMS

What is claimed is:

1. A thermal conductivity pressure gauge comprising:

a sensor resistor;

a sensor chamber having a chamber wall spaced from the sensor resistor;

a heater configured to heat the chamber wall; and

electronics configured to, during a process, apply power to the sensor resistor and determine pressure of gas in the sensor chamber based on ~~the~~a relationship between resistance of the sensor resistor and applied power~~,~~ and ~~to~~ apply power to the heater to heat the chamber wall to control temperature difference between the sensor resistor and the chamber wall~~.~~, the electronics being further configured to, between process runs, elevate temperature of the chamber wall to dry the chamber wall.

~~2. A method of thermal conductivity pressure measurement comprising:~~

~~providing a sensor resistor within a chamber having a chamber wall spaced from the sensor resistor;~~

~~heating the chamber wall to control temperature difference between the sensor resistor and the chamber wall; and~~

~~applying power to the sensor resistor and determining pressure of gas in the chamber based on the relationship between resistance of the sensor resistor and applied power.~~

~~3~~2. The pressure gauge of claim 1 ~~or method of claim 2~~ wherein power, during the process, is applied to the sensor resistor to maintain a constant temperature Ts and power is applied to the heater to maintain a constant chamber wall temperature Tw.

~~4~~3. The pressure gauge ~~or method~~ of ~~any preceding~~ claim 2 wherein Ts is greater than Tw.

~~5~~4. The pressure gauge ~~or method~~ of ~~any preceding~~ claim 2 wherein the temperature Ts is controllable to different constant temperatures.

~~6~~5. The pressure gauge ~~or method~~ of ~~any preceding~~ claim 2 wherein the wall temperature Tw is controllable to different constant temperatures.

~~7~~6. The pressure gauge ~~or method~~ of ~~any preceding~~ claim 1 wherein the heater is positioned within insulation surrounding the chamber wall.

~~8~~7. The pressure gauge ~~or method~~ of ~~any preceding~~ claim 1 wherein the heater is a ribbon heater adhered to an inside surface of insulation surrounding the chamber.

~~9~~8. The pressure gauge ~~or method~~ of ~~any preceding~~ claim 1 wherein the ~~heater is coupled to electronics that apply power to the heater, and the~~ chamber wall and sensor resistor are removable from an assembly of the heater and the electronics and are inserted into the heater as sensor leads are plugged into the electronics to make electrical connection between the sensor resistor and the electronics.

9. ~~10.~~ The pressure gauge ~~or method~~ of ~~any preceding~~ claim 1 wherein, during the process, the chamber wall temperature is in the range of 45°-110° C.

~~11.~~ 10. The pressure gauge ~~or method~~ of ~~any preceding~~ claim 1 wherein, during the ~~chamber wall temperature is greater than~~process, the sensor resistor temperature is greater than the chamber wall temperature by an amount within the range of 30°-110° C.

~~12~~11. The pressure gauge ~~or method~~ of ~~any preceding~~ claim 1 wherein the sensor resistor is a sensor wire.

~~13~~12. The pressure gauge ~~or method~~ of ~~any preceding~~ claim 1 wherein the sensor resistor is a resistor on a surface of a chip within a cavity and the chamber wall forms an opposite wall of the cavity.

13. ~~14.~~ The pressure gauge ~~or method~~ of ~~any preceding~~ claim 1 wherein the electronics are configured to heat the heater to a temperature that cleans the heater wall.

14. The pressure gauge of claim 1 further comprising a baffle across an opening in the chamber wall to a process chamber, the baffle being thermally connected to the chamber wall and configured to block contaminants and radiation from the chamber.

15. A method of thermal conductivity pressure measurement using a sensor resistor within a chamber having a chamber wall spaced from the sensor resistor; the method comprising:

heating the chamber wall to control temperature difference between the sensor resistor and the chamber wall; and

during a process, applying power to the sensor resistor and determining pressure of gas in the chamber based on the relationship between resistance of the sensor resistor and applied power, and

between process runs, elevating temperature of the chamber wall to dry the chamber wall.

16. The method of claim 15 wherein, during the process, power is applied to the sensor resistor to maintain a constant temperature Ts and power is applied to the heater to maintain a constant chamber wall temperature Tw.

17. The method of claim 16 wherein Ts is greater than Tw.

18. The method of claim 16 wherein the temperature Ts is controllable to different constant temperatures.

19. The method of claim 16 wherein the wall temperature Tw is controllable to different constant temperatures.

20. The method of claim 15 wherein the heater is positioned within insulation surrounding the chamber wall.

21. The method of claim 15 wherein the heater is a ribbon heater adhered to an inside surface of insulation surrounding the chamber.

22. The method of claim 15 wherein the chamber wall and sensor resistor are removable from an assembly of the heater and electronics and are inserted into the heater as sensor leads are plugged into the electronics to make electrical connection between the sensor resistor and the electronics.

23. The method of claim 15 wherein, during the process, the chamber wall temperature is in the range of 45°-110° C.

24. The method of claim 15 wherein, during the process, the sensor resistor temperature is greater than the chamber wall temperature by an amount within the range of 30°-110° C.

25. The method of claim 15 wherein the sensor resistor is a sensor wire.

26. The method of claim 15 wherein the sensor resistor is a resistor on a surface of a chip within a cavity and the chamber wall forms an opposite wall of the cavity.

27. The method of claim 15 wherein the electronics are configured to heat the heater to a temperature that cleans the heater wall.

~~15~~28. The ~~pressure gauge or~~ method of ~~any preceding~~ claim ~~wherein the electronics are configured to heat the heater to a temperature that dries the heater wall.~~

~~15. The pressure gauge or method of any preceding claim~~ further comprising blocking contaminants and radiation from the chamber with a baffle across an opening in the chamber wall to a process chamber, the baffle being thermally connected to the chamber wall.

29. A thermal conductivity pressure gauge comprising:

a sensor resistor;

a sensor chamber having a chamber wall spaced from the sensor resistor;

a heater configured to heat the chamber wall;

a baffle across an opening in the chamber wall, the baffle being thermally connected to the chamber wall and configured to block contaminants and radiation from the chamber; and

electronics configured to apply power to the sensor resistor and determine pressure of gas in the sensor chamber based on the relationship between resistance of the sensor resistor and applied power, and to apply power to the heater to heat the chamber wall to control temperature difference between the sensor resistor and the chamber wall.

30. The thermal conductivity pressure gauge of claim 29 wherein the baffle is conical and pointed toward the interior of the chamber.

31. A method of thermal conductivity pressure measurement using a sensor resistor within a chamber having a chamber wall spaced from the sensor resistor; the method comprising:

heating the chamber wall to control temperature difference between the sensor resistor and the chamber wall;

blocking contaminants and radiation from the chamber with a baffle across an opening in the chamber wall, the baffle being thermally connected to the chamber wall; and

applying power to the sensor resistor and determining pressure of gas in the chamber based on the relationship between resistance of the sensor resistor and applied power.

32. The method of claim 31 wherein the baffle is conical and pointed toward the interior of the chamber.

33. A thermal conductivity pressure gauge comprising:

a sensor resistor;

a sensor chamber having a chamber wall spaced from the sensor resistor;

a heater configured to heat the chamber wall; and

electronics configured to apply power to the sensor resistor and determine pressure of gas in the sensor chamber based on the relationship between resistance of the sensor resistor and applied power, and to apply power to the heater to heat the chamber wall to control temperature difference between the sensor resistor and the chamber wall;

wherein the chamber wall and sensor resistor are removable from an assembly of the heater and electronics and are inserted into the heater as sensor leads are plugged into the electronics to make electrical connection between the sensor resistor and the electronics.

34. A method of thermal conductivity pressure measurement using a sensor resistor within a chamber having a chamber wall spaced from the sensor resistor; the method comprising:

inserting the sensor resistor and chamber wall into a heater as sensor leads are plugged into electronics;

heating the chamber wall with the heater to control temperature difference between the sensor resistor and the chamber wall; and

with the electronics, applying power to the sensor resistor and determining pressure of gas in the chamber based on the relationship between resistance of the sensor resistor and applied power.